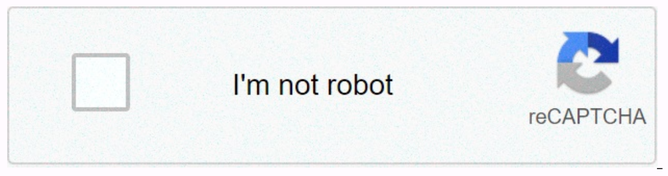

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High road vs low road of emotions

In very rough general terms, emotions are appreciated along two roads: the low road and the high road. The low road is a very direct and evolutionary emotional pathway designed to protect people from life-threatening danger, and is designed to provoke defensive responses without conscious thought. In this example, a snake's visual input is obtained by a tless, projected amygdala, which sends its signals directly to areas of the brain responsible for creating self-defense behavior. The high road involves an indirect route to the Amygdala. In this case thalamic information is transmitted to the sensory cortex where it is further processed and evaluated to a threat level before being sent to the amygdala. If who we are is shaped by what we remember, and if memory is a function of the brain, then synapses - the interfaces through which neurons communicate with each other and the physical structures in which memories are encoded - are the basic units of the self. That was the message of a call given at the APA's 2002 annual conference by NYU psychologist and neuroscience Joseph LeDoux, PhD. Synapses are pretty low on the totem pole of how the brain is organized, but I think they're pretty important, LeDoux said. The self, he suggested, is the sum of the brain's individual subsystes, each with its own form of memory, along with the complex interactions between subsyst sets. Without synaptic plasticity - the ability of synapses to change the ease with which they transmit signals from one subscription to another - the changes in systems required for learning would be impossible. LeDoux's research focused on a network of brain regions responsible for identifying threatening stimuli and responding to them. At the center of the grid is the amygdala, the cluster of almond-shaped neurons near the base of the brain, which stores memories of scary stimuli and triggers fear responses. Studies have shown that there are two pathways through which the fear responses of the amygdala can be activated: a lower way faster than the thyme to the amygdala, and a slower high road that passes from the tless to the neo-vertex and only then to the amygdala, Ledoux said. The two lanes don't always reach the same conclusions, he explained. The relatively raw low road may react to a long, thin object as a dangerous snake - triggering an immediate fear response - while the slower high road states that the object is a harmless stick. Evolutionarily, it may make sense for fast trackers to wed on the side of caution, LeDoux said; After all, it's better to treat a stick like a snake than a snake as a stick. But the disconnect between low and high roads, first discovered in rats but since verified in humans, could also be responsible for some We know a lot of people have fears that they can't get to conditions they're aware of, Ledoux said. People who have pathological fears can treat sticks like snakes all the time, metaphorically speaking. One of the biggest challenges in neuroscience, LeDoux said, is finding out how individual systems like the Fear Network are linked to other systems, and how all brain systems together create the collection of behaviors we call self. Although we know of a number of factors that can bind the brain subsysciences together - including joint inputs, neural convergence zones, and the scattered effects of neurotransmitters like Serotonin - the details remain a mystery, LeDoux said. The insights we gain from researching the brain could give us new ways to think about psychology, he added. For example, studies on the neural fermentations of emotion and cognition have shown that the amygdala sends predictions to almost every part of the brain, including areas responsible for high-level cognition, but the number of predictions back to the amygdala from cognitive areas is small. This insight may help explain why emotion can sometimes prevail over cognition. Emotional systems tend to take over brain resources, Ledoux said. It's much easier to feel and control thought than it is to control emotion. Shashank Ghai,1 Yashan Ghai,2 Alfred O Effenberg1 1Institute of Sports Sciences, Leibniz University Hanover, Hanover, 2The School of Life Sciences, Jacobs University, Bremen, Germany Abstract: Fear can spread parallel through both cortic pathways and series. This can benefit memory consolidation regularly and may allow internal simulation of movements regardless of cortic structures. This perspective offers a delivery of subliminal, aversive and audiovisual kinematic stimuli through neuroprasis in patients with neocortical dysfunction. We suggest possible scenarios where these stimuli could bypass damaged neo-calipate structures and possibly help re-learn the engines. Expected neurophysiological mechanisms and methodological scenarios were discussed in this perspective. This approach introduces innovative perspectives into neuropsychology as to how subcortical pathways may be used to induce engine releveling. Keywords: motor learning, fear perception, internal simulation, sonification, cortical function and the structural organization background of a human brain is like a fungus growing from the inside out, suggesting the ancient prevalence of the innermost sub-cortical structures such as the brain stem, amygdala and superficial neo-cortical structure such as the prefrontal cortex. Evolution has given different functional roles in these neural centers based on their development; For example, the innermost structures typically mediate basic survival functions, such as breathing and fear (threat) processing, whereas Buildings manage sophisticated abilities such as decision-making and self-control, and more.1 Being a basic survival function, Fear mediates primarily within the innermost, suborthorsoristic structures of the brain.1-3 However, due to the evolutionary course, neocortical structures have also formed parallel connections to fear processing, perhaps to allow for more context-oriented cognitive processing of the stimuli.3-5 LeDoux4 labeled such parallel processing of fear by low road processing and cortical pathways as high road processing. However, these routes operate under clear conditions. On the one hand, the low road routes process stimuli quickly and dirtyly using sub-captic pathways, and independently of consciousness.6,7 This route prioritizes physical safety and acts as a fail-safe while ignoring any social or environmental context. On the other hand, high road routes enable slower cognitive processing of resource-dependent stimuli through higher cortical structures and prioritize contextual information related to social, psychological and environmental factors. For example, the pause of longer distribution has been reported when fear processing occurs using higher cortical structures, possibly offering costs for higher-level processing,8 while processing with lower road paths has been reported to be much shorter, meaning that as low as 30-120 ms.9 neuroanatomous studies show that processing of stimuli using a low road allows for the spread of fear stimuli in the amygdala by way of superior colliculi nucleus. 4,10 short orbit, while on the high road route, for visual information, the stimuli will move from the ganglion cells of the retina to the transverse giniculate nucleus, the visual cortex (V1, V2, and V4) and the second temporal cortex, and then end up in the amygdala. Under the threat conditions, bridging stimuli first to a low road path is fenced by an amygdala,8 for visual streams 11,12 and auditory.13,14 This may be due to its high sensitivity to process low spatial frequency information,15,16 thus initiating action even stimulating close enough.6 For example, For instance, Carter and Frith5 suggested that parallel processing on high and errand roads17 allows for a bridging balance between the cerebral cortex and the amygdala by allowing contextual and fail-safe responses to the threat Respectively. A number of corter and syringeal structures take part in processing fear-related stimuli. For example, hypothalamus, amygdala, superior sonic, lateral giniculate nucleus, talamus (polvinar nucleus), locus coarlus and priacocdoctal gray are the main hypothaneous structures involved in fear mediation,10,18 while (lateral-tertiary) prefrontal, orbital, visual, cortex, fruttic, ants The cerebral cortex and hippocampus and bilateral anterior cortex are the main cortical structures.8,18 Furthermore, the functioning of low road sub-cortical pathways is suggested to be independent of higher cortical processing. For instance, tensor diffusion imaging demonstrated predictions between superior vocal and amygdala through pulvinar.19 moreover, Maurice et al20 in their neural imaging study reported a perception of aversive visual stimuli in a patient with effective blind vision (extensively touched in the thy head cortex).21,22 Additionally, low road routes that have special connections with the brain's motor control centers, regardless of cortical control, primarily initiate fight or flight response to threat. Grezes et al23 using magnetic resonance imaging tensor diffusion and probabilistic tractography demonstrated connectivity of amygdala to decreasing cortico-spine, windy and medial precenter, engine cingulate, primary motor cortesias and postcenter gyros. Gokdemir et al24 further reported increasing fear of both cortico-spinal and reticulus-spinal pathways in humans, post-auditory and visual fear merging. Furthermore, the strong role of these primitive subcortical pathways was also reported for perception of biological motion.25,26 Furl et al27 in fMRI analysis revealed improved fear sensitivity in back areas and motion sensitive time corresponding to excellent temporary sulcus, hMT +/V5, inferior frontal warp, fusiform cortex (intra-region fusiform) and action observation system.28 The authors added that the amygdala may also control coding and prediction of aversive incidence based on the elements of stimuli. Furthermore, Bastiaansen et al29 added that such connections of amygdala with these motor centers may be beneficial in activating a reflection of emotions. Also, this suborthority (especially amygdala2) mediates a unique learning and memory mechanism. This mechanism was reported to play a key role in predicting threat-based events before recognition of sensory stimuli.2,30 Here, amygdala was also reported to facilitate learning quickly,31 normal1,31-34 and flexibly.35 Perhaps, By regulating the activity and connectivity of the prefrontal cortex,36,37 Schwabe et al38 suggested that stress caused by a threat could selectively gate memory consolidation in favor of normal talamus-dependent learning2,, 39 compared to the hippocampus.33,35 Shiromani et al31 also confirmed that the changed power of synaptic signaling in the amygdala is the main reason for normal consolidation of memory. The authors noted that relatively weak conditional stimuli (activating post-infunctional N-methyl D-aspartation receptors) are strengthened by the occurrence of unconditional stimuli (which stimulate calcium current), thus triggering strong lateral reactions Furthermore, the independence of this special memorization system from cortic pathways and resilience in terms of long-term retention have also been reported (thalamo-amygdala pathways7). For example, Marne and Quirk2 reported amygdala-related memory plasticity during auditory conditioning of fear, even in the presence of large lesions in the auditory cortex.40 Nonetheless, despite extensive research confirming the low road pathway's unique ability to govern motor action, perception and memory consolidation independent of cortical structures, its possible role in improving prognosis in cases of neo-cortical dysfunction As mentioned earlier, neocortex, the external and final evolutionary development of the brain, accounts for ~76% of volume.41 Any superficial damage to these structures in cases of trauma and brain accidents may cause a wide range of cognitive42-44 and motor sensory function.45 Such damages together cause exhausting symptoms both on cognitive and motor areas, thus adversely affecting the prognosis of such patients. For example, damage to the prefrontal cortex (Disksipic syndrome46) can significantly impair conscious perception;47 self-control; a task for measuring alleged fluency; concept formation; Offset setting; impedance; organizing attention; abstract thinking; Innovative problem-solving capability; stimuli that provide the ability to make decisions; The ability to encode task-relevant information in working memory;48,49 ability to select, monitor, handle current task information44, and others. 50 Shumi-Kok and Walcott51 suggested that such deficits with attention, job memory allocation and short-term memory may greatly prognosis in rehabilitation protocol, where explicit instructions are primarily highlighted.52,53 In this study, we try to explain how these low road routes can be utilized to improve motor learning to aid rehabilitation independently of such high cortic function. Low Road Access: The novel strategy in this article, we try to suggest possible strategies that could be used to access subcakes and low-road paths of the brain to relieve or stimulate the damaged or sleepy structures of the brain and assist in rehabilitation. We propose to utilize mission-specific multimodal neuropsysis to subliminally provide sensory stimuli to improve motor perception and ease the engine relearing process.54 Real-time kinematic auditory feedback (sonification) and feedback Kinetic visual created in some of the extensive rehabilitation approaches that enable comprehensive and effective multi-sensory integration.55,56 Kinematic auditory feedback is a relatively new interdisciplinary approach which has been a relatively new interdisciplinary approach which already and demonstrating to improve motor perception, motor control and rehabilitation learning.57,58 This methodology utilizes the strong link between auditory perception and motor control,59-62 and is reported to operate neural centers related to biological motion perception.63,64 Also, sonification may provide valuable assistance in improving the movement perception of related motor patterns Further assistance in improving the representation and internal simulation of a motor task in the action observation system.65,66 Also, virtual reality is effective in rehabilitation.67 The environment designed in VR can be customized very similar to real-life settings68 and can have advantages in terms of stimulation transfer Kinematic visuals to increase brain function by improving motor perception,69 specifically related to biological motion perception.70 More pronunciation of auditory and visual stimuli can be used to induce a convincing sense of immersion even when exhausted Sensory moles are inconsistent and below the conscious level.69 Therefore , coupling the use of methodologies can provide opportunities to provide multi-modal multi-sensory information in kinematic terms, simultaneous auditory and visual information.58,64,65,71 These methodologies have been demonstrated to improve perception,64 Effective human behavior,68,72 motor learning,64 relearing64 and performance,73 thus enabling benefits during rehabilitation. Radiological evidence of Schmitz et al. 64 demonstrated the firm operation of a special mirror-neuron system and a human action observation system, precisely activating the cerebral cortex: superior temporary sulcus, the Broadman region 45, 6, and the undersulvalence that include a streeto-thalamo-frontal motor loop, that is, a cawd nucleus, a potman, and a thalmos. The authors further assessed that such activation of the observation system while listening to motor activity could lead to internal stimulation of perceived movement. Therefore, suggesting a nonprofit for an increase in mental, auditory and auditory imagery.55 Such multi-sensory sea exploitation for transmitting subliminal aversive stimuli may allow for multi-faceted benefits in the perceptual field, for example, providing kinematic stimuli associated with scary overtakings. Ostensibly, a wild environment can be created in which a distant predator or imminent danger leads the person to choose a flight response and escape the situation. Here, the patient can be subjected to a first person or a third person to see meaning that the patient perceives the threat to themselves or to a virtual avatar, respectively. This difference can be chosen based on cognitive and meta-cognitive function level. Furthermore, coupling the kinemeal audiovisual information for Overtakings and locomotives can cause similar changes in the patient's observation system and improve internal simulation associated with flight traffic. For example, Johansson74 suggested that higher cortical centers are not the main components for perception of underlying biological movement, and therefore, this approach may be effective in a state of cortical dysfunction. Furthermore, the stimuli may also be used to jump-start reflexive behavior. For example, Tamietto and de Gelder75 suggested a strong link between the motor realm and amygdala while processing scary stimuli to stimulate reflexive behavior. In this study, we propose once again to utilize this powerful network and take advantage of multi-sensory integration to address deficits in motor execution. For example, virtual reality can be used to create a specific environment in which a predator, such as a snake, tries to attack limbs, triggering a reflexive detox reflex. Sonification in such a strategy could be used to resent the reflexive action performed, for example, aversive auditory feedback could be on the elbow mimicking flexor detox reflex. Although due to motor restrictions these movements may not be physically activatable, simulating these motor movements may allow preventive guidance (forward feeding mode) essential for execution.76 Such internal representations should trigger internal representations of motor tasks and then assist in kinetic motor simulations for the perceived pattern of movement. Furthermore, guidance of neural pathways may also be stimulated as a neural pathway and rehabilitation perspective for motor execution and imagery, and actively performed movements that share similar neural circuits.77 Ietswaart et al78 suggested that improved brain plasticity because mental practice can play a very important role in recovery following brain damage. Exactly, imagining or practicing movements can trigger compensation and redistribution of brain activity, which can improve the recovery of motor functions (see Hebian Theory79). This is when by conventional passive movements and activity by a physiotherapist may provide additional benefits for releging and performance.80-82 Although stimuli are highly speculative, The frightening stimuli provided in biological movement may also incentivize memory consolidation of movement patterns in a normal way, which in rehabilitation and performance settings have been shown to be very beneficial.83-87 Furthermore, to avoid the perceptual implications beneficial in stimuli behavior can be subliminally delivered., according to reports , the perception of fear stimuli was maintained even when garage stimulation,88 with dichopathic stimulation,89 when the stimulation is shown in the 90s and peripheral vision.91,92 Visual activation of invisible stimuli can also be powerful, when invisibility is induced by neglect93 or inattention.94 Dehaene et al95 suggested a state of contrast between subliminal and preconscious processing, which can be an appropriate tool or application of audiovisual stimuli, namely, the masking of stimuli combined with inattention. The author implied that within conscious perception, a subject would be able to identify and identify the stimuli presented.8 On the contrary, The state of conscious perception implies that the subject has a relatively strong neural response to the presentation, but is still unconscious or will miss it due to lack of attention.95 Finally, we hypothesize that this methodological approach to achieving perceptual and educational benefits by two primary mechanisms, by activating reflexive mechanisms in patients and activating impervious or defective cortical pathways. Furthermore, this approach can be assigned with activities of everyday life, where certain activities can be combined with aversive sensory inputs. Together they hypothesize to improve biological movement perception, higher neural center activation, mental practice, cortic reorganization and regeneration and when combined with physiotherapy, they can lead to additional motor activity in terms of rehabilitation benefits. This perspective offers for the first time the exploitation of low road paths to ease higher neo-calipate structures in case of damage. This approach can also be applications for patients in minimally conscious situations where prognosis is particularly poor.96 These patients exhibit characteristics similar to higher order cortic function.97,98 Additionally, patients under minimally conscious conditions according to the classification by Giacino et al99 and Vincent98 demonstrate visual fixation for recovery, emotional and motor behavior. Producing reflexive motor actions through multi-sensory integration of aversive stimuli can enable the development of increased awareness and stimulate neural reorganization. Finally, the main purpose of this perspective is to stimulate scientific debate on the subject, and we strongly recommend future studies analyze this gap in literature. As a future prospect, we would like to suggest exploitation of aversive olfactory stimuli as a possible psyration in multi-sensory integration to improve fear perception. Studies have reported the effects of olfactory stimuli on the motor control of the human body.100-102 Sakamoto et al102 has estimated that olfaction can have improved stability and motor performance by activating the isolated cortex. Similarly, a multi-sensory integration pattern has been shown in studies evaluating domain103 and visuo-auditory.104 Nonetheless, the most important aspect of why we are interested in integrating Multi-sensory integration is its connection with the lymbic system. Bears and Gage1 suggested that the kind signals to the Amygdala come via four main routes. However, the information drawn from odor stimuli is directly perpetuated in the amygdala from the olfactory bark without pre-erring them in the thalmus, thus implying a profound ability of smell compared to other sensory stimuli on emotional consolidation of memories. Also, the findings of de Garot et al105 are also important when olfactory fear stimuli have been described as as powerful as audiovisual fear signals in fear-thinking. This can add considerably to the development of a comprehensive environment to provoke a fear response. Not only that, but a recent study by Jacobs et al106 also confirmed the presence of spatial coding information with high accuracy with olfaction in humans. These findings add considerably to the potential use of olfaction with motion perception and virtual reality where the spatial information about motor movements derived from sensory exhaustion is a key component.107 Nonetheless, the idea of utilizing olfaction as a possible measure of multisensory integration in motion perception is fairly new and never discussed in previously published literature. The latest developments in virtual reality by coupling olfactory inputs by Ubisoft could possibly ascertain future application. Gaming modulations such as the Nosulus Rift can accurately combine aversive odors and incorporate them into a simulated environment providing improved perception benefits. This has previously been described by Richard et al.108 In addition, we also offer utilization of modern neuroproteses such as smart skins to improve even inputs from skin culls to help multi-sensory integration, and re-learning.109 Summary In this article, we offer a possible methodological approach which utilizes low road fear paths in the rehabilitation of neurological disorders characterized by leading cortical damages primarily leading to executive function. Based on previous findings, this paper bridges the published empirical findings and suggests that perception of fear can occur without consciousness. The paper also proposes a methodological approach through multi-sensory integration methods, such as real-time kinematic auditory feedback, virtual reality for transmitting orearisal stimuli through audiovisual input, with no conscious awareness of improving biological movement perception, associated with the activity of everyday life to improve mental imagery, practice, readiness and possibly neural regeneration. Furthermore, we are also discussing possibly

triggering reflexive motor actions caused by aversive stimulation to improve engine relearing. This combined with physical rehabilitation can allow for additional benefits in terms of prognosis. It Perspective is designed to treat poor prognosis facing patients suffering from neocortical dysfunction. Recognition of this article was funded by Leibniz University's Open Access Foundations hanover. The authors thank Prof. Robert Isler and Professor Thomas Monte for their constructive comments and guidance. Author of donations Shashank Gahai perceptioned the perspective and wrote the article. Ishan Guy and Alfred O. Eppenberg provided helpful discussions and reviewed the paper. All authors have contributed to data analysis, drafting and critical correction of the paper and agree to account for all aspects of the work. The authors' disclosure reports that there are no conflicts of interest in this work. References 1.Baars BJ, Gage NM. 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