DESIGN!NG WITH DANCE | THE LINK BETWEEN ARCHITECTURE AND DANCE [by: ashley biren]

Neuromorphic architecture is created utilizing emergent choreography based on neurological theories of aesthetic experience.

research intent

To explore the effects of dance on the human cognition and physical state and apply it to create a neuromorphic architecture that benefits the user's wellbeing.

abstract

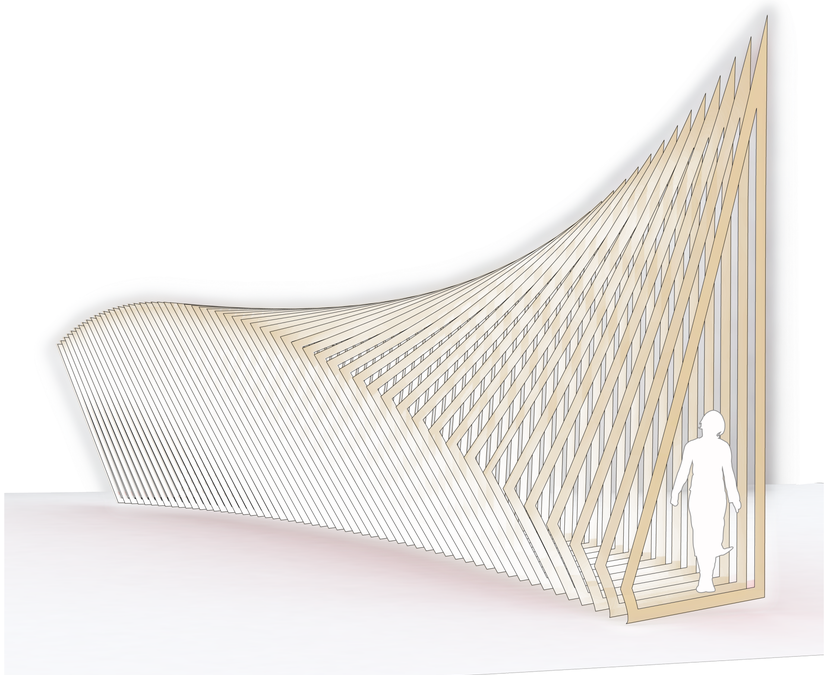
Architecture today is the death of change. Buildings are designed to remain static and unresponsive to the users' evolving mind and body. Spaces solely thrive on people for survival and wither without them. Dance is movement that engages both the mind and body of the viewers. For the audience, dance plays a role in impacting human cognition and physiological state. Similar to the natural environment, dance appears to operate independently but has the ability to influence its surroundings. Imagine a dance that is designed to perceive and react towards the emotional and physical state of the audience. Both the spectator and choreography would share a symbiotic relationship, and thus when one's mind or body changes the other changes in direct response. Now envision a building created by emergent choreography; a human response would perpetuate change in a building, and in return the building responds in kind.

The effects of dance on the human's cognition and physical state must be explored in order to generate a database for emergent choreography. Some of the most interesting research has already been executed on the neuroscience of dance, including the observation of dance by both novices and experts. Research has already proven that dance has a biological impact on the human heart and brain. For instance, complex structures and variations in choreography can generate a healthy variable pattern of the heart beat and stimulate the motor planning areas of the brain for viewers. Thus, the architect can design like a choreographer creating a dance, using these scientific results to stimulate the senses and induce a healthier mind and body. Based on the foregoing, understanding the physical and mental well-being of the users' in a space is essential in the architect's design. Architects must design spaces that allow for a mutual exchange of experience between the users and their surroundings. Through the discovery of human reactions towards space, the architect would have the potential to create an environment that would interact with the human on both a more physical and psychological level - neuromorphic architecture that can respond to human activity.

the experiment

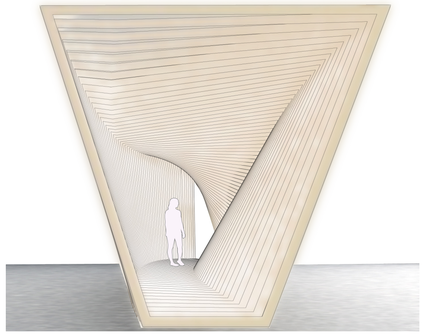
Artists consciously or unconsciously use a variety of methods that allow for the observer to discover the intended purpose of the artist's creation, or to simply allure one's attention. In order to carry a conversation between the audience and the composition, the work must attract its spectator and evolve accordingly to their reactions. In this experiment, neurological theories of aesthetic experiences were used to create emergent choreography that remains aesthetically pleasing to its audience regardless of habituation. Dance can compose infinite possibilities of movements and sequences thus consistently challenging the reaction of others. Emergent choreography creates an evolving dialogue between the dance and the audience; therefore establishing a symbiotic relationship between the two entities.

neuromorphic prototype of unpredictability



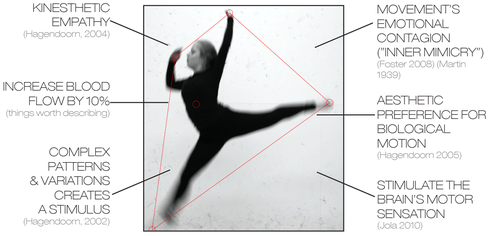
exterior perspective

interior perspective (view D)



interior perspective (view A)

why watching dance?



conclusion

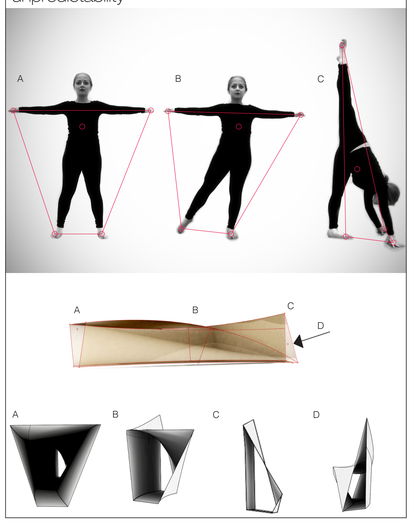
This experiment showcases how the aesthetic experiences of dance can be translated into a formal expression of architecture. From a visual standpoint, the defining appearance of the movements can be realized in the architecture's form. However, further investigation is required to understand the audience's reactions towards watching dance in relation to experiencing a prototype of neuromorphic space derived from movements. An observer's kinesthetic responses to both the built form and dance must be explored using a combination of first-person experiences and third-person neurophysiological evidence, similar to methods of analyzing the kinesthetic empathy in viewing dance.

references

The choreography was based on V.S. Ramachandran and William Hirstein's 'eight laws of artistic experience' (ambiguity, contrast, isolation and metaphor), Edward O. Wilson's biophilia hypothesis (patterns of nature) and perceptual anticipation of Ivar Hagendoorn's hypothesis on beauty and sublime resembling the aesthetic theory of Immanuel Kant (unpredictability).

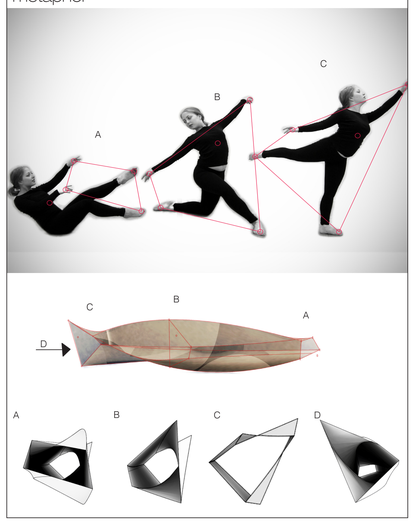
(All photos courtesy of Perry Low)
Foster, Susan Leigh. "Movement's contagion: the kinesthetic impact of performance." Cambridge Companion to Performance Studies. (2008): 46-59. Web. 3 Sep. 2012.
Hagendoorn, I.G. "Dance Perception and the Brain." Thinking in Four Dimensions. McKechnie, S. & Grove, R. (2005): 2. Web. 3 Sep. 2012. <http://www.ivarhagendoorn.com/files/articles/Hagendoorn-DP605.pdf>.
Hagendoorn, I.G. "Emergent Patterns in Dance Improvisation and Choreography." Proceedings of the International Conference on Complex Systems. (2002): n. page. Web. 3 Sep. 2012.
Hagendoorn , I.G. "Some Speculative Hypotheses about the Nature and Perception of Dance and Choreography." Journal of Consciousness Studies. 11.3-4 (2004): 79-110. Web. 3 Sep. 2012.
Hagendoorn, I.G. "The Dancing Brain." From Cerebrum: The Dana Forum on Brain Science. 5.2 (2003): 2-3. Web. 3 Sep. 2012.
Jola, Corinne. "Research and Choreography: Merging Dance and Cognitive Neuroscience." The Neurocognition of Dance. Mind, Movement and Motor Skills. Ed. B. Blaesing, Ed. M. Puttke and Ed. Th. Schack. New York: Psychology Press, 2010. 203-234. Print.
Martin, John. Introduction to the Dance. New York: Dance Horizons, 1939. Print.
"More than just lookin' pretty: Art exercises your brain all over ." things worth describing. Lindsey Anne, 20 08 2012. Web. Web. 3 Sep. 2012. <http://www.thingsworthdescribing.com/2012/08/more-than-just-lookin-pretty-art.html>.
Ramachandran, VS, and W Hirstein. "The science of art: A neurological theory." Journal of Consciousness Studies. 6. (1999): 15-35.
Sommerfeld, Julia. "Human brain gets a kick out of surprises." MSNBC n.d.. Health. Web. 3 Sep. 2012.
Sternberg, E. M. Healing spaces: The science of place and well-being. Cambridge, Massachusetts: The Belknap Press of Harvard University Press, 2009. 71-72. Print.

unpredictability



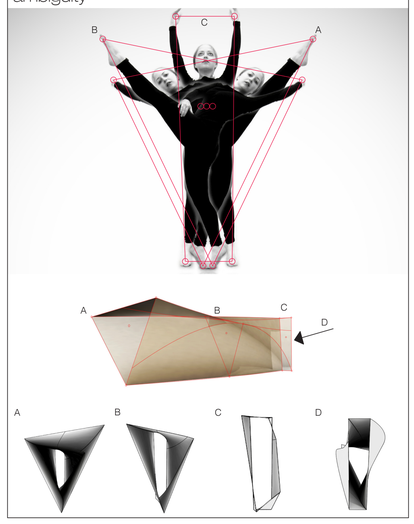
When watching dance, the brain attempts to foresee the next set of movements prior to the actual occurrence. However, if the brain fails to predict correctly, we are taken by surprise. Brain scans reveal humans are hard-wired to receive pleasure from unexpected events; the nucleus accumbens – the main area of the ventral striatum responsible for reward and pleasure – is activated in response to an unexpected incidence. (Sommerfeld Health) (Hagendoorn 2003).

metaphor



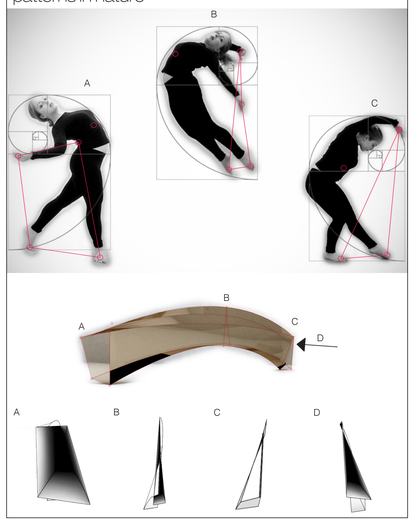
A metaphor creates a visual comparison and eliminates distracting features from an object. The three sets of movements above focuses on the narrative of progressing from the ground to a more uplifting position and thus can be identified as a metaphor of aspiration or progression depending on the viewer. The discovery of this emotion and linking the two 'superficially dissimilar events' (movement and narrative) consequently leads to a rewarding experience. (V.S. Ramachandran and W. Hirstein, 11).

ambiguity



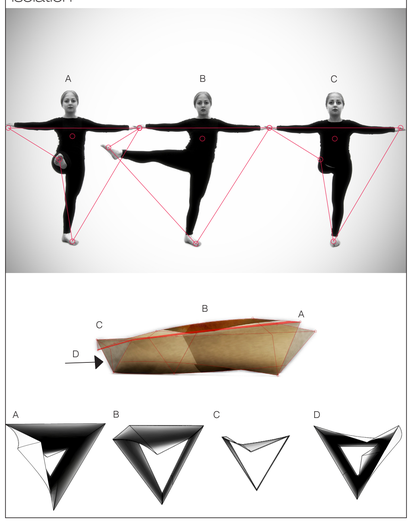
An image that is implicit is paradoxically more appealing than an image that has a clear message. This 'peek-a-boo' effect ensures that the "visual system 'struggles' for a solution and does not give up too easily" as the idea of discovering an object is rewarding for the viewer (V.S. Ramachandran and W. Hirstein, 33).

patterns in nature



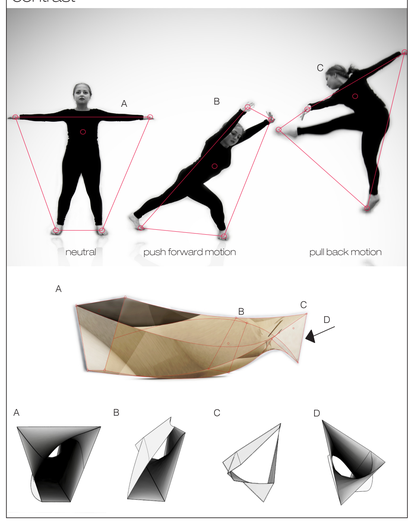
Humans possess an instinctive emotional connection with all living things. When exposed to patterns in nature, such as the golden spiral illustrated above, we become harmoniously in sync with the pattern and in result we feel peaceful and calm. (Sternberg, 72).

isolation



By isolating a specific area, in this case the right leg, the observer is able to direct interest more effectively to this single region, thus permitting one to notice the progression of movement created by the dancer. If redundant information is showcased, the observer's limited attentional resources would become distracted away from the defining characteristics of the object (V.S. Ramachandran and W. Hirstein, 24).

contrast



The combination of these contrasting movements above is aesthetically much more pleasing than shown individually, presumably because the allocation of attention, defined by the edges of the body, changes drastically in three motions. Overall, the effect of contrast is reckoned to be visually appealing as the objects complement one another and facilitate the identification of a single image (V.S. Ramachandran and W. Hirstein, 27).