THE INTERACTION OF SPACE WITH THE HUMAN NERVOUS SYSTEM AND ITS IMPACT ON HUMAN PSYCHOLOGY

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The following research follows a multidisciplinary approach through the domains of Architecture, Psychology, Neuroscience and Pharmacy science in order to investigate how the immediate or the broader built environment could suppress the human psychological disorders and eliminate the use of medicines to some extent, based on the principles of transformable architecture.

Initially it was examined the connections between Neuroscience and human behavior and specifically, the way in which the human senses (sight, hearing, smell, touch) are linked to hormonal changes and thus to the production of the corresponding emotions. It is indicated that receptors all over the human body could receive stimulants which are transferred to the brain that commands for specific hormones to be produced. Each of the hormones released in the blood causes a specific feeling or a combination of feelings. The choice of the hormones is based on the feelings which each one of them causes when released in the blood and these are melatonin, dopamine, endorphins, oxytocin, serotonin, cortisol and adrenaline. The feelings that have been examined are aggressive behavior, anger, stress, depression and fear. Concisely, the following procedure occurs in the human organism:

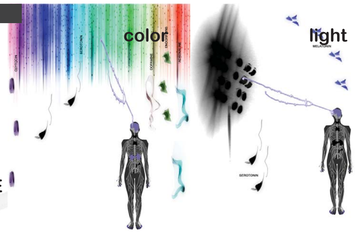
Stimuli > Peripheral Nervous System > Central Nervous System > Brain > Central Nervous System > Peripheral Nervous System > Reaction (hormones and behavior)

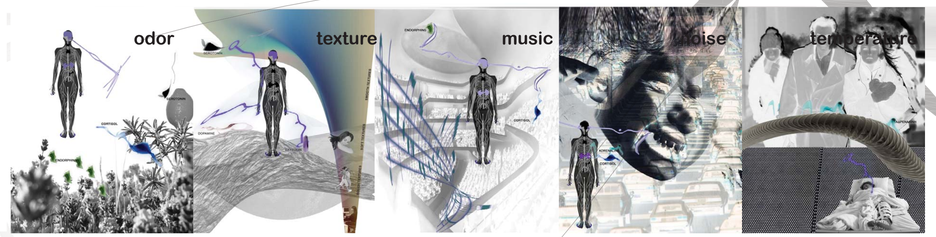
As a next step, the research investigates how architecture can affect the human senses through environmental stimuli, e.g. color and lighting, so as the above procedure will take place and address human psychology. The results are listed in the last diagram.

Finally, it is suggested the creation of intelligent environments that can “sense” the hormonal levels of individuals and “respond” to them by transforming their spatial elements in order to make people feel better. The proposed responsive spaces are equipped with smart materials and sensor-actuator systems with programmed actions (haptic, olfactory, chromatic and so on). By this time, there are a few technological means for achieving that and they are constantly developing.

The research concludes in that responsive architecture can positively contribute to the creation of a more human environment helping people improve their psychological health and preventing them from irrational use of drugs.

FEELINGS	HORMONES	SENSES	STIMULI
AGRESSIVE BEHAVIOR	MELATONIN	SIGHT	COLOR
ANGER	DOPAMINE	HEARING	LIGHT
STRESS	ENDORPHINS	SMELL	ODOR
DEPRESSION	OXYTOCIN	TOUCH	TEXTURES
FEAR	SEROTONIN		MUSIC
	CORTISOL		NOISE
	ADRENALINE		TEMPERATURE





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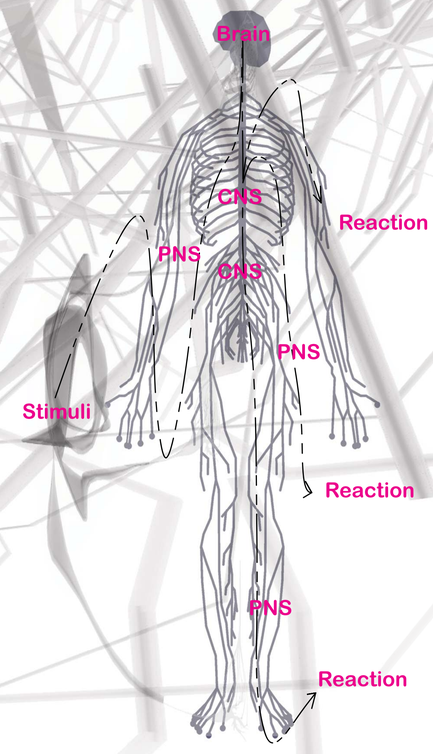

RESULTS OF THE RESEARCH

FEELINGS	HORMONES	STIMULI	NEUROPLACE SYSTEM - TECHNOLOGY
aggressive behavior	↑ Endorphins Oxytocin	Lavender sent Pink color	photochromic materials thermochromic materials
anger	↑ Serotonin Endorphins	Orange color Smooth textures	thermochromic materials changeable-texture materials
stress	Cortisol ↑ Serotonin Endorphins	Rosemary sent / Slow-tempo music Lemon sent / Green color / Smooth textures Lavender sent	sound system changeable-texture materials
depression	↑ Serotonin	High levels of lighting Light blue color	luminescent materials photochromic materials
fear	↑ Serotonin Oxytocin	High levels of lighting Soft textures	luminescent materials soft-texture materials