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Brain and Mind Roles and Study of External and Interoceptive Senses Using MUSE-2

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Abstract: Using creative approaches, this paper focuses on roles of brain and mind in the use of external and interoceptive senses in human health, stress and longevity related to human survival. The mind is the decision maker for everything that a human does also including dangerous activities. The brain oversees survival. Human decisions based on emotions/logic are controlled by the mind. This paper uses MUSE-2 to study human health focusing on external and interoceptive senses.

I. BRAIN AND MIND ROLES

Using creative approaches, this paper focuses on roles of brain and mind in the use of external and interoceptive senses in human health, stress, longevity, and survival.

It is important to study (a) 5 external senses and (b) 8 interoception (internal) senses [1]using MUSE-2 shown in Fig.1, to understand the roles of brain (survival) and mind (human decision maker). MUSE-2 has been used for mind-controlled LEGO robot [2]and alpha wave variability affecting health [3].

The MUSE-2 smartphone app ‘mind monitor’ is used to reveal how a human being feels in a crowd of large audiences such as in a cinema hall.

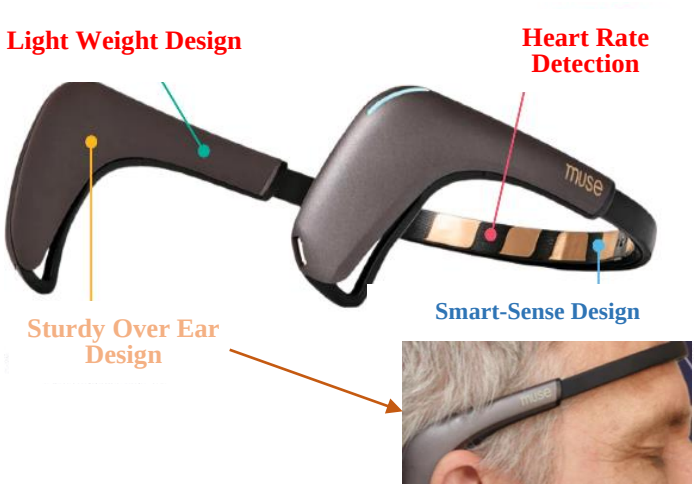

Fig. 1 MUSE-2 has 3 ground connections and 4 for EEG signals.

The brain is the decision maker for human survival and the mind is the decision maker for everything and anything that a human does including dangerous activities.

Fig. 2 shows external and internal (interoceptive) senses. They are extremely important for human survival, good health and longevity. Fig. 2 (c) shows psychological reactions [4]that can be studied using MUSE-2. Based on 7-stages of life shown in Fig. 3, every human, even sisters and brothers, has a unique personality.

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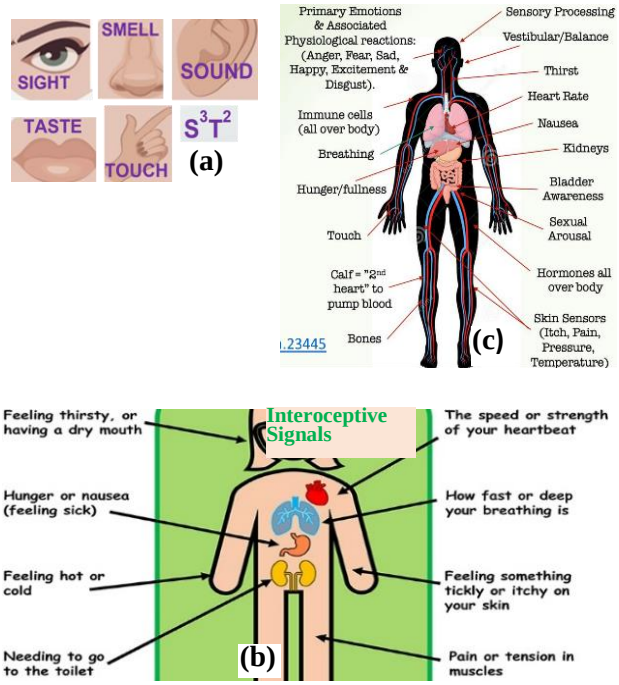

Fig. 2 Senses for human survival; (a) 5 external senses, (b) 8 interoceptive (internal) senses, and (c) psychological reactions [4]

II. INTEROCEPTIVE AND EXTERNAL SEMSES STUDIES

Interoceptive signals [5]interoceptive rhythms in the brain [6], new science of interoception [7] and feelings [8]typically include those from your heartbeat, respiration, hunger and fullness, and autonomic nervous system activity affected by our emotions. They may lead to stress/anxiety and other conditions. Even monkeys have interoceptive senses [9]. The external and interoceptive senses protect a human being exposed to different environments.

MUSE has been used to examine data in all frequency bands including frontal alpha wave [10][11][12][13][14][15][16][17]. Also, MUSE has been used on large audience in an auditorium or cinema or any other gathering [18]. There is a multitude of psychological processes, shaping these unique groups, that can be studied using MUSE-2 headset. Such a study is expected to reveal how a human being feels in a crowd. Diseases that are affected by or caused by or healed by a crowd can be studied using MUSE-2. For example, measurement of stress levels in public, stressful environments, loneliness, and happy moments can be studied by MUSE-2. The new science of interoception deals with (a) signals within self [7]and (b) origin of feelings [8] Age related direct and indirect effects on interoceptive awareness in adult lifespan has been studied [19]. Aging bodies and emotions, and interoceptive differences across adulthood has also been studied [20]. Associations between interoception and emotional regulation and their effects on mental health has been the subject of a study [21].

Fig. 3 Eight stages of life contributing to human brain (survival) and mind (personality and decision making).

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Every human may go through 8 stages of life as shown in Fig. 3. This makes every human being, even sisters and brothers, unique [22]. The stress may be tranfered from one human to other by a process called mirror neurons. When humans and animals learn by watching an action, additional neurons, called mirror neurons [23], become active leading to Mirror Mind (MM) concept [22].

External and interoceptive senses are involved in generating mirror neurons. People under extreme stress spread their stress for those who socialize with them through a process related to mirror neurons [23].

For example, certain parts of brain of person A under extreme stress are very active and when this person socializes with person B neurons in similar parts of person B's brain are also activated bringing person B also under stress. The activated neurons in person B's brain are called mirror neurons. Thus, mirror neurons are involved in stress infection from one human to another.

Role of mind as a decision maker for anything and everything a human does is important as shown in Fig. 4 [22]. Chronic inflammation in Micro-Biome-Gut-Brain-Axis (MGBA) is affected by Diet, Environment, Exercise, Prescription-Meds, Sleep and Amygdala-Scripts (DEEPSA).

The DEEPSA factors with Amygdala Scripts (AS) play a major role as shown in Fig. 4. How Vagus nerve connects brain and body is shown in Fig. 5. Mind is an algorithm based on data generated (a) in MGBA and (b) by DEEPSA factors. Thus, the mind, depending on so many factors, is a decision maker for everything that a human does. The brain on the other hand is responsible for human survival. Thus, the interplay between mind and brain affects human health and longevity. MUSE-2 EEG headset can be used to predict disease and survival.

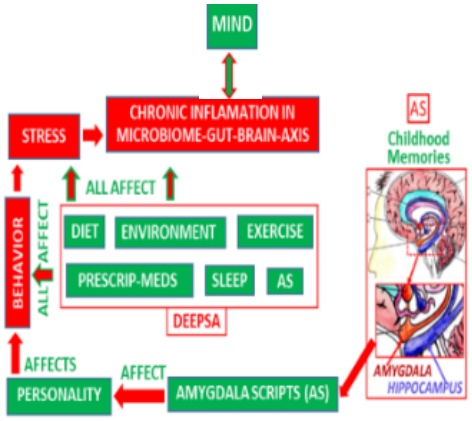

Fig. 4 Model of interrelated factors affecting mind.

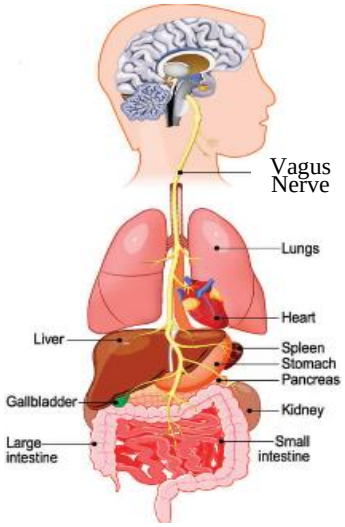

Fig. 5 MGBA parts connected by vagus nerve to brain.

III. INITIAL MUSE-2 DATA

What are the health problems caused or cured by human senses shown in Fig.2? Can health problems be predicted by MUSE-2 studies? Can the human mind be affected based on prediction of MUSE-2 data? These questions can be investigated using MUSE-2 EEG headset.

Using the Brain Monitor App available on a smartphone, the EEG data is first stored in a smartphone. Then the data can be transferred to laptop by taking a picture of the smartphone screen. Fig. 6 shows data transferred from MUSE-2 to laptop (using the system shown in Fig. 1) for the data inside a house with a temperature of 25 ^{o}C.

After recording the data inside the house, the volunteer with MUSE-2 EEG headset walked outside the house with an outside temperature in the range of 5 – 8 ^{o}C. The recorded data under different environments is shown in Fig. 6. The details and interpretations of this data on more volunteers in different environments will be the subject of future publications.

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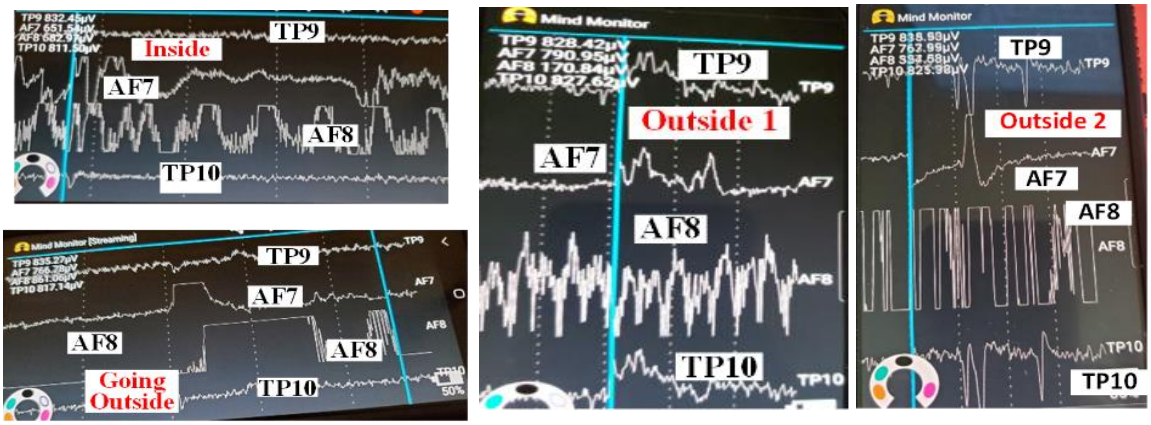

Fig. 6 Brainwaves measured by MUSE-2 on volunteer 1 using an Android phone in different environments: Inside, going outside, outside 1 and outside 2. Outside temperature was 5-8 ºC.

IV. CONCLUSIONS

Using creative approaches, this paper focuses on roles of brain and mind in the use of external and interoceptive senses in human health, stress and longevity related to human survival.

The mind is the decision maker for everything that a human does also including dangerous activities. The brain oversees survival. Human decisions based on emotions/logic are controlled by the mind. This paper uses MUSE-2 to study human health focusing on external and interoceptive senses.

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