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Review Paper

Neurocognitive Aspects of Alexithymia: A Review

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ABSTRACT

The understanding and expression of feelings is natural to majority of us. Moreover, it is a corollary to several facets of daily human functioning, yet not everyone possesses this disposition. This condition is called alexithymia which translates into no words for emotions. Identified officially in 1970s by Peter Sifneos, the condition has seen tremendous shift in its understanding from psychosomatic perspective to neuro-cognitive perspective. The current paper is a literature review of this construct and provides insights into neuro-cognitive aspects. For this purpose, a total of 9 papers were downloaded and reviewed. Findings suggest that it shows high comorbidity with several psychopathological conditions and has consequences for physical health. More studies are required to comprehend the role of amygdala. Further, fewer studies have focussed on cognitive aspects and its implications. Alexithymia despite gained interest requires more intensive research to understand other aspects such as executive functioning from a holistic view.

Keywords: *Alexithymia, Cognition, Emotions, Executive Functioning, Neural Correlates*

In 20th century, when psychodynamics rose, and defense mechanisms became popular among the clinicians studying mind and its disorders; the lack of daydreaming and a bend towards pragmatic and action directed thinking were considered as symptoms of psychosomatic disorders (Wingbermühle, et al., 2012). Interestingly, it was not until the early 1970s that the condition was studied much more in detail. The construct was observed among the patients with psychosomatic symptoms, who failed to respond to psychotherapy (Messina, Beadle & Paradiso, 2014; Meza-Concha, et al., 2017). These patients were found to have several collective symptoms such as trouble in classifying and articulating their feelings, inability to distinguish between feelings and bodily sense of arousals, low fantasies, and an externally directed thinking style along with an evident elusion from the focus on inner experiences (Goerlich, 2018). The condition today is recognized as alexithymia, coined by Peter Sifneos, it is derived from Greek words which translate into no words for emotions (‘a’- no; ‘lexis’- words; ‘thymos’- emotions). Mattila et al. (2006), state its prevalence to be around 10% in the general population, and is more frequent among the male population (as cited in Meza-Concha et al., 2017). Taylor (2000) found the rate to reach up to 60% in patients with psychosomatic disorders (as cited in Meza-Concha et al., 2017).

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Alexithymia has received extensive research in its brief history and scholars believe it to be a personality disposition. However, despite being considered a personality dimension, it has not been recognized as a clinical disorder by DSM-5 (Ricciardi, et al., 2015). Unfortunately, despite not being a disorder, this condition holds profound consequences for daily functioning, and interpersonal relations. Further, it holds close relations with conditions of autism spectrum disorders and schizophrenia (Wingbermühle et al., 2012). Studies also indicate its comorbidity with disorders of personality, depression, anxiety, psychosomatic, substance abuse disorders and even physical ailments such as AIDS. This suggests a strong correlation alexithymia holds with mental illness (Riccardi et al., 2015) and with physical health.

The amounts of studies indicate that the cognitive-affective condition has been a serious source of discussion in the recent decades and efforts to understand it are still in progress. To recognize it completely, the complex interaction between brain, behavior and environment requires further research (Wingbermühle et al., 2012). The advancement in procedures of investigations has also led to increased researches to understand the neurological basis of alexithymia. For the current study, investigations into the brain structures and its role in alexithymia are reviewed.

METHODOLOGY

Objective

The objective of the current review was to understand the neurological and cognitive factors involved in the dynamic construct of alexithymia.

Rationale

Alexithymia which is majorly considered as a personality dimension has several complex levels to it and has an impact on everyday life of an individual along with it being a phenomenon which does not have a long past making it necessary to study. Further, the neural understanding helps to contribute to the literature of working mechanisms of the brain as well alexithymia. Since, the condition shows deficits in cognitive functioning as well, they are also necessary to be understood along with its impact on the executive functioning of the individual.

Procedure

This research involved reviewing already existing literature on alexithymia. To achieve this purpose, neurocognitive aspects of alexithymia were searched on the google scholar. A total of 9 papers were downloaded out of which 7 papers were reviews and 2 studies were independent researches. From the 2 studies one paper focused on the neural aspects of empathy and judging pain through fMRI between alexithymic and non-alexithymic patients and the next paper focused on the executive functioning in the patients with frontal lesions. And from the 7 papers, one paper focused on alexithymia in neurological diseases and thus was not used.

LITERATURE REVIEW

As the efforts to understand alexithymia rose, in the fields of psychology, neurology and medicine, the significance of attempting to operationalize and measure the concept through psychometric tests cannot be ignored. Alexithymia can be measured through either Toronto Alexithymia Scale (TAS) or through Bermond-Vorst Alexithymia Questionnaire (BVAQ). The latter has an edge over the former in the fact that it measures affective dimensions also of the intriguing phenomenon.

Neuro-psychobiological Classification

Bermond (2007) studied alexithymia in detail and classified it into three types. The type I characterized by weakened emotional experience and cognitive processing related to emotions (Wingbermühle et al., 2012; Meza-Concha et al., 2017). Type II observed impairments in cognitive processing related to emotions whereas intact emotional experience (Wingbermühle et al., 2012; Meza-Concha et al., 2017). In the type III emotional experience is impaired and a proper cognitive processing is present (Meza-Concha et al., 2017).

Causal Classification

Table 1: Alexithymia Causal Classification

Type	Primary	Secondary	Organic
Cause	Genetic or early childhood trauma (psychological)	Result of significant psychological or medical events	A result of direct or indirect damage to brain structures.
Nature	Developmental	Consequential	Organic
Onset	Early	Early or late	Early or late
Role	Can cause other mental illnesses	Acts as defense against these events	Can cause other mental disorders
Brain regions involved	Anterior cingulate cortex; corpus callosum; basal ganglia; right temporal lobe and hemisphere	Anterior cingulate cortex	Anterior cingulate cortex; corpus callosum; basal ganglia and right hemisphere

Note: Adapted from Messina, Beadle & Paradiso, 2014

Neural Substrates

Phan et al. (2012) emphasize the noted association between alexithymia and multiple brain regions involved processing cognitively and emotionally along with emotional regulation networks line with the complex construct (as cited in Riadh et al., 2019) and thus the need to study them in depth.

Corpus Callosum

Corpus callosum is a large bundle fibre which connects the two hemispheres of the brain allowing them to work together effortlessly. This interhemispheric activity further holds significance for proper regulation of emotions (Wingbermühle et al., 2012. Both the sides are known to be specialized for contrasting functions and are known to control the opposite side of the body. The left hemisphere is more specialized in language, reasoning, analytical thinking whereas the right hemisphere is specialized in daydreaming, emotions, and holistic thinking. Therefore, to understand and verbalize the emotional stimuli, information from the right side of the brain must be transferred to the left side (Wingbermühle et al., 2012). And hence, the power to translate body language to emotive language for emotional transition is necessary (Messina et al., 2014). In a study of 12 patients who underwent corpus callosotomy due to epilepsy, Hope and Bogen (1977) found that patients experienced decreased ability of fantasy thoughts, dreaming, trouble in describing feelings, and an operative thinking style (Larsen et al., 2003; Wingbermühle et al., 2012). This suggests deficits in both emotional and cognitive processing which are key aspects of alexithymia.

Right Cerebral Hemisphere

The right cerebral hemisphere plays a key role in emotions and any damage to it can lead to problems with emotion processing. Further, damage to it also causes inability to recognize

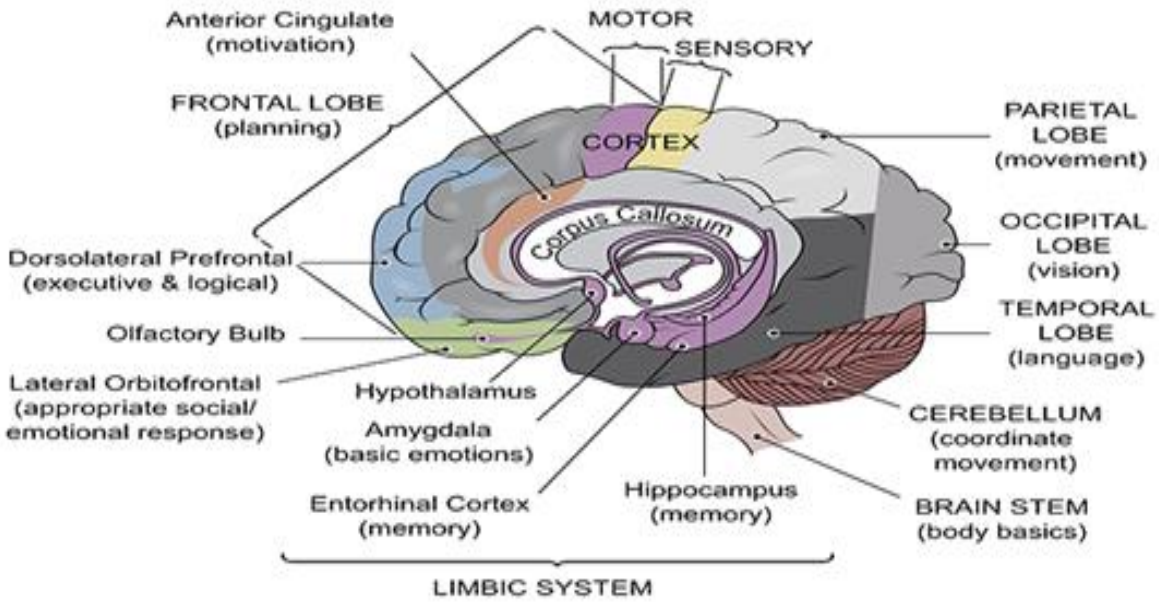
facial expressions in alexithymic patients (Jessimer & Markham, 1997; Kano et al., 2003 as cited in Wingbermühle et al., 2012). A Positron Emission Tomography of alexithymic and non-alexithymic groups by Kano et al., 2003 showed a decreased cerebral blood flow in the right hemisphere of the alexithymic group in comparison to non-alexithymic while viewing variety of emotional expressions (Wingbermühle et al., 2012; Meza-Concha et al., 2017). Research also indicates higher levels of alexithymia in men in consideration of altered right hemisphere (Meza-Concha et al., 2017) but this requires further clinical research to understand the specificities. Interestingly, a study by Bermond et al. (2008) in females highlighted the involvement of the left hemisphere in alexithymia (Meza-Concha et al., 2017).

Frontal Lobe

Frontal lobe of cerebral cortex located at the front most region is known to be the storehouse of all higher cognitive functions ranging from memory, attention, language, planning, decision making, reasoning, impulse-control, social behaviors, and importantly for this review emotional expression and regulation of own and understanding that of others. Several studies have attributed expressive parts of emotional processing to the structures found in the frontal lobe and damage to it might lead to exhibition of alexithymia (Larsen et al., 2003). The area involved in alexithymia particularly, has been located in the prefrontal cortex (PFC) owing to its involvement in higher cognitive and affective activity (Larsen et al., 2003). Rolls (2002) found that the area comprises lateral, medial and orbitofrontal cortex (as cited in Wingbermühle et al., 2012) and can be easily divided into dorsolateral and ventromedial regions (Larsen et al., 2003) Moriguchi et al. (2006) in a comparison fMRI study between alexithymic and non-alexithymic individuals while viewing painful pictures of hands and feet revealed lower hemodynamic activity in the left dorsolateral prefrontal cortex (DLPFC) along with lower signal change in the left lateral prefrontal cortex. The study further, found that alexithymic individuals report painful stimuli as less painful. Therefore, indicating the active role of DLPFC in controlling perception of other's pain, empathy and cognitive functions of visual stimuli perception which fails to activate in alexithymia.

Whereas the ventromedial area connected with medial temporal lobe integrates processes of motivation and emotion. Further, the orbitofrontal cortex and anterior cingulate cortex (ACC) located in the region are involved in emotional functioning and learning (Larsen et al., 2003) through their connections to limbic systems (Kandel et al., 1991; Malloy & Duffy, 1994 as cited in Riadh et al., 2019).

Figure 1: Highlighting Brain Regions



Note: Figure taken from Transform technology

Ross & Mesulam (1979) and Hornak et al., (1996) found orbitofrontal cortex crucial in recognizing emotional vocal and facial manifestation (as cited in Messina et al., 2014) therefore, lesions in the part can lead to impairment in voice and facial expression identification and it leads to reduced emotes, and emotional decision making but no impact on emotional cognitions are observed (Wingbermühle et al., 2012). Lastly, medial prefrontal cortex was found to exhibit low activation in individuals with high alexithymia, an area which represents identification of mental state of self and that of others (Moriguchi and Komaki, 2013). Another study by Riadh et al. found damage of medial and orbital frontal gyrus associated with alexithymia. This illustrates the consistent role of frontal lobe regions in alexithymia.

ACC on the other hand is divided into dorsal region engaging in cognitive functions such as feedback selection related to motor tasks and interior-ventral region engaged in affective functions such as autonomic activity and inner emotional feedback (Wingbermühle et al., 2012). The cognitive part has strong commute interconnections with the lateral prefrontal cortex (PFC) and the affective part has connections with amygdala, hippocampus, hypothalamus, and the orbitofrontal cortex (Wingbermühle et al., 2012). van der Velde et al., 2014 found reduced volume of dACC associated with cognitive dimension (Goerlich, 2018).

An integrative approach was adopted by Critchley et al. (2003) to illustrate the integration of mind and bodily processes in ACC and suggested it to be the center of autonomic responses signally the adaptive control of behavior (as cited in Wingbermühle et al., 2012). And thus, has significance for integration of emotions, cognition of emotions and resulting behavior. Notably, emotional perception, a significant deficit in alexithymia is recognized as the early step in the processing of emotions has involvement of ACC, further, it also plays a vital role in emotional perception, manifestation, and experience (Riadh et al., 2019). Moreover, the

described roles are known to be key features of alexithymia- difficulty in identifying and expressing emotions, illustrating its significance in understanding alexithymia.

Amygdala

Amygdala is the known center of emotions and attention system (Goerlich, 2018), and is situated in the medial temporal lobe with one part present in both the hemispheres. Therefore, studying amygdala is alexithymia becomes significant. Unfortunately, the number of studies that link alexithymia and amygdala are limited (Meza-Concha et al., 2017). Reduced activity of amygdala has been linked to change in emotional processing (Messina et al., 2014).

Further, fMRI findings of conscious emotion processing studies suggest that right amygdala shows low activation in reaction to body expressions which are fearful (Pouga et al., 2010 as cited in Goerlich, 2017) and of amygdala in reaction to fear-inducing and repulsive images particularly to difficulty in identifying emotions (Leweke et al., 2004 as cited in Goerlich, 2017).

Insula

It is the region surrounded by frontal, temporal, and parietal lobe. It is divided into anterior and posterior areas where the anterior deals with internal emotional integration and posterior deals with empathy (Meza-Concha et al., 2017). Further, it is highly activated in alexithymic individuals while processing somatosensory information and in the affective-pain matrix (Kano et al., as cited in Moriguchi & Komaki, 2013). Therefore, the high activation results in experience of pain in the form of psychosomatic symptoms. Study by Moriguchi et al. also found that personal distress and emotional affectivity were more associated with insula than cognitive and coping mechanisms. Further, structural imaging studies show that a reduced volume of insula when it comes to cognitive alexithymia dimension (Goerlich-Dobre et al., 2015 as cited in Goerlich, 2018).

Executive functioning

Majority of the papers reviewed reported studies on neural aspects of alexithymia; only one paper focused its attention on cognitive functioning of alexithymia. Alexithymia is a complex condition whose impact is far and pervasive not just in emotional processing but cognitive functioning and the resulting behavior as well. Executive functioning is an umbrella term which refers to the ability of dynamically adapting to changing environmental conditions (Riadh et al., 2019) which includes several mental skills. Studies on large indicate the poor relationship between alexithymia and executive functioning (see Henry et al., 2006; Wood & Williams, 2007; Costa et al., 2007; Xiong-Zhao et al., 2006; Zhu et al., 2006) in clinical and nonclinical population (as cited in Riadh et al., 2019). Unfortunately, these studies are diverse and many exhibit different relationships.

Riadh et al. in a detailed study investigating various cognitive functioning capabilities and the relationship with alexithymia. The study conducted on patients with 1) prefrontal cortex lesions, 2) parietal lesions and 3) control patients (with no known neural damage or disorder) were administered a battery of neurological tests investigating inhibition, plasticity, forethought, working memory and inductive reasoning. Results indicated that the patients with alexithymia displayed increased level of alexithymia in patients with prefrontal lesions along with poor executive functioning. The study illustrates how frontal lesions patients are unable to internalize, interpret and express their internal states pointing out their lack of cognitive control over identifying and expressing, further, the patients indulged more

in external events than introspecting internal states (Riadh et al., 2019). These findings hold consequences for understanding the role of cognitive deficits in such individuals.
The link found between verbal and visuo-spatial mechanisms and alexithymia suggest their role in deficits seen and the importance of inter-spheric activity (right hemisphere for emotions and left for language). Further, these findings have also been observed in previously mentioned studies. The poor scores on verbal tasks also highlight the role of language in alexithymia and its facet of difficulty in expressing feelings.

The cognitive function of inhibition and shifting play a vital role in identifying feelings where distinguishing feelings internally and adapt them continuously according to the situations along with planning which is important for both identifying and expressing (Riadh et al., 2019). Moreover, inhibition and shifting allows one to think externally and internally (Riadh et al., 2019) and thus help in reacting to various situations.

CONCLUSION

Alexithymia's history rose from psychodynamics in the form of psychosomatic symptoms, but it did not get its real identity till the early 1970s. In its brief history a tremendous shift in understanding its neural aspects has been observed advancing human understanding of the concept. The construct is not just unique from the perspective of neurology but from that of cognitive and clinical psychology as well. The researches illustrated the gained momentum of neuropsychological ways of assessing the socio-emotional aspects of the condition. Alexithymia, despite not being a clinical disorder, has profound consequences for personal, social, and cognitive functioning. Further, it has been associated with several clinical disorders, neurological conditions such as traumatic brain injuries and health diseases such as AIDS, and cancer. Studies indicate strong neural basis for the condition; however, the causal factors appear difficult to understand, therefore, it seems safe to conclude as of now that it holds a bidirectional relation. Majority of the articles reviewed for the current literature review pointed out to different brain regions contributing to the deficits observed in alexithymia, the role of interhemispheric activity through callosum seems to be particularly highlighted throughout. Amygdala was also seen to be a pivotal point of observation but studies on it fall short. The review by Messina et al. stresses how different brain regions are involved in primary secondary and organic alexithymia. Several regions of the brain involved in various aspects of emotional processing were continuously highlighted throughout the researches. This makes it necessary to understand them in correlation to each other as the brain works in an all-harmonious manner.

Unfortunately, decreased focus was observed on the cognitive processing and external oriented thinking style which also form the key features of the condition throughout these papers. Moreover, only one paper focused on executive functioning in alexithymic patients, which highlighted the diverse findings of various researches pointing to the importance of studying it more comprehensively. Cognitive functioning investigations would contribute to understanding the neural substrates of the condition better. To conclude, in its short past alexithymia has become an intriguing condition to study and has seen progress ever since its birth but the obstacles in understanding the condition are not yet over and this calls for intensive contextual research considering its deep impact on just the individual but the society at large.

REFERENCES

Goerlich, K. S. (2018). The Multifaceted Nature of Alexithymia – A Neuroscientific Perspective. *Frontiers in Psychology*.

Larsen, J. K., Brand, N., Bermond, B., & Hijman, R. (2003). Cognitive and emotional characteristics of alexithymia A review of neurobiological studies. *Journal of Psychosomatic Research, 54*, 533 – 541.

Messina, A., Beadle, J. N., & Paradiso, S. (2014). Towards a classification of alexithymia: primary, secondary and organic. *Journal of Psychopathology, 20*, 38-49.

Meza-Concha N. et al. (2017). Towards a neurobiological understanding of alexithymia. *Medwave*. *17*(4). DOI: 10.5867/medwave.2017.04.6960

Moriguchi, Y. (2007). Empathy and Judging Other's Pain: An fMRI Study of Alexithymia. *Cerebral Cortex, 17*, 2223-2234.

Moriguchi, Y., & Komaki, G. (2013). Neuroimaging studies of alexithymia: physical, affective, and social perspectives. *BioPsychoSocial Medicine, 7*(8), 1-12. Retrieved from http://www.bpsmedicine.com/content/7/1/8

Riadh, O. et al. (2019). Neuro-cognitive correlates of alexithymia in patients with circumscribed prefrontal cortex damage. *Neuropsychologia*

Ricciardi, L., Demartini, B., Fotopoulou, A., & Edwards, M. J. (2015). Alexithymia in Neurological Disease: A Review. *Journal Neuropsychiatry Clinical Neuroscience, 27*(3), 179-187.

Wingbermuhle, E. (2013). The neurocognition of alexithymia: evidence from neuropsychological and neuroimaging studies. *Acta Neuropsychiatrica, 24*, 67-80.

TNQ (n.a). Retrieved from https://www.tnq.co.in/images/graphic-editing/redrawing_1.png

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Conflict of Interest

The author(s) declared no conflict of interest.

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