



Review paper

Brain Damage Disorders: Integrating Current Scientific Knowledge into a New DSM Category

Michail Kikrilis *¹

¹ Cognitive Psychologist, Athens, Greece

KEYWORDS	ABSTRACT
DSM categories Brain Damage Disorders symptoms etiological factor	Phineas Gage has offered neuropsychology with great knowledge on how Ventromedial Prefrontal Damage (VM-PFD) is related with social behavior as well as personality changes. In addition to VM-PFD cases, many other cases of Brain Damage have been associated to psychiatry – related cognitive impairments. Although this damage may be caused by a vast variety of reasons, in most cases it leads to several psychiatric symptoms often referring to different DSM categories. As a result, “Brain Damage Disorders” is suggested as an additional, new DSM category connecting various psychiatric symptoms with their common origin. Attributing these psychiatric symptoms to their common etiological factor, in other words, Brain Damage, may result in better understanding, as well as more efficient treatment.

1. Phineas Gage’s Case

In 1848, while working, Phineas Gage suffered a severe brain injury since a 3.2 cm – diameter, meter-long bar, passed through his head, by entering the left front of his brain, and finally completely leaving his head at the top of the skull on the right side. Although Phineas Gage survived this severe accident, his personality was changed to such an extent that people who knew him said “Gage is no longer himself”. After the Ventromedial Prefrontal Damage (VM-PFD) his accident had caused, he became irritable, irreverent, profane, rude and often disrespectful. Although Phineas Gage died about 12 years after his accident, Gage’s case triggered more research on the possible deficits caused by Ventromedial Prefrontal Damage (VM-PFD) (Filho, 2020).

2. Similar Ventromedial Prefrontal Damage (VM-PFD) Cases

Phineas Gage has undoubtedly offered neuropsychology with a great contribution while connecting ventromedial prefrontal brain activity with social behavior. Ever since, many cases (Rolls, & al., 1994, Dimitrov & al., 1999, Cato, Delis, Abildskov, 2004) confirm that ventromedial prefrontal damage (VM-PFD) is highly associated with significant impairments in social behavior, such as cognitive inflexibility, impulsivity, disinhibition, sense of responsibility, emotion, social competence, social decision making and social conduct regulation in general. This damage may not only come from an accident, but also other causes such as lesions (Freitas & al. 2022). As a result, until today the case of Phineas Gage has been triggering plenty of research connecting impairments on social behavior with VM-PFD.



*Corresponding author: Michail Kikrilis

DOI [105281/ijisr-2550226](https://doi.org/10.5281/ijisr-2550226)



Furthermore, the nature of such impairments is closely related to relevant psychiatric assessments concerning social behavior (Milberg, Hebben, & Kaplan, 1996). According to Trebuchon & al., 2013, the nature of such impairments is highly associated with psychiatric disorders mostly concerning social behavior. Schleim (2022) emphasizes that among the relevant journal articles, almost the sum of these articles (92%) described personality changes and 52% of them described a psychopathy-like kind. According to Cato & al. (2004), VM-PFC is connected with a wider spectrum of cognitive deficits, including several psychiatric disorders.

3. Further Brain Damage Cases with Common Symptoms

Ventromedial Prefrontal Cortex (VM-PFC) damage is not the only type of brain damage accompanied by psychiatry-related cognitive impairments. MMA athletes exposed to frequent sparring experience significant and progressive impairments in executive functions, including Mental Processing Speed, automatic processes, control processes, direct and indirect memory, as well as inhibitory control and cognitive flexibility (Brito & al, 2025).

Head strikes, injuries and lesions are only some of the factors leading to cognitive impairments. According to Dhakal & Bobrin (2023), cognitive deficits may be associated with numerous factors, such as (among others) Delirium, Alzheimer disease, Stroke, Developmental disorders (Down syndrome), Head injury, Multiple sclerosis, Parkinson disease, Meningitis, Acquired immune deficiency syndrome, Alcohol, drugs, toxins, Sepsis and Tumor.

Many such impairments include personality and social behavior changes, memory loss, cognitive deficiency, depression and anxiety, as well as various other symptoms related to psychiatric disorders. In fact, there is a vast variety of causes leading to brain damage associated psychiatric symptoms, such as cognitive inflexibility, social behavior and personality changes, delusions, as well as depression and anxiety disorders (Obasa & al, 2024).

In conclusion, although numerous factors may cause significant brain damage, psychiatric symptoms, (such as personality and social behavior changes, depression and anxiety disorders) are the common outcome in most of these cases (Duarte & al, 2023). This rising diagnostic category emerges as a profound need of a more holistic categorization of psychiatric symptoms originating from Brain Damage.

4. A New DSM Category

Although psychiatric symptoms resulted by brain damage may vary, often falling into different DSM Categories such as (among others) Personality Disorders, Depressive Disorders, Anxiety Disorders, Neurocognitive Disorders, Trauma- and stressor-related disorders (A.P.A., 2022), a new DSM Category including all possible disorders caused by Brain Damage can integrate diagnoses based on the same etiological factor. Brain Damage Disorders, as a new DSM category may organize various different psychiatric symptoms under the common etiology from which they originate. This could result in a double benefit:

- 1) Such a category shall provide Brain Damage psychiatric patients with more accurate, reliable, holistic and efficient diagnoses based on more objective, tangible and easier to point out symptoms.
- 2) Integrating the different psychiatric symptoms related to different types (and areas) of brain damage may shed more light on how these disorders could be better treated.

5. Brain Damage Disorders

Brain Damage Disorders category may organize various psychiatric symptoms based on the prevalent DSM categories (A. P. A., 2022). In consistence with the prevalent DSM-V, TR (A.P.A., 2022) categories, psychiatric diseases based on Brain Damage shall be categorized depending on the nature of the resulting psychiatric symptoms. As a result, Brain Damage Diseases can be named according to the already formed DSM categories, such as: Brain Damage Personality, Depressive, Anxiety or Mixed disorder (including symptoms from various categories) and perhaps an additional Unspecified Brain Damage disorder in case new (or not easy to specify) psychiatric symptoms appear. This new categorization may shed more light on how Brain Damage, as a measurable fact, is related to different psychiatric symptoms, as well as the extent to which this takes place.

References

1. Ahmed, S., Venigalla, H., Mekala, H. M., Dar, S., Hassan, M. (2017). Traumatic Brain Injury and Neuropsychiatric Complications. *Indian Journal of Psychological Medicine*, 39(2):114–121. doi: 10.4103/0253-7176.203129
2. American Psychiatric Association (2022). *Diagnostic and statistical manual of mental disorders, fifth edition, text revision*. Washington: American Psychiatric Association.

3. Brito, M. A. Fernandes, J. R., Costa, K. F., Maurício, C. A., Gonçalves, A. F., Nóbrega, O. T., Muñhoz, E. A., Brito, C. J., Pérez, Diego I. V., Miarka, B. (2025). Long-Term Cognitive Decline in MMA Fighters: A Two-Year Cohort Study on Executive Function Impairments Due to Repetitive Head Strikes. *International Journal of Environmental Research and Public Health*, 22(7), 1004; <https://doi.org/10.3390/ijerph22071004>
4. Cato, M. A., Delis, D. C., Abildskov, T. J. (2004). Assessing the elusive cognitive deficits associated with ventromedial prefrontal damage: a case of a modern-day Phineas Gage. *Journal of the International Neuropsychological Society*, Volume 10, Issue 3, pp. 453 – 465. doi: <https://doi.org/10.1017/S1355617704103123>
5. Dhakal, A., Bobrin, B. D. (2023). Cognitive Deficits. *StatPearls. (Internet)*. <https://www.ncbi.nlm.nih.gov/books/NBK559052/>
6. Dimitrov, M., Phipps, M., Zahn, T.P., & Grafman, J. (1999). A thoroughly modern Gage. *Neurocase*, vol. 5, is. 4, pages 345–354. <https://doi.org/10.1093/neucas/5.4.345>
7. Duarte, D. C., Duarte, J. C., González, Á. A. O., García J. F. C. (2023). Psychiatric disorders in post-traumatic brain injury patients: A scoping review. *Heliyon*, Volume 9, Issue 1, <https://doi.org/10.1016/j.heliyon.2023.e12905>.
8. Filho, R. V. T. (2020). Phineas Gage's Great Legacy. *Dementia Neuropsychologia*, 14(4), pages 419–421. doi: 10.1590/1980-57642020dn14-040013
9. Freitas P. H. M., Monteiro R. C. Freitas P. H. M., Monteiro R. C., Bertani R., Perret C. M., Rodrigues P. C., Vicentini J., Morais T. M. G., Rozental S. F. A., Galvão G. F., Mattos F., Vasconcelos F. A., Dorio I. S., Hayashi C. Y., Santos J. R. L., Werneck G. L., Tocquer C. T. F., Capitão C., Cruz L. C. H., Tulviste J., Fiorani M., Silva M. M., Paiva, W. S., Podell K., Federoff H. J., Patel D. H., Lado F., Goldberg E., Bennett, R. L., Michael, V. L., Rozental, R. (2022). E.L., a modern-day Phineas Gage: Revisiting frontal lobe injury. *Lancet Regional Health – Americas*, 11:14:100-340. doi: 10.1016/j.lana.2022.100340.
10. Goldstein, K. (1944). The mental changes due to frontal lobe damage. *Journal of Psychology*, 17, 187–208. doi: 10.1080/00223980.1944.9917192
11. Milberg, W.P., Hebben, N., & Kaplan, E. (1996). The Boston process approach to neuropsychological assessment. In I. Grant & K. M. Adams (Eds.), *Neuropsychological assessment of neuropsychiatric disorders (2nd ed., pp. 58–80)*. New York: Oxford University Press.
12. Obasa, A. A., Olopade, F. E., Juliano, S. L., Olopade, J. O. (2024). Traumatic brain injury or traumatic brain disease: A scientific commentary. *Brain Multiphysics*, Vol. 6, Is. 6. Elsevier. <https://doi.org/10.1016/j.brain.2024.100092>
13. Rolls, E.T., Hornak, J., Wade, D., & McGrath, J. (1994). Emotion-related learning in patients with social and emotional changes associated with frontal lobe damage. *Journal of Neurology, Neurosurgery, and Psychiatry*, 57, 12, 1518–1524. doi: 10.1136/jnnp.57.12.1518.
14. Schleim, S. (2022). Neuroscience Education Begins With Good Science: Communication About Phineas Gage (1823–1860), One of Neurology's Most-Famous Patients, in Scientific Articles. *Frontiers in Human Neuroscience*. Volume 16, Issue 5. pages 812-837. <https://doi.org/10.3389/fnhum.734174>
15. Trebuchon, A., Bartolomei, F., McGonigal, A., Laguitton, V., Chauvel, P. (2013). Reversible antisocial behavior in ventromedial prefrontal lobe epilepsy. *Epilepsy & Behavior*, Volume 29, Issue 2, Pages 367-373. <https://doi.org/10.1016/j.yebeh.2013.08.007>