

Psychological and neural basis of viral online internet challenges: A review

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ABSTRACT

Psychology and human neural response are centrally associated with social media interaction. An increase in social media use in recent years has been associated with an increase in the number of internet viral trends. The number of internet challenges has been engaging millions of people to take part in it. In this article, we are trying to focus on human behavior and its neural basis of making internet trends viral. Dopaminergic pathways and one's social dominance have been key role players in this. The feedbacks and increased reaction on one's uploaded post that sums up increased peer attention on social media can be linked with dopamine pleasures and the reward cycle. Dopaminergic reinforcement triggers user tagging multiple other users for taking up challenge. Challenges and trends involving displaying physical fitness provides one with its increased social ranking as it can be traced with fitness having advantages of social dominance within peers. Cortisol response may play an important role in negative domain response. Hence activation of dopaminergic pathway and benefit of elevated social ranking can be the reason for an increased number of users attempting social media trends.

Keywords: *Dopaminergic pathway, cortisol, Social dominance, Social media, Internet Challenges.*

Social media has been an important part of many people's life. To date, billions of people are registered to one or the other social media service and many of the users spend 120+ [1] minutes on social media. With an increase in social media users, many new trends and social media challenges are getting viral. Many users are actively taking part in one or other challenges. These challenges range from posting a picture with specific constraints to performing physical tasks [2, 3]. Many of the internet challenges have proven fatal and life-threatening to users, still, the trends have been continuing over the years with the change in its specificity. The users involved in the challenge range from celebrities to an average user. If the trend of many famous viral challenges we observe, we can find the common thing that all the internet challenges involved either displaying physical strength or display of self in some of the other ways that grab the peer users' attention on the platform. This gives us the clue that beyond just trends, the neural pathway and mechanisms are involved in this. To understand first we focus on types of viral challenges and its classification. We classified

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challenges in two types: Challenges involving physical task and Soft challenges, challenges involving pictures, videos or creativity. To make analysis we classified 5 of the physical task challenges and 4 in soft challenges.

Challenges involving physical task

This where the viral challenges that involved participants to perform the task that required one or more of the physical skills including physical strength, pain bearing strength or physical precession. The 5 challenges that went viral, we considered are as follows:

1. *Cinnamon challenge*: In 2013, this challenge involves swallowing a tablespoon of cinnamon powder in timeframe of 60 seconds without liquid or water
2. *Planking challenge*: In 2013, holding a plank for maximum time as possible with different variations.
3. *Ice bucket challenge*: This was started in 2014, The Ice Bucket Challenge also known as ALS Ice Bucket Challenge is an activity involving the dumping of a bucket full of ice or ice water over a head.
4. *Kylie Jenner lip challenge*: In 2015, inserting lips into a shot glass, small jar or bottle, and then sucking out the air which resulted in creating a vacuum.
5. *Kick bottle opening*: In year 2019, a bottle is placed on a table with its cap loosely fixed on it. The person trying it out is required to untwist the cap with a roundhouse kick.

Soft challenges

Challenges involving pictures, videos or creativity: This is the challenges that are consisting of posting pictures, videos and such kind of self-representing contents with specific conditions. The 4 challenges that went viral, we considered are as follows:

1. *Mannequin challenge*: 2016, In which people remain frozen in action like mannequins while a moving camera film them
2. *In my feelings challenge*: 2018, It consisted of Jumping out of a moving vehicle and dancing on the road on the music song by Drake's "In My Feelings"
3. *10 years photo challenge*: 2019 Participants posted two images of their self-side by side one of them which was taken at least ten years apart.
4. *Sari challenge*: 2020, Involved a female posting her photo in sari, traditional Indian attire. This came to huge popularity in India.

Dopaminergic system

Dopaminergic systems [4] form the neural basis for a lot of people engaging in viral social media challenges. Rewards can be defined as those objects or stimuli, which we will work to acquire through the allocation of time, energy, or effort; that is, an object or goal that we seek. Whenever we are exposed to a rewarding stimulus, the brain responds by increasing the release of the neurotransmitter dopamine and thus giving the pleasurable feeling. Dopamine and pleasurable feeling are important with respect to dopaminergic signaling as it helps utilizing and allocation of energy [7]. Elevated Dopamine stimulates reinforcement making users to do the same activity repeatedly. Dopamine [5] has a major role in reward and pleasure systems. The dopaminergic system can be classified into four major pathways [6]. Pathways are known as Mesolimbic Pathway, Mesocortical Pathway, Nigrostriatal Pathway, and Tuberoinfundibular Pathway. Mesolimbic Pathway. Mesolimbic and mesocortical systems play an important role in balancing reward versus cost estimates [7, 8]. The mesocortical pathway connects the ventral tegmentum to the prefrontal cortex. The mesolimbic pathway connects the ventral tegmental area in the midbrain, to the ventral striatum of the basal ganglia in the forebrain. The amygdala and hippocampus are key

components of the limbic system and are associated with emotion and memory formation, respectively.

Neural Basis of soft challenges

Social appreciation or social rewards tend to trigger the dopaminergic systems [12]. If we look at the social challenges, there are two things we can consider that are 1. People are getting an opportunity to show their best aspect of oneself for e.g.: beauty face, dancing skills, creativity or good attires and 2. Showing the best aspect of self is generating positive social rewards each time like, comment or reaction is received on the posted challenge post that attributes to social appreciation. Social appreciation correlates to reward in this case [13]. This reward triggers a dopaminergic system mostly mesolimbic pathway with giving short term acute pleasurable feelings. Dopamine acts as a reinforcement factor. Elevated levels of dopamine tend to make a person do the task repeatedly [14, 15]. This behavior further promotes a user tagging multiple other users to take up the challenge. Social motivation also triggers a competitive environment in neural aspects [16]. So when the peer user of the same social level having bonding in positive or negative domain tags, this motivates and triggers the competitive environment to take up the challenge. If the tag is from the positive domain user [18] i.e. friends, serotonergic release can trigger the competition and if the tag is from the negative domain user i.e. competitive or disliked, cortisol release [17] can trigger the competition.

Neural Mechanisms involved in challenges having physical task

Here it's not only the previously discussed dopaminergic systems have a major role but also the evolutionary social dominance [20]. As per the mechanism of natural selection in evolutionary theory, fittest always has the upper hand in survival [19]. To survive and reproduce one needs higher social ranking or social dominance. Being fit physically than comparative others increases the chance of social dominance. Also, in recent years, the trend of dating online is increasing. Being fit and aesthetic increases the chance of getting a mate. Evolutionary and neurologically increased chances of getting mate increase the chance of reproduction [21, 22, 23] and passing of genes to the next generation, supporting evolution. The way to exhibit the alpha characteristics over the internet is to display strength, endurance, pain bearing capacity, physical skills or body aesthetics through photos or videos. Completing internet challenges involving physical task suffices both the neurobiological and evolutionary motto. Completion of physical task says for e.g. planking challenge not only peaks once fitness and social rank over the peer users but also increases the chance of social dominance and increasing other gender attraction [22, 23]. So in these kinds of challenges it is not only previously discussed neurobiology but also evolutionary psychology comes into play.

Cortisol and Social Media

Most of the social media posts or internet challenges posts are the posts having positive end results i.e. say for soft challenges faces in photos may be enhanced with filters, edits and skills applied, etc. Not many posts with failed results or trolled comments are kept for a long time. Many of the times posts having negative reactions are being deleted. Mostly but may not be all times the challenges that don't aim to provide good feedback or elevate your social status are taken up or become viral. This is nothing but the type of social exclusion on the internet. Intense encounters of social exclusion or relational dismissal can elicit cortisol reactivity [10], especially when the assessment is unambiguous and remarkable. Social rejection can likewise keep up raised cortisol levels in light of these dangers. According to a study by Beekman JB et al [9], Post exclusion cortisol levels were significantly higher, and

people reported greater perceived stress and negative affect. Also, Pre-Experience of Social Exclusion affects the Hypothalamus-Pituitary-Adrenal Axis changing normal cortisol response [11]. This can be an explanation of why some of the internet challenges do not get viral.

DISCUSSION

Social media and its trends or online internet challenges may seem to be technological advancement but underlying mechanisms tend to be neurological. Changes to dopamine levels, modulate the response to viral internet challenges. The dopaminergic system plays an important role in altering responses to social media activities. Social dominance, social ranking and psychological motives of displaying strength can be the basis of many people taking up physical tasks that become viral on the internet. The stress response generated by cortisol alteration can result in trolling and some of the posts or internet challenges not becoming viral. This conclusion needs to be asserted with further studies.

REFERENCES

1. How Much Time Do People Spend on Social Media in 2019? Marie Ennis-O'Connor medium.com, Aug 8, 2019
2. The 7 Best Social Media ‘Challenges’ of All Time Dezmond Moore coiski.com, November 15,2019
3. Social media challenges – What went viral? sadia writtenbysadia.com, February 23, 2020
4. Hormones and the Social Brain Bruce S. McEwen Science Vol. 339, Issue 6117, pp. 279-280 DOI: 10.1126/science.1233713
5. Dopamine and reward: a view from the prefrontal cortex Chau, Bolton K.H; Jarvis, Huw; Law, Chun-Kit; Chong, Trevor T.-J. Behavioural Pharmacology, Volume 29, Number 7, October 2018, pp. 569-583(15)
6. Dopaminergic Neurons and Brain Reward Pathways: From Neurogenesis to Circuit Assembly. Luo SX, Huang EJ. Am J Pathol. 2016;186(3):478–488. doi:10.1016/j.ajpath.2015.09.023
7. Putting desire on a budget: dopamine and energy expenditure, reconciling reward and resources Beeler Jeff, Frazier Cristianne, Zhuang Xiaoxi Frontiers in Integrative Neuroscience, Volume:6,2012 <https://doi.org/10.3389/fnint.2012.00049>
8. Neurobiologic processes in drug reward and addiction Adinoff B. Harv Rev Psychiatry. 2004;12(6):305–320 doi:10.1080/10673220490910844
9. Need to Belong, Not Rejection Sensitivity, Moderates Cortisol Response, Self-Reported Stress, and Negative Affect Following Social Exclusion. Beekman JB, Stock ML1, Marcus T J Soc Psychol. 2016;156(2):131-8 doi: 10.1080/00224545.2015.1071767
10. Cortisol Responses to Social Exclusion Sally S. Dickerson and Peggy M. Zoccola The Oxford Handbook of Social Exclusion, Feb 2013
11. Effects of Pre-Experience of Social Exclusion on Hypothalamus-Pituitary-Adrenal Axis and Catecholaminergic Responsiveness to Public Speaking Stress Weik U, Kuepper Y, Hennig J, Deinzer R PLOS ONE 8(4): e60433 <https://doi.org/10.1371/journal.pone.0060433>
12. The rewarding nature of social interactions Krach S, Paulus FM, Bodden M, Kircher T Front Behav Neurosci. 2010; 4:22 doi:10.3389/fnbeh.2010.00022
13. Baik Ja-Hyun Dopamine Signaling in reward-related behaviors Frontiers in Neural Circuits, Volume:7, 013 doi=10.3389/fncir.2013.00152

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14. Role of brain dopamine in food reward and reinforcement. Wise RA. *Philos Trans R Soc Lond B Biol Sci.* 2006;361(1471):1149–1158 doi:10.1098/rstb.2006.1854
15. Dopamine in Drug Abuse and Addiction: Results of Imaging Studies and Treatment Implications Volkow ND, Fowler JS, Wang G, Swanson JM, Telang F *Arch Neurol.* 2007;64(11):1575–1579 doi:10.1001/archneur.64.11.1575
16. A specific role for serotonin in overcoming effort cost Meyniel F, Goodwin GM, Deakin JW, et al *Elife.* 2016;5:e17282 doi:10.7554/eLife.17282
17. Hormones and Behavior Kathleen V.Casto & David A.Edwards Volume 82, June 2016, Pages 21-37 <https://doi.org/10.1016/j.yhbeh.2016.04.004>
18. Opponency revisited: competition and cooperation between dopamine and serotonin Boureau YL, Dayan P. *Neuropsychopharmacology.* 2011;36(1):74–97
19. From ‘natural selection’ to ‘survival of the fittest’: On the significance of Spencer’s refashioning of Darwin in the 1860s Offer, J. (2014). *Journal of Classical Sociology*, 14(2), 156–177 <https://doi.org/10.1177/1468795X13491646>
20. The Evolution of Interacting Phenotypes: Genetics and Evolution of Social Dominance. Allen J. Moore, Kenneth F. Haynes, Richard F. Preziosi, and Patricia J. Moore *The American Naturalist* 2002 160: S6, S186-S197
21. Kleshchey, M.A., Osadchuk, L.V. Social domination and reproductive success in male laboratory mice (*Mus musculus*). *J Evol Biochem Phys* 50, 227–233 (2014) <https://doi.org/10.1134/S0022093014030053>
22. Social Dominance and Courtship and Mating Behaviour in Rams in Non-Competitive and Competitive Pen Tests R Ungerfeld, SP González-Pensado *Reproduction in Domestic Animals* <https://doi.org/10.1111/j.1439-0531.2007.00987>
23. The inheritance of social dominance, mating behaviour and attractiveness to mates in male *Nauphoeta cinerea* Author links open overlay panel Allen J.Moore *Animal Behaviour* Volume 39, Issue 2, February 1990, Pages 388-397
24. Detection of Dopamine Dynamics in the Brain R. Mark Wightman Leslie J. May Adrian C. Michael *Anal. Chem.* 1988, 60, 13, 769A-793A
25. The role of dopamine in reward and pleasure behaviour – review of data from preclinical research R. A. Bressan et al *Acta Psychiatrica Scandinavica*: 05 May 2005 <https://doi.org/10.1111/j.1600-0447.2005.00540.x>
26. Journal home page for Trends in Neurosciences, Trends in Neurosciences, Volume 3, Issue 4, April 1980, Pages 91-95 The dopamine synapse and the notion of ‘pleasure centers’ in the brain Roy A.Wise [https://doi.org/10.1016/0166-2236\(80\)90035-1](https://doi.org/10.1016/0166-2236(80)90035-1)
27. What is the role of dopamine in reward: hedonic impact, reward learning, or incentive salience? Kent CBerridge, Terry ERobinson *Brain Research Reviews*, Volume 28, Issue 3, December 1998, Pages 309-369 [https://doi.org/10.1016/S0165-0173\(98\)00019-8](https://doi.org/10.1016/S0165-0173(98)00019-8)
28. Pharmacology and behavioral pharmacology of the mesocortical dopamine system T.M.Tzschentke *Progress in Neurobiology*, Volume 63, Issue 3, February 2001, Pages 241-320 [https://doi.org/10.1016/S0301-0082\(00\)00033-2](https://doi.org/10.1016/S0301-0082(00)00033-2)
29. Opinion, Social dominance and stress hormones Scott Creel *Trends in Ecology & Evolution*, Volume 16, Issue 9, 1 September 2001, Pages 491-497 [https://doi.org/10.1016/S0169-5347\(01\)02227-3](https://doi.org/10.1016/S0169-5347(01)02227-3)
30. The concept of social dominance Thelma E.Rowell *Behavioral Biology*, Volume 11, Issue 2, June 1974, Pages 131-154 [https://doi.org/10.1016/S0091-6773\(74\)90289-2](https://doi.org/10.1016/S0091-6773(74)90289-2)

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Conflict of Interest

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