



sounds, mic brushing, personal attention role plays etc. Whispering is the most common trigger, with almost all performers using a soft voice and whispers in their videos. Another common and popular trigger is tapping, with performers tapping their nails or other items on wooden, plastic, metal or paper objects. Microphone brushing, finger tracing, slow breathing and mouth sounds are also frequently used. Eating and drinking sounds are quite popular; specially slurping, biting and chewing crunchy or gummy foodstuffs. This form of ASMR finds an overlap with the South Korean trend of 'mukbang', which is an audiovisual broadcast of a host consuming food. Online platforms are now brimming with *Mukbang* ASMR videos. Other frequently viewed videos include role-playing, wherein the performer is depicted as someone providing personal attention; such as a massage therapist, hairdresser, nail technician or make-up artist. Clinical role-play such as doctor, nurse or physical therapist is also popular, with performers simulating general physical examinations, eye and ear check-ups, neurological examination etc. Videos may be specifically targeted to help viewers find relief from insomnia, anxiety, panic attacks, migraines etc. Many ASMRtists combine triggers with techniques such as breathing exercises, guided meditation, progressive muscle relaxation and positive affirmations. ASMR has consistently been compared with two other phenomena- frisson and synesthesia. Frisson is described as a strong feeling of excitement or thrill, usually caused by music. It consists of an overwhelming emotional response along with physical response in the form of pilo-erection. Frisson is usually associated with physiological arousal, and occurs over a shorter time frame. ASMR, on the other hand, has a soothing and relaxing effect and can have a variable time course. In synesthesia, individuals involuntarily experience stimulation of multiple sensory modalities simultaneously. Although ASMR has been likened to an auditory-tactile synesthesia, it differs in that individual can voluntarily choose to disengage from ASMR [4]. Barratt and Davis found 29 of their study participants to genuinely have synesthesia, which was 5.9% of the sample [1]. This was just short of being significantly greater than the prevalence of synesthesia in the general population, which is 4.4% [5].

### NEUROPHYSIOLOGY OF ASMR

The neurophysiological basis of ASMR is still unclear. A study found that out of the Big Five personality traits, individuals who experience ASMR scored higher on Openness-to-experience and Neuroticism than those who do not [6]. Only a handful of studies have attempted to delineate the neural substrate of this interesting phenomenon. According to prolific ASMR researcher Craig Richard, ASMR works through various neurotransmitter pathways; namely endorphins, oxytocin, serotonin and dopamine. Serotonin and oxytocin both contribute towards the feeling of comfort, relaxation and decreased stress. Additionally, the former leads to mood elevation as well as improved sleep, while the latter causes increased endorphin

receptor sensitivity. Endorphins are implicated in the euphoria and tingling sensation, along with relaxation and sleepiness. To add to all this, dopamine could possibly contribute to the desire to experience ASMR repeatedly. He also hypothesizes that ASMR-inducing triggers actually stimulate pathways that form the biological basis of inter-personal bonding and affiliative behaviors. There are many parallels between ASMR triggers and parental behaviors; for instance, soft and gentle whispers, light and soothing touch, undivided attention, expressions of concern etc. [7]. A study of emotional and physiological correlates of ASMR found it was associated with decreased heart rate and increased skin conductance. These seemingly opposite findings (calmness and arousal) point towards the emotional complexity of the ASMR experience, indicating that it is more than just 'tingles' [8]. A 32-channel Electroencephalogram (EEG) controlled study found that ASMR stimuli, particularly auditory ones, elicited increased alpha wave activity in ASMR experiencers but not in controls [9]. Functional imaging has been a preferred mode of investigation into the possible neural pathways of the ASMR experience. In a controlled study using fMRI, researchers concluded that individuals with ASMR had increased connectivity between regions of the occipital, temporal and frontal cortices, and less functional connectivity of the default mode network, when compared with controls [10]. Atypical patterns were also found in the central executive and sensorimotor networks, along with reduced functional connectivity in the salience and visual networks [11]. These findings suggest that while ASMR-experiencers have less distinct resting state networks than non-ASMR experiencers, they had recruitment of additional brain areas while experiencing the rewarding tingling sensations.

Lochte et al used fMRI to examine brain activation in ASMR-experiencers and found that they showed significant activation in nucleus accumbens, dorsal anterior cingulate cortex and insular regions, indicating the involvement of pathways associated with reward as well as emotional arousal [12]. A 2020 fMRI study that used seed-based correlation analysis found that functional connections between the posterior cortex, superior/middle temporal gyri, cuneus and lingual gyrus were significantly increased during the ASMR experience when compared to resting state [13]. Sensitivity to each trigger category may itself be associated with unique patterns of functional connectivity, such as atypical attentional processing [14]. These studies, though still not providing unequivocal evidence, are still a step in the direction of understanding the neurobiological mechanisms of ASMR.

### REPORTED BENEFITS AND CLINICAL APPLICATIONS

The first peer-reviewed article on ASMR carried out a survey of 475 participants who experienced ASMR [1]. Nearly 98% participants reported watching ASMR videos in

order to relax, 82% for sleep and 70% to deal with stress. Upto 75% participants reported that whispering triggered the tingling sensation, followed by personal attention, crisp sounds, slow and repetitive movements etc. Participant also reported using it to deal with chronic pain. Watching ASMR videos before bed was a ritual for 81% of the participants, and led to an improvement in mood for 80% of them. This survey sought to pioneer ASMR research, and also refuted the commonly held misconception that ASMR was used as a means of sexual stimulation. Further studies also established that ASMR was used commonly for relaxation, sleeping, reducing anxiety and improving mood [8,15]. The application of ASMR has also been explored in education circles, as it can improve focus, help with performance anxiety and boost creativity [16]. ASMR has also been suggested as a potential tool in mitigating meltdowns in autistic individuals, and reduce anxiety related to emotional self-regulation. It could be both a crisis as well as preventive measure [17]. Individuals who experience ASMR have been seen to use cognitive reevaluation techniques in emotionally arousing circumstances, thereby indicating towards more effective emotional regulation than non-experiencers [18]. Various online posts and testimonials are available on the role of ASMR in addiction recovery, dealing with sexual assault, abusive relationships etc. [19-21]. An example is Karuna Satori ASMR, who reports having turned to ASMR to overcome her oxycodone addiction and now runs her own channel [22]. Interestingly, the online ASMR community is known for being a warm and appreciative space. The comments section is always very positive and encouraging; with people extending virtual support, advice and positive affirmations to each other.

### ASMR IN THE COVID ERA

ASMR has taken on a new role amid the coronavirus outbreak- that of helping soothe and relax people experiencing isolation and anxiety due to the pandemic. The COVID-19 pandemic suddenly jolted millions of people into a life of loneliness and uncertainty. They were away from human company, and constantly worried about themselves, their family and friends. Those diagnosed with or suspected to be carrying the virus were subjected not just to isolation, but to stigma and judgement. Normal ways of life were suspended; causing anxiety, low mood and difficulty in sleeping. People around the globe took to watching ASMR videos to manage stress during quarantine or isolation periods. The videos attempt to mimic a human presence as well as touch, creating an ersatz companionship to counter aloneness [23]. Many performers have streamed videos simulating COVID testing; using the platform to help people get comfortable with the process, disseminate information and debunk myths [24].

### CONCLUSION

ASMR has taken the world by storm, yet it is quite clear that ASMR is more than a pop culture phenomenon. It has

potential applications in many areas related to mental health and well-being. ASMR has managed to build a diverse worldwide audience, and is not just a millennial trend. However, scientific research in this field is quite scanty and needs greater impetus for us to truly understand the neural pathways at play here. It seems to be a complex neurobiological phenomenon, with its roots in various affiliative behaviors such as parent-child, friends and partners. With greater comprehension of this experience, we will be able to unlock new frontiers in this field. Currently, ASMR is being used by millions of people to relax, focus, help them sleep, cope with trauma. It has the potential to be utilized in a more structured and technical manner. ASMR could be a tool in the mental health professional's arsenal with its easy use, accessibility and lack of adverse effects. Nevertheless, it is important to note that it could be an adjunctive therapy instead of being the primary treatment modality for psychiatric disorders. One must be pragmatic and not overly enthusiastic in this sphere.

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