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A Grant Proposal for the Effects of Autonomous Sensory Meridian Response on Sleep Quality in Older Adults

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by

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Dedication

A stick, a stone, it's the end of the road
It's the rest of a stump, it's a little alone
It's a sliver of glass, it is life, it's the sun
It is night, it is death, it's a trap, it's a gun

The oak when it blooms, a fox in the bush
A knot in the wood, the song of a thrush
The wood of the wind, a cliff, a fall
A scratch, a lump, it is nothing at all

It's the wind blowing free, it's the end of the slope
It's a beam, it's a void, it's a hunch, it's a hope
And the river bank talks of the waters of March
It's the end of the strain, it's the joy in your heart

The Waters of March
Antônio Carlos Jobim

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~Justin Hulbert~

I would not have been able to do this project without you.
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I am beyond grateful for all the time and energy you dedicated to helping me along the way.
I apologize for not using cats as my target population, cat ASMR will simply have to wait a while longer.

~Cathy Reinis and the LLI~

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~my dearest friends~

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~ma chère famille~

Merci de m'avoir soutenue à travers ce projet. Je vous aime infiniment.
Des bisous, des bisous, des bisous!

~ASMR~

I watched a LOT of ASMR while writing this to both fuel this project and recover from this project. I will forever be grateful for this weird sensation that feels good.

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Abstract

Autonomous Sensory Meridian Response (ASMR), first coined by Jennifer Allen in 2010, is a term used to describe an automatic emotional and physiological response to certain auditory and visual stimuli. This sensory phenomenon is characterized by feelings of pleasure, calmness and a tingling sensation down the scalp and back (Poerio, 2020). What originally started out as a phenomenon some people experience in everyday life evolved into an internationally recognized and sought-after media made available on a variety of platforms including YouTube. ASMR's popularity may be attributed to its reported sleep, relaxation, and mood improvements in younger adults (Barratt and Davis, 2015). Sleep Disturbances are particularly prevalent in the elderly, especially amongst nursing home and assisted living facility residents. This is a growing concern considering how instrumental sleep is to daily functioning and the detrimental effects poor sleep can have on people's health. Poor sleep in older adults is associated with chronic stress, increased morbidity, and lower quality of life (MacLeod, S. et al. 2018).Taken together, this project hopes to explore the effects of ASMR on the sleep quality of older adults living in assisted living facilities, using younger adults as a comparison. The open questions I hope to explore in this study are: how do older adults who have little to no exposure to ASMR or preconceived notions about ASMR experience ASMR? Could ASMR experience and sensitivity be attributed to a placebo effect? Furthermore, how does ASMR experience change over one's lifetime? I plan on conducting a norming study in which participants aged 65 and up are presented with three ASMR videos and asked to provide feedback on the videos in a survey format. The results of the norming study will inform a grant proposal looking at the effects of ASMR vs. a control video on the sleep quality of residents of assisted living facilities and college students. Participants will be presented an ASMR and a control video before bed, and their sleep quality and ASMR experience will be measured using the Oura Ring Generation 3 and the ASMR-15. I predict there to be a significant effect of the ASMR video on the sleep quality and ASMR experience of younger adults. In addition, I predict there to be a significant effect of the control video on the sleep quality and ASMR experience of older adults.

Keywords: Autonomous Sensory Meridian Response, older adults, sleep quality

A Grant Proposal for the Effects of Autonomous Sensory Meridian Response on Sleep Quality in Older Adults

People have long turned to multimedia as a form of entertainment, escapism, and relaxation from the stressors and troubles that accompany daily life. Bob Ross's long-running television program "The Joy of Painting " on PBS between 1983 and 1994 is a popular example of a show that had relaxation and entertainment benefits for its viewers during its runtime and continues to do so up to this day. This show gained traction for multiple reasons. For example, it is a wonderful resource for artists and people learning how to paint. However, other individuals report experiencing a tingling sensation in response to Bob Ross's program. This experience fits the definition of what has come to be known as Autonomous Sensory Meridian Response (ASMR).

AMR is a term used to describe an automatic emotional and physiological response to specific auditory and/or visual stimuli characterized by feelings of pleasure, calmness, and a tingling sensation that travels down the nervous system (Roberts et al., 2019). This tingling sensation is akin, in some respects, to the aesthetic chills induced by certain forms of moving music (Fredborg et al., 2017). Both chills, also known as frisson, and ASMR require external stimuli to elicit a physiological and emotional response. If we unpack the meaning of each letter in ASMR, the A stands for autonomous which refers to the automatic, involuntary nature of ASMR. The S stands for sensory and relates to the physical sensation that is integral to the experience of ASMR. The M or meridian relates to the peak sensation of ASMR and the R or response categorizes ASMR as a behavior or reaction in response to an external stimulus.

The term ASMR not only refers to this sensation but is also attributed to the things that incite this very sensation. Hostler et al. (2019) define ASMR as both a state (sensory experience) and a trait (ability to experience said sensory experience). The specific audio and visual stimuli reported to incite ASMR are commonly referred to as "triggers." Common triggers include whispering, tapping, crackling, page turning, repetitive movements and tasks, and personal attention. Videos that elicit ASMR are called ASMR videos and their creators are known as ASMRtists. When making content for the purpose of ASMR, ASMRtists ground their videos in the performance and production of different triggers. There lies the beauty and circularity of ASMR; ASMR inhabits a space for uncertainty as well as possibilities that provides ASMR enjoyers and content creators with the freedom to explore a variety of unique and diverse triggers. This explains why there is such a wide range of content online that is considered ASMR.

The Birth of ASMR

Before ASMR became what it is known as today, a popular type of media, ASMR was considered a sensation certain people experienced in everyday life. Examples of everyday experiences that can spark ASMR include: getting one's hair brushed, being read a story, and watching someone complete a monotonous, repetitive task such as folding laundry. The first members of the ASMR community were people that met each other on health forums in the early 2000s and bonded over an unidentified sensation (Smith & Snider, 2019; Maddox, 2021). They then began sharing videos with each other that elicited this unidentified sensation until eventually, individuals started making videos with the intention of eliciting ASMR (Maddox, 2021). After multiple Google searches in attempts to find a definition for this strange sensation

she was feeling, Jennifer Allen found a forum in SteadyHealth titled “Weird sensation feels good”. Allen, is believed to have coined the term ASMR on the SteadyHealth forum in 2010 in response to the absence of a name for this “weird sensation that feels good”(Keiles, 2019; Poerio, 2020).

Since 2010, the up-and-coming ASMR community has shifted its presence from Reddit forums to YouTube. YouTube serves as the ideal platform for sharing ASMR content considering it is an affordable, accessible, and popular video-sharing platform. In fact, YouTube is home to a growing ASMR community of viewers and so-called ASMRtists. According to Hardwick (2020), in 2021, ASMR was the second most searched term on YouTube in the United States and the third most searched term on YouTube worldwide. One of the most popular ASMRtists, Gibi ASMR, has 4.06 million subscribers on YouTube. This popularity may be explained by YouTube’s algorithm making suggestions based on demographics.

In addition to YouTube, ASMR-inducing stimuli can be accessed through a variety of mobile apps, such as The Calm App, a meditation app for sleep and relaxation, and Tingles, which offers audio and visual ASMR, and white noise content to promote relaxation. Today, people have immediate, on-demand access to the content created for the purpose of ASMR. Furthermore, the increase in media during the 20th century has opened up the doors for ASMR to take form and make it accessible to a wider audience, spreading internationally. For example, in South Korea, a popular ASMR trend that has emerged is a type of video known as “mukbang”, in which content creators record themselves consuming large amounts of food (Poerio, 2020).

Why ASMR?

One of the goals of ASMR videos is to simulate feelings of deep relaxation and tingles individuals experience in everyday life. Many young people anecdotally report watching or listening to ASMR stimulus to help reduce stress, improve well-being, and fall asleep more easily. In a study surveying 475 participants, aged between 18-54, who reported experiencing ASMR, 98% reported using ASMR for relaxation, 82% for sleep, and 70% for stress relief. Furthermore, 80% of participants reported an improvement in mood during and following an ASMR state (Barratt & Davis, 2015). Poerio et al. (2018) found that 83% of participants reported watching ASMR in order to elicit ASMR and 51% reported that they watched ASMR either daily or multiple times a week. These findings suggest that for a subset of the population, ASMR is purposefully sought out by those who experience it due to benefits related to relaxation, sleep, and stress relief.

The Key Ingredients of ASMR Videos

Despite the fact that ASMR encompasses a large pool of content, there are key characteristics that differentiate ASMR videos from other forms of multimedia (e.g., guided meditation videos and music). One key factor of ASMR videos is the manner in which the audio is recorded and how the video's content is structured. ASMR videos uniquely focus on the isolation and magnification of mundane, everyday sounds. Videos created to induce ASMR rely on microphones or high quality recording devices to record and isolate crisp, pure sounds. In order to best experience the audio of ASMR videos, it is often recommended to wear headphones to feel the intensity and fullness and pureness of the sound.

Recording high quality audio is integral to ASMR because it plays a crucial role in the sensory experience of ASMR. Barratt et al. (2017) found that 77% of participants rated that the pitch of the audio had an impact on ASMR experience and 56% of participants agreed that lower-pitch sounds were more effective than higher-pitch sounds in eliciting ASMR. These findings provide evidence for the importance of audio on the affective experience of ASMR.

The main focus of the majority of ASMR videos is the object/subject of the video and the sound it emits. Such sounds tend to be recorded in empty, silent spaces devoid of background noise or music. Smith and Snider (2019) describe this "lack of physical co-presence" as an integral aspect of ASMR that is key to understanding this phenomenon and art form (p. 45). It is possible that certain objects emit frequencies with timbers that people are more receptive to than other objects, increasing their likelihood of eliciting ASMR.

However, another core ingredient of ASMR is the manner in which videos are structured and paced. Slow and repetitive movements are a prominent ASMR technique that ASMRtists make use of in their videos on Youtube. The low intensity of slow movement and spoken word, when present, have a lulling quality that work in harmony with the stimulating auditory stimulus. A typical ASMR video involves an ASMRtist's slow and repetitive interaction with a variety of different objects (e.g., lighting a candle, turning pages of a book, tapping on a box, popping bubble wrap) with a hyperfocus on the sound the object produces. Such videos can be accompanied by whispered or soft spoken descriptions of the objects or one-sided conversations with the viewer.

ASMR videos create fantastic spaces for sounds that usually exist as background noise in everyday life to take center stage as the object of attention and admiration. By removing a sound

from its original context, it is transformed into a new sensory experience within its new context as the focus of an ASMR video. A sound that may be considered background noise in daily life (e.g., the sound of brushing hair) occupies an ambivalent space as something that is both familiar and unfamiliar, mundane and new in the ASMR realm. ASMR is an alternate reality experience striving to simulate reality (Chae et al., 2021).

Likewise, a prominent auditory technique of ASMR videos is the binaural effect. The binaural effect occurs when two tones with different frequencies are simultaneously presented to both ears, causing the listener to perceive both frequencies as one beat (Reedijk et al., 2013). These dual frequencies that elicit the binaural effect are referred to as binaural beats. The auditory stimuli heard by each ear is separately registered in the superior olivary complex, located in the brainstem. From there, neurons located in the inferior colliculus recognize the auditory input as a beat or single frequency (Lee et al., 2019). Although the binaural effect is not incorporated in all ASMR stimuli, it is a common feature used by ASMRtists, which requires headphones for the effect to take place (Nissinene, 2018). In order to do so, an ASMRtist will use two microphones and whisper different words in both ears so that the sound travels from ear to ear. The utilization of the binaural effect in ASMR videos reinforces the influence and importance of auditory stimulus in eliciting ASMR.

Considering the rise of sleep disturbances, Lee et al. (2019) were interested in combining binaural beats and ASMR to induce sleep in people that have trouble falling asleep. Lee et al. (2019) decided to test the effects of adding ASMR to binaural beats because binaural beats were considered unpleasant when listened to on their own before bed. The binaural beats were set at a frequency of 6Hz which corresponds to the frequency during the first sleep stage “at which brain

activity is entrained during non-rapid eye movement (NREM)" (Lee et al., 2019, p.1). The researchers selected ASMR nature sounds including rain, sea waves, waterfall, forest, and river sounds as their ASMR stimulus. After finding the optimal ratio of binaural beats to ASMR, the researchers compared its effects to other auditory stimuli (binaural beats only, ASMR only, and silent stimuli). The researchers found that the combined binaural beats and ASMR stimulus was capable of inducing the brain signals necessary for sleep onset. Participants reported feelings of calmness after listening to the ASMR and the combined ASMR and binaural beats stimulus. After listening to the combined stimulus, participants had an increased theta power in the midline that is linked to transitioning into sleep. This study provides support for the pairing of ASMR and binaural beats as a stimulus with potential sleep benefits, which is common practice of ASMRtists in ASMR videos.

Another prominent characteristic of ASMR videos is the use of first-person perspective to create the illusion that the viewer is experiencing the ASMR in person, in spite of the evident digital distance. In order to create the illusion of proximity, ASMRtists often speak closely into the microphones and use close up angles. The key factors of ASMR listed above (high quality audio and quiet backgrounds) work together to enhance the simulation of closeness and intimacy between the viewer and the ASMRtist. Furthermore, Smith and Snider (2019) put forth the idea that having digitally mediated intimacy removes the pressure on the consumer to socialize and engage in conversation. The intimacy of ASMR videos is essentially one-sided in the sense that nothing is expected from the viewer, which in itself is comforting and conducive to relaxation. The viewer's only responsibility is to sit back and relax.

ASMR Beyond YouTube

The key factors that make ASMR stimulus effective mediators of the ASMR state have recently been employed by advertising and marketing platforms. It's possible that ASMR recently caught the attention of brands and businesses because of its growing popularity on YouTube and social media. Michelob Ultra made an ASMR commercial called "The Pure Experience" starring Zoe Kravitz to advertise a beer named the Michelob Ultra Pure Gold. This commercial aired during the 2019 Super Bowl (Schonfeld, 2019) and can be found on YouTube using the following link: https://www.youtube.com/watch?v=zqU8ar4gSyI. In this commercial, Zoe Kravitz uses the whispering ASMR trigger by whispering softly into a microphone:"let's all experience something together." This commercial successfully captures the crisp auditory component of ASMR through its recording of Kravitz tapping on the bottle as well as the fizzing and bubbles of the beer being poured into a glass. Another example of ASMR in advertising is the "Oddly Ikea" Ikea campaign which consists of a 25-minute long ASMR styled video of back to school college items (https://www.youtube.com/watch?v=uLFaj3Z_tWw). In this commercial, a voice softly describes different dorm solutions with close up angles of the products for sale as well as their sound and texture.

Additionally, a unique use of ASMR is the way *W magazine* has integrated ASMR into their interview process. *W,* a fashion magazine, owns a YouTube channel on which well-known celebrities are documented exploring ASMR and answering questions about themselves. One of these ASMR interviews with rapper Cardi B has reached 52 million views on YouTube (https://www.youtube.com/watch?v=HUMygkRhB88). The celebrities are provided two microphones, with a microphone corresponding to each ear. These microphones enable the

celebrities' interviews to speak using a binaural effect. Through advertisements like these, ASMR is reaching new platforms and audiences. ASMR has the potential to intensify the consumer experience of products and market the sensory experience of different products using ASMR elements and triggers such as whispering, tapping, and the binaural effect.

Misconceptions of ASMR

In order to better understand what it is that makes ASMR ASMR, it is important to distinguish what it is not. Although ASMR tingles are often compared to frisson, also described as chills induced from listening to moving music, these sensations are not interchangeable (Fredborg et al., 2017). Whereas research suggests that frisson is associated with increased heart rate, increased respiratory rate, and increased skin conductance, ASMR is associated with decreased heart rate and increased skin conductance in participants that experience ASMR (Poerio et al, 2018). Furthermore, whereas frisson is associated with feelings of excitement, tingles are associated with feelings of calmness (Poerio et al, 2018). These findings put forward the physiological differences between ASMR and frisson suggesting that these sensations are not one and the same.

ASMR is often misjudged and misinterpreted as an erotic experience when in fact, this notion contradicts the ASMR phenomeon. Although sexual ASMR does exist, ASMR is inherently nonsexual. For instance, ASMR is associated with inciting feelings of relaxation rather than excitement and arousal. Barratt and Davis (2015) found that 84% of participants disagreed with the statement that ASMR served as a sexual stimulant. In fact, the ASMR community is ardently against the sexualization of ASMR, which may be related to their drive for scientific recognition and validation (Smith & Snider, 2019).

The stigmatization of ASMR as a sexual experience or kink has had detrimental effects on ASMRtists and the perception of ASMR in the late 2010s. In 2018, YouTube started flagging or removing nonsexual and nonviolent videos from their platform that were deemed inappropriate. As a result, multiple ASMR videos were flagged and demonetized despite not violating Youtube's community guidelines. Demonetization is when a YouTube channel is banned from making earnings through advertising. Because brands do not want to be affiliated with inappropriate channels and content, YouTube flags accounts that are not ad-friendly. Many roleplay ASMR videos were demonitzed by YouTube because the term "roleplay" was regarded as sexual content. (Cresci, 2018; Maddow, 2021). Furthermore, Youtube even asked PayPal to freeze the accounts of certain ASMRtsists with flagged YouTube accounts. As a result, multiple prominent ASMRtists such as ASMRGlow and Creative Calm ASMR had their accounts suspended and were unable to access their PayPal earnings for 180 days (Cresci, 2018). Fortunately, the banning of their accounts was revoked once this story gained media coverage. Youtube and PayPal's actions speak to how the misjudging of ASMR as an inappropriate experience has harmful effects on the ASMR community.

Literature Review of ASMR

Although the scientific literature on ASMR is limited, there is a small but growing body of peer-reviewed work dedicated to bettering our understanding of this phenomenon. Cash et al. (2018) designed a study to test whether ASMR experience is a product of expectation comparing participants that reported experiencing ASMR and participants that reported not experiencing ASMR. The expectancy manipulation consisted of two conditions. In the first, the encouraging condition, participants were informed that the videos they would be presented were proven to

elicit ASMR in individuals. In the discouraging condition, participants were informed that the videos they would be presented were proven to not elicit ASMR in individuals. Participants were then asked to give the videos an ASMR ranking. Cash et al. discovered that unlike the non-ASMR participants, ASMR participants were unaffected by the expectation manipulation. In addition, ASMR participants rated ASMR clips higher than non-ASMR clips (foil and music) at eliciting ASMR. Although Cash et al. interpreted these findings as providing evidence for expectancy effect in both groups (ASMR and non-ASMR experiencers), Hostler et al. (2019) proposed a different interpretation in their review of this study. Hostler et al. (2019) argued that these findings disprove the notion that ASMR is a product of individual expectation and prove that ASMR is a genuine experience for people that experience ASMR.

Fredborg et al. (2021) conducted an EEG study during which participants were presented eight different stimuli: 2 audiovisual ASMR videos, 2 audiovisual control videos, 2 audio ASMR stimuli, and 2 control audio stimuli. The EEG analysis revealed more significant alpha power activation in the frontal and parietal lobes during the viewing of auditory ASMR stimuli than for audiovisual ASMR stimuli. They also found that the ASMR experience of ASMR-sensitive participants (individuals that experience ASMR) was correlated with increased alpha power recorded over the frontal and parietal lobes and near the precuneus. This pattern of activity has also been observed in individuals during creative ideation and divergent thinking tasks (e.g., Fink & Benedek, 2014). The most surprising result of the study was that control participants (i.e., individuals who reported not being ASMR-sensitive) experienced a decrease in alpha power in frontal and precuneus regions when comparing their pre ASMR state vs. during the ASMR stimuli.

Increases in alpha power are often associated with mindfulness and meditation (Roberts et al., 2021). These findings suggest that ASMR is linked to a restful and mindful state in brain regions related to sensory perception and executive functions in people that experience ASMR (Ferdbordg et al., 2021). All this considered, it's worth noting the study's limitations, such as the study's small sample size (N=28), participant reports of the EEG recording interfering with their ASMR tingle experience, and a high concentration of Caucasian females in the sample.

Another study found that the connectivity in the default mode network was disrupted in ASMR sensitive individuals compared to a control group (individuals who reported not being sensitive to ASMR) "between frontal, sensory and attentional regions" (Hostler et al., 2019, p.525). The default mode network prominently includes the medial prefrontal cortex, medial temporal gyri, bilateral inferior cortices, precuneus and posterior cingulate gyrus (Smith et al., 2015). The DMN is more active during the resting state and is associated with internal focus (Ashwal, 2017). The researchers suggested that ASMR may be related to reduced ability to inhibit sensory-emotional experiences that are suppressed in most individuals (Smith et al., 2017).

Multiple studies have examined the links between personality traits and ASMR sensitivity. Fredborg et al. (2017) discovered that people that reported experiencing ASMR had a significantly higher openness to new experiences and neuroticism scores on the Big Five Personality Inventory (BFI). In addition, self-report ASMR experience was correlated with lower conscientiousness, extraversion, and agreeableness compared to the control group. ASMR sensitivity was measured using the ASMR checklist, anASMR scale that measures participant's

tingle experience and intensity in response to 14 different stimuli (e.g., haircut simulation, watching someone draw, chewing sounds).

Another study involving a generalized sample of 185 Australian psychology undergraduates found a significant correlation between ASMR, personality, and sensory sensitivity. Higher ASMR scores were associated with higher openness to new experiences on the BFI and sensory processing sensitivity (SPS) on the Highly Sensitive Person Scale (HSPS) . Lower conscientiousness scores were associated with ASMR scores for participants with previous ASMR experience (Roberts et al., 2021). ASMR sensitivity was measured using the ASMR-15, a 15-item ASMR scale for which further explanation will be provided in the methods section of this paper.These results suggest that people interested in and receptive to ASMR may have higher emotional reactivity and open-mindedness to novel and unfamiliar experiences compared to people who do not show the same interest in or receptivity to ASMR.

In addition to personality, another study explored the relationship between ASMR and sensory suggestibility. Sensory suggestibility refers to when an individual's sensory experiences are influenced by another person in a covert manner (Keizer et al., 2020). Researchers used the sensory suggestibility scale (SSS) as a measure of sensory suggestibility on ASMR-sensitive participants and a group of non ASMR-sensitive participants. A Mann Whitney *U* test showed that the ASMR group and the non-ASMR group had a significant difference in SSS scores, with higher SSS scores in the ASMR group. Keizer et al. (2020) argued that ASMR sensitive individuals are more vulnerable to "experiencing illusory sensory events" (p.115).

One study using an eye-tracking approach to the study of ASMR involved 91 participants divided into three groups: ASMR sensitive, not-ASMR sensitive, and unsure. Participants were

presented with an ASMR video and a control video and were tasked with pressing a button every time they felt tingles. The control stimulus used for this study was the same video as the ASMR stimulus stripped of its audio. Although the study found no significant differences between groups, tingle reports were correlated with increases in pupil diameters in the ASMR group. In addition, all three groups had a significant increase in pupil diameter during the ASMR video compared to the control video. Finally, the ASMR group and unsure group reported more tingles during the ASMR video than during the control video (Valtakari et al., 2019).

Finally, ASMR research has also explored the development of ASMR sensitivity by looking at the age at which individuals first report experiencing ASMR. Multiple people that experience ASMR report having had their first experience of ASMR during childhood (Poerio et al., 2018). Participants in a study by Poerio et al. (2015) reported their first ASMR experience between the ages of 5 and 10. Poerio (2020) argues that ASMR is deeply connected to the triggering of memories, whether it be from childhood or other moments from an individual's life. The repetitive, monotonous, familiar movements of ASMR have the ability to tap into memories of past moments which may play a part in the sensation of extreme calmness and tingles that characterizes ASMR.

One of the major takeaways of these findings is the individual differences between people that report experiencing ASMR and those that do not. More specifically, the literature suggests there are physiological and neurological differences in people that experience ASMR compared to those that do not experience ASMR. Despite the fact that ASMR is highly individualized and that different ASMR stimulus have different effects on different people, it is noteworthy that the ASMR community united around Jennifer Allen's term and agreed upon the characterization of

ASMR as a pleasurable, calming sensation associated with a tingling sensation in the crown of the head and down the spine. Furthermore, although people vary in what triggers they find effective in eliciting ASMR, Barratt and Davis (2015) discovered that 75% of the participants reported experiencing tingles from the trigger whispering, 69% from personal attention, 64% from crisp sounds (e.g., metallic foil, tapping fingernails), and 53% from slow movements. These findings suggest that whispering, personal attention, crisp sounds, and slow movements are triggers capable of producing ASMR in the vast majority of ASMR experiencers. As a result, these findings were considered in the selection of stimulus proposed as part of this Grant Proposal.

Considering that ASMR research is in its infancy, there are still open questions that the current ASMR research has only begun or failed to answer. One of these open questions is whether ASMR sensitivity is innate or learned? Do ASMR sensitive people automatically experience ASMR after experiencing ASMR stimulus or do they develop this sensitivity through continued exposure to ASMR stimulus? Is ASMR experience on a spectrum or a binary? Can ASMR sensitive individuals experience habituation and lose the ASMR trait? What percentage of the population is sensitive to ASMR?

For the purposes of my research, I will be focusing on a number of other open questions. Firstly, I ask whether ASMR sensitivity changes over the lifespan? Research has shown that children are capable of experiencing ASMR, but how does this experience change and develop with age? The majority of studies on ASMR have recruited participants with exposure or knowledge of ASMR. But what is the response from people who likely don't have preconceived notions about ASMR stimuli? Would they be interested in using them to find similar benefits

reported by younger populations, particularly with respect to healthy sleep habits and relaxation? In an attempt to answer these open questions, this project will focus on how older adults, individuals aged 65 and up, experience ASMR and how ASMR may benefit their sleep quality.

In this study, I will focus on the classification of ASMR as a trait, operationally defined as an automatic, peak emotional and physiological response to certain auditory and/or visual ASMR-inducing stimuli. This definition of ASMR is purposefully rooted in empirical terms to make research in this area more tractable. Furthermore, this study will use the contextualized version of the ASMR-15, adapted and tested by Roberts et al. (2021) to measure ASMR sensitivity. In this study, ASMR sensitivity refers to an individual's ability to experience ASMR (e.g. experience tingles and/or sense of deep calmness from the viewing of ASMR videos). Sleep quality will be measured using the Oura ring Generation 3, a device which calculates an overall nighttime sleep quality score.

Sleep in Older Adults

According to Minert et al. (2016), one in five people in the United States will be over the age of 65 by the year 2030. As the aging population continues to grow, it is important for individuals to understand the natural physiological changes that take place in the older population. One notable shift that occurs in older adults is the natural change in sleep architecture which may result in a decreased sleep quality. Age-related sleep changes are characterized by a reduction in total sleep time, sleep efficiency (i.e., the time a person spends asleep during the night), slow wave sleep, and rapid eye movement sleep. Other age related sleep changes include an increase in sleep latency (the time between being fully awake and the onset of sleep), numbers of wakeups during the night, and time awake after sleep (Miner et al., 2016;

Abad & Guilleminault, 2018). These age-related sleep shifts are often associated with napping and sleep onset during the day (Bloom et al., 2009). Due to these natural physiological changes in their sleep architecture, older adults have a reduced sleep quality due to their shorter sleep periods and increased amount of wakups during the night compared to the average sleep quality of other age groups. The natural changes to sleep architecture and their effects on sleep quality in older adults is important considering how essential sleep is to maintaining physical and cognitive health. For example, sleep plays a key role in immune health, blood sugar regulation, memory consolidation, concentration, and mood (Altini & Kinnunen, 2021).

One explanation for age-related shifts in older adults' sleep architecture is a change in circadian rhythm over the lifespan. The circadian rhythm is the body's internal clock which oversees the sleep wake cycle. The circadian rhythm is also responsible for other vital functions such as regulating heart rate, hormone secretion and body temperature. The circadian rhythm uses information from light exposure to synchronize an individual's sleep wake cycle with their environment (Duffy et al., 2015). Using artificial light at night is associated with melatonin production reduction, interfering with one's circadian rhythm (Duffy et al., 2015). Aging is associated with a shorter circadian rhythm. This explains why older adults tend to feel sleepy sooner and wake up from sleep earlier. Older adults often complain of sleepiness and drowsiness during the day. Longitudinal studies suggest that daytime drowsiness is associated with increased risk of falls, cardiovascular disease, and death (Miner et al., 2015). There are a multitude of factors in addition to circadian rhythm changes that can contribute to poor sleep quality in older adults such as medication use, a person's mental health (e.g., depression, anxiety), pain related to diseases such as arthritis and heart disease, and bereavement (Miner et al., 2015). Poor sleep

hygiene is another factor that can negatively impact an individual's overall sleep quality. Sleep hygiene relates to lifestyle changes and recommendations to promote healthy sleep habits and improve sleep (Irish et al., 2015). Examples of good sleep habits to promote sleep hygiene include avoiding naps during the day and drinking caffeinated beverages before bed (Irish et al., 2015).

Although sleep complaints are common amongst the aging population, it is important to distinguish the difference between natural physiological changes related to age that affect sleep and sleep disturbances. Physiological changes in sleep architecture are not necessarily a bad thing. These changes are natural, meaning they should not be of concern unless they are contributing to sleep complaints that are negatively impacting one's daily functioning. Age-related sleep changes can increase the risk of someone developing a sleep disturbance. According to Miner et al. (2016), "healthy older adults who have sleep latencies greater than 30 minutes, sleep efficiency below 80%, or REM sleep percentage below 16% or greater than 25% of total sleep are at increased mortality risk" (p. 33).

Sleep Disturbances in Older Adults

Sleep disturbances are disorders related to an individual's sleep quality and capacity that often require treatment. Sleep disturbances are particularly prevalent in older adults, especially amongst nursing home residents. Factors attributed to the increased prevalence of sleep disturbances in nursing homes include reduced daytime exposure and more time spent in bed (Valenza et al., 2013). This is a problem because poor sleep quality can have detrimental effects on older adults, such as chronic stress, increased morbidity, and lower quality of life (MacLeod et al., 2018). In addition, sleep complaints amongst older adults can result in day-time fatigue,

decreased physical and psychological health, and weakened cognition related to poor sleep quality (Tel, 2013). Sleep disturbances are often associated with bereavement, reduced physical activity, and medication side effects (McCarthy, 2021).

A prominent sleep complaint and sleep disturbance amongst older adults in insomnia. Insomnia refers to difficulty falling asleep, difficulty sustaining sleep, and earlier wake ups. According to Miner et al. (2016), insomnia symptoms increase with age and its prevalence rate for people aged 65 and older is estimated to be 50%. In order to be diagnosed with insomnia, the individual must have impaired daily function due to their sleep disturbance (Bloom et al., 2009). Insomnia can be attributed to circadian rhythm disturbances, medication and substance use, other sleep disorders or illnesses (Israel et al., 1997). Treatments prescribed for the treatment of insomnia seek to increase sleep duration and quality. Common treatments for insomnia include Cognitive Behavioral therapy (CBT) and pharmacotherapy (Abad & Guilleminault 2018). Insomnia medications approved by the US Food and Drug Administration (FDA) include nonbenzodiazepine receptor agonists, benzodiazepines, orexin receptor antagonist suvorexant, ramelteon (melatonin receptor agonist), the antidepressants doxepin and trazodone, and other antidepressants, antihistamines, antipsychotic agents, gabapentin, pramipexole, tiagabine, valerian, and melatonin (Schroeck et al., 2016). Despite their reported sleep benefits, certain FDA-approved medications for sleep disturbances have side effects that are risk factors for seniors. For example, benzodiazepines and sedative-hypnotics used in the treatment of insomnia are associated with increased falls, reduced cognitive functioning, increased mortality, and anterograde amnesia (Schroeck et al., 2016; Ancoli-Israel et al.,1997; McCarthy, 2021; Bourgeois et al., 2013). In fact, long-term use of benzodiazepines is discouraged due to the

physical and psychological dependence as well the unforeseeable long-term effects (Bourgeois et al., 2013).

In addition to insomnia, another prominent sleep disorder in older adults is Sleep Disordered Breathing (SDB), a term used for multiple respiratory related sleep disorders such as obstructive sleep apnoea (OSA) and central sleep apnoea (CSA) (Israel et al., 1997). Sleep apnea is when an individual is unable to breathe during a period of time during sleep. This sleep disturbance has been attributed to nervous system impairments or an obstruction of the upper airway (Israel et al., 1997). Common causes of OSA include obesity, diabetes, hypertension whereas CSA is associated with opioid usage and left ventricular failure (McCarthy et al., 2021). Research suggests that SDB is linked to cognitive impairment (McCarthy et al., 2021). The most prominent treatment for SDB is Positive airway pressure therapy (PAP), a machine with a face mask worn at night shown to overturn the obstruction of the upper airway associated with improved daily functioning (Weaver et al., 2008).

Another prominent sleep disturbance is Restless leg syndrome (RLS), a disorder characterized by the moving of one's limbs during sleep, often due to feelings of uncomfortability and restlessness (Israel et al., 1997; McCarthy et al., 2021). Comorbidities of RLS include cardiovascular disease, hypertension, diabetes, and depression (McCarthy et al., 2021).

Audition in Older Adults

Considering that audio is a key component of ASMR-inducing stimuli, if ASMR is to be tested on older adults, it is important to consider how hearing is impacted by aging. Older adults tend to have higher hearing impairments than other age groups. According to Walling et al.

(2012), hearing loss affects more than 80% of people over the age of 85. On average, hearing decreases by 1 dB (decibels) every year following the age of 60 (Walling et al., 2012). Furthermore, 60% of older adults between the age of 71 and 80 and 80% of older adults above the age of 85 suffer from hearing loss of 25dB or more (Walling et al., 2012). Everyday conversations have a sound level of 45 to 60 dB. In comparison, whispering has a sound level of 30dB whereas shouting has a sound level of 110 (Center For Disease Control and Prevention, 2019).

Age-related hearing loss or presbycusis is characterized by reduced speech comprehension and difficulty identifying sound sources. Untreated presbycusis is associated with isolation, depression, and reduced self-esteem (Gates & Mills, 2005). Hearing loss in both ears above 2000 Hertz is considered a sign of presbycusis (Cheslock & De Jesus, 2021). Presbycusis is reported to affect two thirds of Americans over the age of 70 (Cheslock & De Jesus, 2021). The first thing affected by presbycusis is the ability to hear high frequencies. Over time, the ability to hear lower frequencies is also gradually affected (Gates & Mills, 2005; Cheslock & De Jesus, 2021). The first marker of presbycusis is the degeneration of the stria vascularis (Walling et al., 2012). Located in the cochlea, the stria vascularis is responsible for the balance and maintenance of ions of the endolymph (inner ear fluid) and the release of endocochlear potential (EP). The EP plays a crucial role in the mechanotransduction of hair cells, which transforms external stimuli into electrical signals (Liu et al., 2016).

Current Study

Sleep quality in older adults can be negatively impacted by natural sleep changes and sleep disturbances. In fact, the risk of developing a sleep disturbance increases with age and

sleep complaints are common amongst older adults. In younger age groups, studies have found that individuals that experience ASMR report sleep and relaxation benefits as well as improvements in mood (Barratt & Davis, 2015). However, the potential benefits of ASMR videos on older adult's sleep quality remains unknown. Considering that the majority of ASMR studies recruit younger participants with knowledge of or exposure to ASMR, how do older adults who have little to no exposure to ASMR or preconceived notions about ASMR experience ASMR? Could ASMR experience and sensitivity be attributed to a placebo effect? The aim of this project is to propose a study looking at the effects of ASMR on older adults living in assisted living facilities to better understand this phenomenon and discover its effects on sleep quality of older adults. While the effect of ASMR on older adults is mostly unknown, we can use the current research of ASMR on younger populations to make an inference about older adults' ASMR receptivity and sensitivity.

Norming Study

A small norming study was conducted to gain basic knowledge on older adults' initial, genuine reactions to ASMR videos. The aim of this study was to gain feedback on older adults' experience of ASMR, their relaxation habits, and whether they would be interested in integrating ASMR into their bedtime routine. The results of this study were used as preliminary information to guide the grant proposal that is designed to test the effects of ASMR on the sleep quality of older adults living in assisted living facilities. Furthermore, the ASMR video that received the highest relaxation rating from participants in the norming study relaxation was then selected as the ASMR stimulus of choice tested for the study described in the grant proposal below.

Grant Proposal

This grant proposal aims to propose a novel approach to the study of ASMR through the lens of an age demographic that has been neglected by the current ASMR research. I am proposing a study to test the effects of ASMR on sleep quality in older adults living in assisted living facilities, using college students as a comparison. The grant proposal was designed to answer the following question: Can ASMR improve sleep quality in older adults? This grant proposal serves as a stepping stone to gaining deeper understanding on how ASMR sensitivity changes throughout the lifetime. Participants would watch an ASMR video before bed and their sleep quality would be measured during the night using the Oura Ring, generation 3. I hypothesize that the ASMR video would have a greater effect size in younger adults than older adults due to younger participant's preconceived notions and familiarity with ASMR. Furthermore, I predict that there will be a main effect of the control video on ASMR experience and sleep quality in older adults, with the opposite effect found in younger adults. This prediction is based on the assumption that older adults would find the ASMR video more unfamiliar and overwhelming than the control video, due to the audiovisual elements that are unique to ASMR-inducing stimuli.

Assisted Living Facilities

Assisted living facilities are long-term non medical residences for older adults that struggle to live independently but do not require the assistance and medical care provided by a nursing home. Similarly to nursing homes, sleep complaints are common in assisted living facilities. The average number of people living in an assisted living facility is reported to be 50 residents (Paying for senior care, 2022). Individuals living in assisted living facilities seem like

the ideal population for this project considering that they face sleep complaints but have enough independence to provide informed consent. Services provided by assisted living facilities can vary from facility to facility, but, overall, residents are provided with house keeping services, communal meals, and personal care support (Martin, 2010). Martin (2010) conducted a study looking at sleep quality in older adults living in assisted living facilities in Los Angeles and found that two thirds of participants showed symptoms of diagnosable sleep disturbances.

Method

Norming Study

Participants

The study involved six female, caucasian participants aged 65 and up ($M = 74$, $SD = 6.27$). Participants were recruited from the Bard Lifetime Learning Institute (LLI). The LLI is a volunteer run organization that offers courses and events for adults seeking to continue their learning. An email was sent out to a total of 74 LLI members currently enrolled in classes held in Bard Hall and the Stevenson Gym at Bard College (i.e., locations proximate to where the study would take place) via email (see Appendix B for recruitment mail on page X). This study was approved by Bard College's Institutional Review Board on February 4th, 2022 and was pre-registered on the Open Science Framework, see the following page: https://osf.io/8hbf3/?view_only=c9817f20764a47c6bf2cbcbde5491255. Participants were compensated with a blank notebook and a handwritten thank-you note.

Materials

The materials used for this study included three 5-minute ASMR videos, handouts of the informed consent form (see appendix D), the debrief form (see appendix E), and the survey

questions (see appendix F). The ASMR stimulus consisted of three videos sourced from YouTube that were shortened from their original length to fit 5 minutes. According to Barratt and Davis (2015), whispering, crisp sounds, and personal attention were the three most highly rated ASMR videos by participants that report experiencing ASMR. As a result, the types of ASMR videos selected for this study were chosen based on the findings of Barrett and Davis (2015). The videos themselves were selected from YouTube based on their popularity ratings (e.g.,number of likes and comments). Furthermore, the ASMR video selection followed the ASMR stimulus exclusion criteria used by Roberts et al. (2020). Their exclusion criteria included: videos lacking videos (audio only), required context to be understood (e.g., video series), violent content, medical contexts, shorter than 2 minutes long, depictions of drug use, music, brightly colored backgrounds, and the mention of the words "tingle" and "ASMR." The first video presented in the study is a sand cutting video, created by Sand Tagious, titled "30 Minutes of Satisfying Sand and Mad Mattr Cutting Asmr". (https://www.youtube.com/watch?v=udm0umBnTsw), the second is a whispered story created by ASMRRequests, titled "Bedtime Fairy Tales: Tapping, Page Turning, Soft speaking, Whispering"(https://www.youtube.com/watch?v=KK-dQFtLGKI). The third video is of personal attention, created by ASMR Ting Ting, titled "Sleep in 25 minutes ~ Intense Relaxation" (https://www.youtube.com/watch?v=4-8iQW6Yvuw). Participants completed a questionnaire with 8 questions regarding their age, gender, bed time, and whether they partake in any bedtime relaxation habits (e.g., watching TV or reading a book before bed). The questionnaire included four free responses and four Yes/No questions. In addition, participants filled out four survey questions after watching each video. The format of the survey questions was a 5-point Likert

scale (*5= strongly disagree, 1= strongly agree*). After filling out the 12 survey questions, participants rated the videos from least to most relaxing (*3= least relaxing, 1= most relaxing*).

Design

This study was exploratory in nature, and as a result, the primary researcher did not have any prior predictions or hypotheses in regards to the study's results. The researcher was not blind to the videos presented to participants nor the order of the videos. Considering that the purpose of the study was to gain self-report feedback from older adults' experience on ASMR, the order of the videos was randomized once. The researchers accepted that there may be order effects considering the small number of participants were surveyed together and presented all three videos in a group setting. The purpose of the norming study was to see whether older adults found the stimulus of different ASMR triggers relaxing and/or enjoyable. Furthermore, this study sought to gauge older adult's initial reactions to ASMR by presenting them with three popular ASMR videos and surveying which one they were most receptive to. The video that receives the highest relaxation ratings from participants will be proposed as the ASMR sleep intervention in the Grant Proposal.

Procedure

The study took place in a large theater at Bard College with enough space for participants to socially distance. Once participants arrived, the researcher introduced herself and handed out packets with the informed consent. The researcher read the informed consent outloud and took time to answer participants' questions. Following the informed consent, the researcher explained the instructions of the study: "You will be shown three 5-minute videos. After watching each video, please fill out the corresponding survey questions. You can find the survey questions by

flipping the first page of your packet." Participants were asked to flip to the next page of their packets to find the survey questions. Next, the first ASMR video was played and participants were given a couple minutes to answer the survey questions for that video. This process was repeated two more times for the other two ASMR videos (the whispered story and the personal attention) once participants completed the survey questions. Once the three videos were played, participants answered one final question and we were then debriefed by the researcher. Participants were handed a separate sheet of the debrief statement for them to take home. The participants had a lot of questions and confusion about what ASMR was and provided profound feedback on their experience and thoughts on the videos. Following the debriefing, participants received a small token of the researcher's appreciation in the form of a notebook worth approximately $10 and a handwritten thank-you note. As soon as participants left the theater, the primary researcher separated the signed informed consent forms from the survey question packet in order to remove any links between the participant and their data. The signed consent forms were placed in a designated folder and stored in Bard College's Memory Dynamics Lab. The study took approximately 40 minutes to complete.

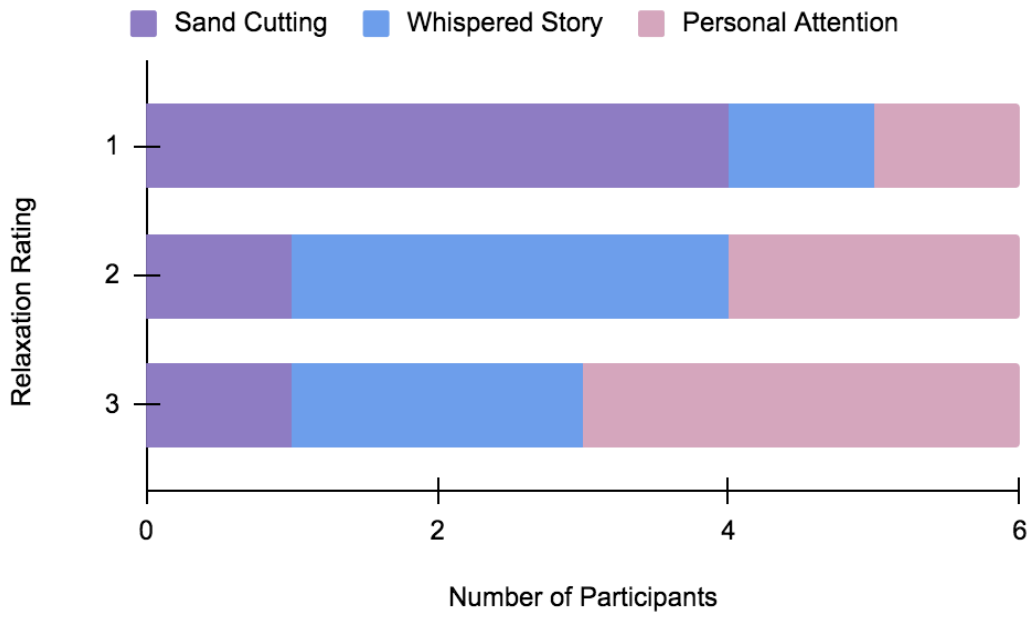
Results

An exact binomial test with exact Adjusted Wald 95% CI was run on the 6 participants' relaxation rating of three ASMR videos (sand cutting, whispered story, personal attention) to differentiate their video preference from random chance. Of the six participants, 4 rated the sand cutting as the most relaxing video (94.12%). Sand cutting had a 95% CI of 29.56% to 90.75%, p = .099. The binomial test indicated the proportion of the sand cutting video relaxation ranking of .94 was higher than the expected 0.67 , p= .099 (1-sided). Because the p-value was larger than

.05, I can conclude the sand cutting video is not statistically significant. Nonetheless, a valuable metric to the study of the efficacy of ASMR videos in elicit ASMR is their online popularity. The sand cutting video used in this study has 317K likes and 0 dislikes on YouTube. The norming study was low powered and the overall ratings of the ASMR videos on the 5-point Likert scales were low, suggesting that the videos were not successful in promoting relaxation in older adults. The reason for the low ratings of the ASMR videos was explained in the self-report section of the survey in which participants were given free space to share comments and give feedback on the videos. The majority of the participants reported that the combination of audio and video was overwhelming and distracting. Furthermore, they suggested that the videos would be more successful in eliciting relaxation if they were audio based only or uni modal. One participant reported that the combination of text, whispering, and hands in the Whispered Story was too eye-catching and distracting from the story, preventing their relaxation. Another participant found that the ASMRtist in the Personal Attention video was too beautiful to the point that it was distracting. In regards to the audio quality, one participant reported that the consonants of the ASMRtist during the Whispered story sounded like clicks which made her feel tense and hindered upon her ability to understand the story and relax. Furthermore, multiple participants found some of the videos amusing and comical, which hindered upon their ability to relax. Overall, these findings suggest that the combination of visual and auditory stimulus, consonants and pronunciation, attractiveness of ASMRtist, and comedic quality of ASMR both distracted and obstructed participant's ability to relax while watching the videos during the study.

Figure 1

Relaxation Ranking per ASMR Video



*Note.*The graph displays the distribution of participants' ranking of the three ASMR videos (sand cutting, whispered story, and personal attention). Participants were asked to rank the three videos from least relaxing to most relaxing (1=most relaxing, 3= least relaxing.) The sand cutting video was listed as the most relaxing video by 4 out of 6 participants, making it the video with the highest relaxation rating. Three out of 6 participants listed the personal attention video as the least relaxing, giving it the ranking of least relaxing video.

Discussion

Due to the low power of this study, the findings were not statistically significant. The findings of this study suggest that although some of the videos were considered enjoyable and relaxing, the majority of the participants were not interested or open to watching the three ASMR videos before bed. One participant wrote in the self report section that they did not understand the point of one of the ASMR videos. Additionally, multiple participants commented that although they found some of the videos relaxing, they could not see themselves watching them

before bed. A possible explanation for the disinterest in watching ASMR before bed could be the fact that ASMR videos were too curious and unfamiliar to the participants. When an individual is unfamiliar with something, it can be difficult for them to grasp its meaning or purpose upon first exposure.These findings suggest that participants did not perceive the examples of ASMR videos they were presented to be effective relaxation and sleep aids before bed. It is possible that the videos selected for this study were not effective enough in eliciting ASMR in the overall population. Furthermore, considering how ASMR tingle preferences can have a lot of variability across individuals, the triggers selected (crisp sounds, whispering, and personal attention) may not be the types of ASMR videos older adults would find the most relaxing and ASMR-inducing. Nonetheless, these triggers were selected based on the findings of Barratt & Davis (2015) whose survey of 475 of ASMR-sensitive participants revealed that whispering, personal attention, and crisp sounds were the most popular ASMR triggers. Context is an important factor that contributes to the ASMR experience. As a result, watching ASMR videos in a large theater with a group of people is particularly different from how ASMR is usually consumed: alone and before bed. ASMR is often associated with intimacy and privacy, which is synonymous with the average sleep experience. Being told to fall asleep in a large room with a large group of people may not be an individual's ideal description of a resting place. The same can be said for being asked to watch ASMR videos. The time of day of administration, the group setting, and the location of the study are likely to have had an impact on participants' rating and experience of ASMR. The norming study shaped the grant proposal by providing the researchers with a better understanding of older adult's initial reactions to ASMR as well as which of the three ASMR videos presented to participants was the most successful in promoting relaxation. The grant

proposal is intended to extend the norming study by testing the possible benefits of ASMR on sleep quality in older adults. Rather than measuring participant's relaxation, enjoyment, and interest in watching ASMR videos before bed via self-report, the Grant Proposal will attempt to measure both participant's ASMR experience and sleep quality after watching ASMR before bed compared to a non-ASMR control. Considering that one of the limitations of the norming study was the lack of ASMR tingle measure, the Grant Proposal will include an ASMR metric that measures participant self reported tingle experience. In addition, the norming study will include younger adults as a comparison to test how the experience of ASMR differs between young adults and older adults. Subsequently, researcher's can account for the ASMR's video effectiveness in eliciting ASMR by comparing its effects on two age groups. For example, if both groups of participants have low effects of ASMR on sleep quality and ASMR tingle experience, this could be explained by the video's lack of effectiveness in eliciting ASMR even on younger adults, that are expected to be more accustomed and familiar with ASMR than older adults. Another limitation of the norming study that will be addressed in the Grant Proposal is the setting and administration of the ASMR videos. Rather than being presented ASMR videos during the day in a group setting, participants will watch the ASMR stimulus before bed in their own residence. One of overarching messages the participants of the norming study conveyed to the researcher was the dislike of the combination of auditory and visual stimulus, which is considered an integral part of the ASMR state. In addition, this combination is a prominent component of the videos created to elicit ASMR usually found on YouTube. For example, Videos that did not include both auditory and visual stimulus were considered an exclusion criteria when Roberts et al. (2020) were selecting ASMR stimulus for their study.In order to

explore the possible effects of making ASMR videos unimodal, the control video in the grant proposal will be identical to the ASMR video except that it will have no auditory stimulus. Past studies have found that ASMR auditory stimuli was correlated with a higher increase in alpha power than ASMR auditory and visual stimuli in ASMR sensitive participants aged between 19 and 37(Roberts et al., 2021). Based on the study's operationalization of ASMR stimulus as audiovisual, to create a non-ASMR control, the researchers will use solely the ASMR visuals.

Grant Proposal

Participants

The proposed study would involve 128 residents over the age of 65 from assisted-living facilities and 128 college students between the ages of 18 and 30 (n=256). Participants would be recruited via email listservs, with permission from the different locales. The researcher would email 30 colleges and assisted living facilities located in the state of New York within a 50 mile radius of the research facility. The first 256 responses would be included in the study. In regards to the older adults group, participants will be included if they are aged 65 and up, whereas the young adults will be included if they are between the age of 18 and 30. All participants will be included if they are native English speakers, and have a bedtime no later than 12:30 pm. Before the start of the study, participants will be screened using the Pittsburgh Sleep Quality Index (PSQI), the Geriatric Depression Scale (GDS), and the Geriatric Anxiety Inventory (GAI). Participants with scores >5 on the PSQI, scores >5 on the GDS, and scores >10 on the GAI will be excluded from participating (Rawtaer, et al., 2021). Participants excluded for scores >5 on the GDS will be recommended to take a follow-up test. In addition, participants in both groups diagnosed with severe hearing loss and diagnosed with sleep disturbances will not be included in the study.

Finally, participants will be excluded from the study if they plan on switching or starting a new medication during the timeline of the study as it could interfere with their sleep quality. College students will be compensated $75 and older adults will be compensated with a goodie bag consisting of games and coloring books approximately $15 to thank them for their participation.

Materials

Materials used in this proposed study will include a 5-minute ASMR video and a 5-minute non-ASMR video (see appendix T). The ASMR stimulus was chosen based on the results of the norming study. The ASMR video which received the highest relaxation rating during the norming study was the sand cutting video. As a result, the researcher used a 5-minute video of sand-cutting and a corresponding control video. The control video is identical to the ASMR video except that it was stripped of its audio. The ASMR ingredients that the control video will be lacking is the pure, crisp audio that is integral to the ASMR experience, especially for the sand cutting video. The reason why the rendering of the original audio will make the video non-ASMR is based on the principle that a key ingredient of ASMR is the audio and visuals. As explored in the introduction, audio plays an instrumental role in the ASMR state. Participants will be asked to use a tablet (see appendix U) accompanied by headphones (see appendix V) to watch the videos before bed. Participants will be trained in how to use the tablets to ensure they face no difficulties while watching the video. Finally, the Oura ring Generation 3, a wearable sleep and activity tracker, will be worn by participants for the duration of the study on their non-dominant hand. The ring will calculate a sleep score of participants' sleep quality for the two nights of sleep interventions with a week-long wash-out period between the two sessions.

Participants would complete a sleep diary (see appendix O) and the ASMR-15 the following day of the sleep intervention.

Pittsburgh Sleep Quality Index (PSQI)

The PSQI (see appendix W) is a sleep quality measure with 19 self-rated questions distributed across seven components. The seven components are: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, disturbances, use of sleeping medication, and daytime dysfunction. The scores on each component are combined into a global score ranging from 0 to 21 points (0=no difficulty, 21= severe difficulties in all areas). A global score > 5 has shown to have an 89.6% sensitivity and 86.5% specificity to distinguish individuals with poor sleep quality (Valenza et al., 2013; McPhillips et al., 2020.) The PSQI is a widely used instrument that has been validated as a measure of sleep quality in older adults (Cole et al., 2006.; Rawtear et al., 2016), living in assisted living facilities and nursing homes (McPhillips et al., 2020). The PSQI is relatively easy to administer and takes approximately 5 minutes to complete (Valenza et al., 2013).

Geriatric Depression Scale (GDS)

The GSD (See appendix Q) was developed and validated in two studies; Brink et al. (1982) and Yesavage et al. (1983) (Montorio & Izal, 1996). A 15-item self-report scale designed to measure depression in older adults. The scale follows a Yes/No response format (e.g. “Do you often get bored?”). 10 items, when answered positively, signify the presence of depression and the last five signify the individual the presence of depression when answered negatively. The GDS can be used with both healthy and ill older adults, with mild to severe cognitive impairment and dementia (Greenberg, 2012). The GDS is considered to have a 92% sensitivity and a 89%

specificity rating (Greenberg, 2012). Scores ranging from 0-4 are considered normal, whereas 5-15 are considered signs of mild to severe depression. For example, scores between 5 and 8 are considered signs of mild depression whereas scores between 12 and 15 are considered signs of severe depression (Greenberg, 2012).

Geriatric Anxiety Inventory (GAI)

The GAI (See appendix R) was developed in 2007 by Pachana et al. (Johnco et al., 2015). The GAI consists of 20-items designed to measure anxiety symptoms in older adults. 20 questions following an Agree/Disagree response format (e.g " I worry a lot of the time"). The GAI is reported to have acceptable test-retest reliability and strong internal consistency (Gould et al., 2014, Johnco et al., 2015). In addition to older adults, the GAI has been validated for individuals with Parkinson's disease, chronic obstructive pulmonary disease (COPD), as well as individuals with cognitive impairment (Johnco et al., 2015).

Oura Ring Generation 3

The Oura Ring Generation 3 is a wearable ring made of durable titanium with built in sensors with the capability to accurately track sleep, activity, fitness, period prediction and cycle tracking using measures of heart, body temperature, and blood oxygen levels. In addition to a variety of trackers, the ring also offers a library of guided meditations and audio sessions. The cost of the Oura ring ranges between $299 and $399 based on the color. For this experiment, participants will wear the silver band considering it is the lowest costing ring with a standard jewelry color. The Oura ring takes 20 to 80 minutes to charge and has an estimated battery life of 4 to 7 days. The ring weighs 4 to 6 grams and is waterproof up to 100m. In order to access the data collected by the Oura Ring, one can either download the Oura app which is compatible with or access the

data through the "Oura on the web" website (https://cloud.ouraring.com/user/sign-in?next=%2F). Both the website and app are free of charge and the ring does not have to be connected to the app in order to collect data.

Sleep Score

The Oura ring calculates an overall sleep quality score during the night with scores between 0 and a 100. A score that is 85 or higher is considered ideal, whereas a score under 70 is an indicator of poor sleep. The sleep score combines total time asleep, sleep efficiency, restfulness, REM sleep, deep sleep, restfulness, timing, and sleep latency. The Oura ring uses sensors to measure heart rate, heart rate variability, respiration, body temperature, and physical activity/movement. These signals are recorded through photoplethysmography (PPG), negative temperature coefficient, and a 3-D accelerometer (Altini & Kinnunen, 2021). The standard, backed by research, measure of sleep is through polysomnography (PSG). The PSG comprises brain wave signals, eye movement signals, cardiac signals, and muscle activity data to track an individual's sleep stages during the night (Altini & Kinnunen, 2021). In a study comparing a standard PSG setup with data scored by a certified sleep technologist to the Oura ring, the ring had an accuracy that ranged from 74% to 98% across sleep stages (Altini & Kinnunen, 2021). The Oura website states that the Oura ring has a 79% agreement when compared to PSG laboratory sleep tests.

ASMR-15

The ASMR-15 (see appendix P) is a 15 item self-report scale designed to measure ASMR propensity (Roberts et al., 2019). The scale items were derived from 303 qualitative definitions of ASMR experience from which a factor analysis was conducted and generated four subscales

(Roberts et al., 2021). These four subscales consist of Sensation, Affect, Relaxation, and Altered consciousness. The modified version of the ASMR-15 put forth by Roberts et al. (2021) differs from the original ASMR-15 because it includes a description of ASMR and tingles without using the term ASMR to provide context to a non-specialized sample. In addition, the ASMR description includes emotional correlates, examples of common triggers, in accordance with Hostler et al. (2019) recommendations for ASMR research . This version of the ASMR-15 would be used as the ASMR measure in this study because it was intentionally revised to suit a generalized sample; participants that are not familiar with or have no experience with ASMR. Finally, this measure has proven reliable, with a Cronbach's alpha result of .77 (Roberts et al., 2021).

Design

This proposed study will operate using a double-blind, within-subjects design with a matched control condition. Specifically, there will be two sessions of sleep intervention scheduled a week apart from each other, with the ordering of the video conditions (ASMR vs. control) counterbalanced across participants. The time at which the sleep intervention is administered will be relative to the participant's bedtime.

Procedure

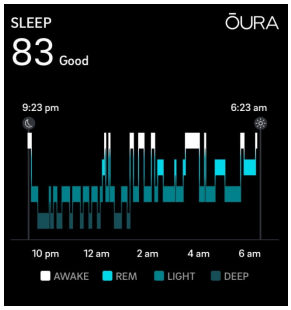
As soon as participants have been recruited, the researchers will mail individual sizing kits for participants to determine their Oura ring size. The participant's ring size will be measured to ensure that the Oura ring they are assigned fits them and that the sensors are positioned properly for optimal accuracy. The sizing kits are free and come as part of the Oura ring order. Once the ring sizes of the participants have been measured, the ring sizes will be filled out online and

ordered. If there are size overlaps between the two groups, less rings will be ordered to be reused by different participants. Two days before the start of the experiment, the primary researcher will give participants in the older adults group a group tutorial on how to use the tablets and headphones that will be used during the study. The younger adults group will be sent the tutorial and instructions via qualtrics. Participants will practice turning on the tablet and playing a sample video (e.g., a video of a kitten acting silly) downloaded to each tablet. In addition, participants will be asked to start wearing their assigned Oura ring, until the end of the experiment, in order to get used to wearing it throughout the day and night. That day, the researcher will create an Oura ring account for each participant so that once data collection is completed, the researcher will be able to sign into each participant's individual accounts on "oura on the web" (oura website) to view the ring data collected during the study (sleep score and physical score). This will allow the researcher to ensure that the sleep score data collection is running smoothly prior to data collection. At the end of the study, participants will be given access to their ring data in case they are interested in seeing their sleep scores that were measured during the experiment. Participants will also be asked to fill out a sleep diary for two consecutive mornings before the experiment in order to get into the habit of using one. For the participants that are college students, participants will complete a digital version of the sleep diary that will be accessed via qualtrics. During this learning period, participants will be asked to adhere to the same bedtime considering this will be required for the two nights of sleep interventions during the study. This bedtime will vary across participant's, depending on their preferred bedtime. The study will officially begin after the two-day training period for the tablet, ring, sleep diary, and set bedtime rehearsal. The first day of the study, the Oura ring will

automatically caclulcate an activity score of participant's daytime activity throughout the day. That night, based on their counterbalancing condition, participants will watch the ASMR video or the control video before bed. Participants will be asked to turn on the tablet and play the video downloaded once they are ready for bed. Each video will play for 5 minutes. The viewing of the video will be monitored by the tablet to ensure that participants are watching the full video. The Oura ring will calculate a sleep score of the participant's overall sleep quality during the night. In the morning, participants will complete their sleep diary and ASMR-15 before/during breakfast. After a 1 week wash out period, the order will reverse and participants will watch the opposite video before bed. During the wash out period, participants will continue to wear the Oura ring. One week later, participants will watch the opposite video (e.g., if they watched ASMR the first week, they then will watch the control the following week). Once each group has experienced both conditions, the study will come to a close and participants will be debriefed by the primary researcher on the true nature of the study either via qualtrics or in person. Two researchers will remain on call at the assisted living facilities of the participants during the two days of training in case any technical problems arise. If a participant fails to watch the video or complete the survey, participants will be given the chance to try again the following day as long as they have not seen the video.

Figure 1

Timeline of a Participant's first day of sleep intervention with the ASMR video

8:00 AM - 10:30 PM	10:00 PM - 10:35 PM	10:35 PM - 9:00 AM	9:00 AM
Participant goes about their day wearing the Oura ring 	5 min ASMR video before bed with table and headphones 	Sleep score calculated during participant's sleep 	Completion of the Sleep Diary & ASMR-15 

Note. This table depicts what a day in the life of a participant in this study would look like. In this timeline, the participant is starting the study with the ASMR video (sand cutting) meaning that the following week, they would watch the control video. Throughout the day, the only task expected from participants would be to wear their Oura ring and to not take it off until the end of the study. An example of the sleep score collected by the Oura Ring during sleep is presented in the 10:35 PM - 9:00 AM portion of the participant's schedule. In the morning, participants would be expected to fill out the sleep diary and ASMR-15.

Predicted Results

128 participants yields 80% power assuming α = .05, and r = .35. Results would be analyzed using a mixed 2 (older adults, younger adults) x 2 (ASMR video, control video) analysis of variance with repeated measures on the video type. I expect there to be no interaction of video type on sleep score and ASMR experience. In addition, I expect the ASMR video to have a significant effect on the ASMR-15 and sleep scores of participants in the younger adults group. On the other hand, I expect the control video type to have a significant effect on the sleep score of participants in older adults.Predicted marginal means for the sleep scores and ASMR-15 scores per age group and video type can be found in Table 2.

Table 2

Predicted means for the the relation of Video Type and Age Group on Sleep Score

	Sleep score (0-100)			**ASMR-15 (1-5)**		
Age	ASMR	Control	Overall	ASMR	Control	Overall
Older	76	84	80	1.8	2.18	1.99
Younger	86	72	79	3.08	2.5	2.79
Overall	81	78		2.91	2.34	

Note. Possible marginal means of video type across both groups on sleep quality (sleep score) and ASMR experience (ASMR-15) for both weeks of sleep intervention. This table shows that older adults were predicted to have an overall smaller ASMR-15 score than younger adults. Furthermore, sleep scores and ASMR-15 scores were higher in older adults for the control than ASMR videos whereas the opposite effect was predicted in younger adults.

Discussion

The aim of this study was to explore the relationship between ASMR experience and sleep quality in older adults. Furthermore, this research sought to raise awareness about ASMR, an automatic, physiological response that requires further attention and recognition from the scientific community. I predicted that the ASMR video would have a significant effect on the sleep quality and ASMR experience of younger adults.This prediction is based on the findings of Fredborg et al. (2021) who found more significant alpha power activation in frontal and parietal lobes from the viewing of auditory ASMR stimuli than audiovisual ASMR stimuli in participants aged between 19 and 37. As a result, I assumed that based on these findings, the ASMR video in the study would be more effective for improving sleep quality and ASMR experience in younger adults than the control considering the control video is free of audio. This prediction is further supported by Barratt and Davis (2017) who found 77% of participants to rate the pitch of an ASMR video having an impact on their ASMR experience.

The predicted participant marginal means of the ASMR-15 scores in this study were generated by averaging the ASMR-15 scores of participants in two studies: Roberts et al. (2019) who had a specialized sample and Roberts et al. (2021) who had a non-specialized sample. I also predicted that the control video would have a significant effect on sleep quality and ASMR experience of older adults. This prediction was primarily grounded in the results of the norming study in which participants reported unimodal videos as being more effective in eliciting relaxation than audiovisual videos. Although the study was low-powered, these findings were a surprise to me and changed my thinking on how ASMR videos could be received by older adults. Due to the absence of literature on the possible effects of ASMR on sleep quality for both young

and older adults, I had to make assumptions and generate my own sleep score data based for both young and older adults in accordance with my hypotheses.

Limitations

A limitation in this proposed study could be the time at which the ASMR-15 would be administered. Having participants complete the ASMR-15 the morning after the viewing of the video could impact the participant's recall of the video and their viewing experience, especially for older adults. However, the researcher accepted this possible limitation and chose to administer the ASMR-15 in the morning rather than promptly after the viewing of the ASMR and control video so as not to interfere with participants' ASMR experience, sleep onset, and overall sleep quality.

Another limitation is the fact that the ASMR video and control were only viewed once by participants. In order to address this limitation, this study should be replicated over the course of multiple weeks to test the consistency of the effects of ASMR on sleep quality and ASMR sensitivity. For individuals in the study that experienced tingles from watching the ASMR video, would this response continue to occur if this study was continued over the course of multiple nights? Does repeated exposure to ASMR videos have an effect on the development and consistency of ASMR experience, especially if this participant's first exposure to ASMR? To answer these questions, future research should present ASMR videos to participants on multiple occasions to study whether familiarity and repeated exposure to ASMR affects how receptive an individual is to ASMR? This could involve either the showing of different ASMR videos or the same video over time. Such research would be a stepping stone towards answering an open question in ASMR research: Is ASMR sensitivity innate or learned? Moreover, this research

could shed light on the longevity of ASMR's potential sleep benefits. Are ASMR's sleep benefits sustainable or temporary?

Another possible limitation of the study would be how bedtime was not controlled for across participants. This measure was taken to ensure that participants would be going to bed at a time that felt natural rather than forced. According to Hostler et al. (2019), ASMR experience may be "idiosyncratic and dependent on other contextual factors" (p. 529). The differences between experiencing ASMR in everyday life compared to experiencing ASMR within the context of an experiment could possibly affect participant's experience of ASMR in the proposed study. However, to have participants watch the ASMR videos in their own beds at their regular bedtime instead of a controlled bedtime would be a measure taken by the researcher in hopes to strengthen the study's external validity.

Finally, a noteworthy limitation is the lack of research of ASMR on older adults to ground the research hypotheses and predicted results proposed in this study. For example, I generated data based on my own assumptions for the predicted results of the effect of video type on sleep quality in young and older adults considering the current lack of research of ASMR on sleep quality. In response to this, the researcher grounded its research in the available peer-reviewed ASMR literature as well as research on media similar to ASMR videos on olders adults to inform the study's research and results.

Future Research

A prominent measure in ASMR research that this study did not include was the screening of older adults for ASMR sensitivity prior to conducting an experiment on its effects on sleep quality. Considering that this study aimed to look at the possible effects of ASMR on sleep

quality on a general population of older adults, I did not concern myself with discirmination ASMR sensitive and non-ASMR sensitive participants pre-experiment. However, as the results of this study and other literature suggest, being receptive to ASMR plays an important role in ASMR experience as well the benefits one might gain from it. Screening participants for ASMR-sensitivity beforehand could help researchers gauge what percent of older adults are receptive and sensitive to ASMR.

Another measure this study lacked that could be addressed in future research was a measure of older adult's physiological response to ASMR. To better understand older adult's physiological responses to ASMR, future research should use a skin conductance test to measure older adults' physiological response to ASMR following exposure to an ASMR stimulus. Such a study could shed light on whether the physiological response to ASMR changes throughout the lifetime. Do older adults have a similar physiological response to younger adults in response to ASMR stimulus? ASMR sensitivity is associated with decreased heart rate and increased skin conductance for participants aged between 18 and 77 (Poerio et al., 2018). A study looking at the physiological effects of ASMR on older adults could screen participants for ASMR sensitivity to observe skin conductance differences between participants sensitive to ASMR and those that are not sensitive to ASMR.

Hostler et al. (2019) wrote an insightful review article in which they made recommendations for future ASMR research worthy of note. According to Hostler et al. the duration, intensity, and frequency of tingles that characterize ASMR, is still unknown and in need of further research. The ASMR-15 attempts to adhere to these recommendations with the following questions: However, continued research is necessary which is why future ASMR

research should continue to include a measure participant's tingle duration and intensity. Such research would be a valuable tool to better understand whether ASMR sensitivity operates on a spectrum and whether ASMR experience varies across ASMR-sensitive individuals.

The sampling method proposed in this study is another possible limitation worth addressing. Considering that the colleges and assisted living facilities, from which participants would be recruited, are geographically isolated, due to convenience and cost efficiency, future research should be conducted looking at other locales in different geographical locations to test whether these predicted results are generalizable to a larger population.

Finally, this grant proposal failed to explore the possible interactions of race and gender on ASMR experience. Although I had the intention of collecting this information using the demographics questionnaire, I did not include exploratory analyses related to them. Despite not having made predictions for these possible effects, this could be a rich area to explore in the future. Furthermore, there is a general lack of attention paid to the possible interactions of race and gender in the current ASMR literature, making this area of study even more important and necessary to better our understanding of the ASMR phenomenon.

Looking more specifically at gender, Smith and Snider (2019) found a prominence of female identifying ASMRtists in comparison to male identifying ASMRtists online. This is particularly pertinent to YouTube considering that the ASMRtists that receive the most likes and subscribers are predominantly White and Asian women. Smith and Snider argued that "ASMR also reproduces gendered notions of care" (Smith & Snider, 2019, p. 45). In interactive, roleplay ASMR videos, female ASMRtists tend to embody nurturing, caretaker roles. For example, common ASMR roleplay videos include tucking you into bed, doing your makeup, cutting your

hair, and giving you a clinical checkup. When surveying the most popular ASMR videos on YouTube, Barrat and Davis (2015) observed a prominence of close proximity videos such as grooming and medical examinations in which close attention and focus is paid to the viewer. A reason for the popularity of personal attention ASMR videos could be that they propel viewers to pay better attention to their body and become more aware of their senses. Personal attention ASMR videos increase viewer's self-awareness in response to the ASMRtist paying attention to the viewer and how the viewer feels. A study examining ASMR and individual differences in sensory sensitivity found that participants with stronger scores of ASMR experience had higher levels of body awareness and interoceptive sensitivity, and were more likely to be considered highly sensitive (Poerio et al., 2022). Interoceptive sensitivity relates to one's conscious awareness of an affective response to external stimuli.

The misunderstanding of ASMR as an erotic experience may be interconnected with the reproduction of gendered notions of care in ASMR. Furthermore, the sexualizing of women and fetishization of asian women in media both cause and exacerbate the stigmatization of ASMR as an erotic experience. ASMR videos of women playing into caretaker roles, providing close, personal attention and whispering softly are all actions that are often perceived as sexual connotations, even if the video's intentions ar purely to provide comfort and relaxation. In addition, the act of imitating a real life experience (e.g., a cranial exam) through role plays embodies an imaginary, fantastical space that makes said content vulnerable to sexualization as opposed to an actual clinical cranial exam administered by a trained professional. One of the participants in the norming study stated that the personal attention video "would work for someone looking for an erotic dream". The term "dream" removes the ASMR video from reality,

reinforcing its synthetic and fantastic quality. The interpretation of this video as erotic is particulalry interesting considereing that in the video, the ASMRtist was simply showing viewers her newly painted nails and a one of her favorite makeup brush. This participant's perception of the video as erotic reinforces how people that do not understand ASMR often misinterpret it as sexual.

Considering the effects of gender on ASMR experience, future research should explore how the gender identity of ASMRtists as well as the role they play within the context of the video effect viewer's ASMR experience. Future research should address how the race and gender identity of an ASMR content creator affects participant's experience of ASMR in relation to their own race and gender identity. Such a study could present different groups of participants with two identical ASMR videos with the only difference being the race and gender of the participant. Furthermore, such a study could include an implicit bias test as a post-experimental assessment. In order to observe the effects of gender specifically on the sexual perception of ASMR, a study should randomly assign participants to one of two identical ASMR videos that either have a male presenting or female presenting ASMRtist. After viewing their assigned video, participants would be asked to rate how sexual they perceived the video to be. This methodology would enable researchers to test whether male ASMRtists videos are equally sexulasized as female ASMRtists videos.

Finally, ASMR research could benefit from a systematic review looking at why the majority of ASMRtists with large followings on YouTube tend to be young, White and Asian women. Is this because these populations are more inclined to produce ASMR videos than other

groups or because viewers are more receptive to these ASMRtists, whether this preference is consciously or subconsciously made.

Implications

The aim of this study was to gain insight on how older adults experience ASMR and whether they would find similar relaxation and sleep benefits reported in younger populations. For participants in the study whose sleep quality would benefit from the ASMR sleep intervention, the next steps would be to personalize the ASMR videos according to their individual interests, triggers, and needs in order to maximize the benefits experienced from watching ASMR videos before bed. For example, a participant that is a hardcore Jane Austen fan may be most receptive to whispered readings ASMR of Jane Austen novels or regency era ASMR roleplays than to an ASMR sand cutting compilation. Another participant who deeply misses their relatives may prefer personal attention and caregiver roleplay ASMR videos which provide comfort and digital intimacy during times of loneliness and sadness.

One of the implications of this study are the possible health benefits of ASMR on older adults. ASMR is an accessible and affordable resource that shows scientific promise due to its reported relaxation, sleep, stress-relief, and mood improvement benefits in younger adults (Barratt & Davis, 2015). If ASMR can help improve sleep quality in healthy older adults, then could it also have sleep benefits for older adults with sleep disturbances? Considering the negative side effects associated with sleeping pills prescribed to older adults to treat sleep disturbances, ASMR could serve as a useful resource considering it has less foreseeable side effects than sleeping pills. If future research supports the use of ASMR to promote sleep in older adults with sleep disturbances, then ASMR could be integrated in Relaxation Therapy, a

common behavioral treatment therapy for primary insomnia(Edinger, Means, 2005). ASMR could be added to the list of recommended sleep and lifestyle habits to promote sleep hygiene.

Although the ASMR videos used in this study were multimodal, audio only or visual only videos may be the most pertinent and appropriate approach for the elderly with hearing loss or vision impairment in addition to sleeping disturbances, as shown in the norming study. Considering that hearing loss is prominent in the aging population, ASMR videos that focus on visuals as opposed to audio may be the most beneficial for this population and should be tested in a sleep intervention study.

In conclusion, despite its misconception as an erotic state, ASMR is an internationally recognized calming effect that has been a source of comfort and entertainment for many, whose possible sleep and overall health benefits require furrther study. This study hoped to inspire in its readers a curiosity for ASMR and a better understanding of the complex phenomenon known as ASMR and the videos created to elicit this response in viewers. Perhaps readers will feel inclined to watch an ASMR video, if they have not done so before, after reading this paper to discover whether they themselves carry the ASMR trait and/or have experienced the ASMR state.

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Appendix

Appendix A: IRB Application

Section 1

Please enter the following information about yourself:

Today's date: *

11/10/21

Name: *

First Julia

Last Morin

Email: jm6181@bard.edu

Your Academic Program/Department/Office: Psychology

Your status (faculty, staff, graduate or undergraduate student): Undergraduate

Adviser or Faculty Sponsor (if applicable): Justin Hulbert

If you are a graduate or undergraduate student, has your Adviser or Faculty Sponsor seen and approved your application?

Yes

No

Your Adviser's or Faculty Sponsor's email address (if applicable): jhulbert@bard.edu

Please list all individuals (full name and status, i.e. faculty, staff, student) involved in this project that will be working with human subjects. Note: Everyone listed must have completed Human Subject Research Training within the past three years. *

Julia Morin, undergraduate student (see Human Subject research training certificate page 6).
Justin Hulbert, Professor in the Psychology Program

Do you have external funding for this research?

Yes

No

If so, state the name of the sponsor and the title of the project as it was submitted to that sponsor.

Section 2

Please enter the following information about your project.

What is the title of your project? Videos for Relaxation

When do you plan to begin this project? (Start date): *

1/17/22

The plan would be to begin sometime in February, as soon as I receive IRB approval.

Describe your research project: *

I aim to present a sample of older, generally healthy adults three 5 minute audio-visual clips designed to generate a feeling of well-being and ask them about their experiences using a short survey measure. People have long turned to certain types of multimedia experiences for comfort and to wind down after a long day. Anecdotally, that is one reason why Bob Ross's long-running "The Joy of Painting" television program on PBS has been (and continues to be) popular. In fact, many individuals have reported additional mental and somatic (bodily) effects when listening to the dulcet tones and colorful imagery of Ross and others. These experiences sometimes involve a tingling sensation that is akin, in some respects, at least, to the aesthetic chills induced by certain forms of moving music. Autonomous sensory meridian response (ASMR) is the term applied to such peak (i.e., meridian), pleasant, automatic (i.e., autonomous) sensations in response to sounds or videos that are often associated with a tingling down the scalp and the back of the neck. The creation and dissemination of ASMR materials has become something of a cottage industry, with countless examples on platforms ranging from YouTube to meditation apps for the phone (e.g. the Calm app). Many young people anecdotally report watching/listening to ASMR materials (e.g., videos of brightly colored sand being cut into cubes along with the crinkling sound it makes--see, for example, https://www.youtube.com/watch?v=udm0umBnTsw) in order to de-stress and go to sleep at the end of a long day. Why? This is an area of active study in a relatively new field. Some of the popularity may be due to word of mouth and YouTube algorithms making suggestions based on demographics. One study comparing personality traits and ASMR sensitivity found that people who reported experiencing ASMR rated higher in Openness to new experiences and sensory processing sensitivity (SPS) on the Big 5 Personality test compared to participants that did not report experiencing ASMR (Roberts et al. 2021). Furthermore, another study using the default mode network (DMS) found atypical function connectivity in ASMR sensitive individuals compared to a control group. This study suggests that ASMR may be related to reduced ability to inhibit sensory-emotional experiences that are suppressed in most individuals. (Smith et al. 2017). But what is the response from people who likely don't have preconceived notions about or exposure to ASMR stimuli? Would they be interested in using them and find similar benefits (particularly with respect to healthy sleep habits)? I hope to capture some preliminary information to guide my exploration of this topic by surveying members of the Lifetime

Learning Institute (LLI), which provides educational and social opportunities for individuals outside of the typical college-age population (https://lli.bard.edu/about-lli/mission/). Specifically, I hope to get feedback about ASMR videos from older adults (people aged 65 and up) represented by the membership of the LLI in order to guide the development of my Senior Project. I see this data collection as acting like something along the lines of a focus group as I write a grant proposal for my Senior Project that is designed to test this phenomenon and its effect on sleep in older adults. To be clear, though, I do not intend to collect additional data for the larger experiment proposed in my forthcoming Senior Project. I merely hope to gain from this small survey a general understanding of older adults' initial reactions to ASMR videos, which types they prefer, and how they might envision themselves using them (if at all). With that feedback, I would be in a better position to select stimuli and procedures that better fit this age demographic for my Senior Project proposal.

Describe the population(s) you plan to recruit and how you plan to recruit participants. Please submit all recruitment material, emails and scripts to IRB@bard.edu *

My population of interest is older adults aged 65 and up. I have contacted the Lifetime Learning Institute and hope to recruit LLI members via email, with the approval of its steering committee and the IRB. In order to recruit participants, I'd ask the LLI to distribute the following message I created via its email listserv about an opportunity to participate in a study: "A Bard Senior Psychology major is looking for participants aged 65+ from the LLI to participate in a study for her Senior Project. The aim of this study is to gain a better understanding about your daily routines, what you find relaxing, and how videos might be incorporated into your relaxation routines as you get ready for bed. This study, which has been approved by the Bard IRB and is supervised by Prof. Justin Hulbert of the Psychology Program, should require no more than 40 minutes of your time and will take place in a large classroom on campus (in the Preston Hall theater) between X and Y. Please email jm6181@bard.edu or call 203-402-9455 if you are interested for further details and to set up a meeting time." I also hope to use an additional recruitment method, pending permission from the professors leading LLI classes as well as approval from the LLI organizers, to introduce myself and talk briefly about my study at the beginning or end of LLI classes that are held on Bard's campus during the Spring semester.

Will your participants include individuals from vulnerable or protected populations (e.g., children, pregnant women, prisoners, or the cognitively impaired)? *

Yes

No

If your participants will include individuals from the above populations, please specify the population(s) and describe any special precautions you will use to recruit and consent. Approximately how many individuals do you expect to participate in your study?

The population is generally healthy senior citizens aged 65 and up from the LLI community. I expect about 20 participants to participate. Special precautions I will use to recruit and consent will be to

ensure that my recruitment text, informed consent, debrief form, videos, and survey questions are written in a way that is easy to read and understand. E.g., I will use a larger font on materials presented to participants, steer away from unnecessary scientific jargon, and use clear and simple questions. Before the videos are played, I will play a sample audio clip to test the volume and ask participants to inform me if the sound level is too low or high. If any of the participants' preference for the audio level conflicts with the general group to the point that watching the videos would be uncomfortable or unbearable for them, they will be offered to step out and wait outside the classroom until the group is finished with the study before they can participate themselves with a comfortable sound level. Participant responses will remain confidential with me and my advisor, and will be fully anonymized to the extent that they appear in my Senior Project.The signed consent forms will be kept in a folder separate from the collected survey data, eliminating links between them. Consent forms will be retained for the required three-year minimum (45 CFR 46.115).

Describe the procedures you will be using to conduct your research. Include descriptions of what tasks your participants will be asked to do, and about how much time will be expected of each individual. NOTE: If you have supporting materials (printed surveys, questionnaires, interview questions, etc.), email these documents separately as attachments to IRB@bard.edu. Name your attachments with your last name and a brief description (e.g., "WatsonSurvey.doc").
***Morinsurvey.doc**

Describe any risks and/or benefits your research may have for your participants.

While not everyone may end up appreciating the videos in the same way or to the same extent, the videos, generally described as extremely pleasant, contain no offensive imagery or sounds. These low-risk materials are also of the type that individuals may encounter in their daily life (e.g, sounds of whispering). I do not foresee any direct benefits my research may have for participants.

Describe how you plan to mitigate (if possible) any risks the participants may encounter.

I will remind individuals prior to consent and again before each video that if they find the video uncomfortable to watch, they may stop watching at any point. In addition, if participants find a question uncomfortable, they may skip the question without penalty.

Describe the consent process (i.e., how you will explain the consent form and the consent process to your participants):

At the start of the study, I plan to introduce myself and hand out copies of the informed consent to the participants. Participants will receive a packet consisting of the informed consent, the survey questions, and the debrief form. I will read the informed consent outloud and ask participants if they have any questions. At the end of the study, the researcher will separate the informed consent sheets, that have been signed, from the packets without looking at the names and signatures of the participants to remove the link between the participants and their data. Packets that do not have a

signed informed consent will be recycled. The signed consent forms will then be placed in a folder that will be safely kept in Preston Hall's Memory Dynamics Lab.

Have you prepared a consent form(s) and emailed it as an attachment to IRB@bard.edu? Note: You must submit all necessary consent forms before your proposal is considered complete. *

Yes

No

If you are collecting data via media capture (video, audio, photos), have you included a section requesting consent for this procedure(s) in your consent form(s)?

Yes

No

Not applicable

If your project will require you to employ a verbal consent process (no written consent forms), please describe why this process is necessary and how verbal consent will be obtained and stored.

I will be using written consent forms.

What procedures will you use to ensure that the information your participants provide will remain confidential and safeguarded against improper access or dissemination?

Participant responses will remain confidential with me and my advisor, and will be fully anonymized to the extent that they appear in my Senior Project. The signed consent forms will be kept in a folder separate from the collected survey data, eliminating links between them. Consent forms will be retained for the required three-year minimum (45 CFR 46.115) and they will be kept in Preston Hall's Memory Dynamics lab.

Will it be necessary to use deception with your participants at any time during this research? Withholding details about the specifics of one's hypothesis does not constitute deception, this is called incomplete disclosure. Deception involves purposefully misleading participants about the nature of the research question or about the nature of the task they will be completing. *

Yes

No

If your project study includes deception, please describe here the process you will use, why the deception is necessary, and a full description of your debriefing procedures.

For all projects, please include your debriefing statement. (This is information you provide to the participant at the end of your study to explain your research question more fully than you may have been able to do at the beginning of the study.) All studies must include a debriefing

statement. Be sure to give participants the opportunity to ask any additional questions they may have about the study. *

My project does not include a deception. Please find the debriefing statement attached below along with informed consent (see page 9).

If you will be conducting interviews in a language other than English, will you conduct all of the interviews yourself, or will you have the assistance of a translator? If you will be using the assistance of a translator, that individual must also certify that he or she is familiar with the human subject protocol and has completed the online training course.

Myself

Translator

Not applicable

If your recruitment materials or consent forms will be presented in languages other than English, please translate these documents and email copies to IRB@bard.edu. I have submitted all of my translated materials.

Yes

No

Not applicable

Section 3

To finalize and submit your application. Please verify that you have completed this form fully and accurately.

Finalize and Submit

I agree to obtain IRB approval prior to beginning my work with human subject participants. I agree to only perform the research as described in the above application. I agree to seek IRB approval for any modifications in the approved study. I agree to inform the IRB if I receive any complaints from research participants within two days of receiving a complaint. I certify that all of the information contained in this proposal is accurate and truthful.

Submitting this form means that you affirm the statement above and will comply with the content. This counts as your legally binding signature.

CITI Program Certificate:
https://www.citiprogram.org/verify/?w91b01915-9179-46ce-b273-3444f78b580d-35599076

Appendix B: Norming Study Recruitment Email

Email subject: Volunteers Needed for Bard Student's Study - - Pls Read Below

Email: A Bard senior with a psychology major is looking for participants aged 65+ from LLI to participate in a study for her Senior Project. The aim of this study is to gain a better understanding about your daily routines, what you find relaxing, and how videos might be incorporated into your relaxation routines as you get ready for bed. This study, which has been approved by the Bard IRB and is supervised by Prof. Justin Hulbert of the Psychology Program, should require no more than 40 minutes of your time. and will take place in Weis Cinema on Friday, March 18, at 1:30. The attendees will watch three five-minute videos and respond to questions. Please email Julia at jm6181@bard.edu or call 203-402-9455 to let her know that you can attend.

Appendix C: IRB Approval

Bard College Institutional Review Board

Date: February 4, 2022
To: Julia Morin
Cc: Justin Hulbert, Deborah Treadway, Brandt Burgess
From: Tom Hutcheon, IRB Chair
Re: Videos for Relaxation and Sleep

DECISION: APPROVED

Dear Julia,

The Bard Institutional Review Board has reviewed your revisions and approved your proposal entitled, "Videos for Relaxation and Sleep." Your proposal is approved through February 4, 2023 and your case number is 2022JFEB4-MOR.

Please notify the IRB if your methodology changes or unexpected events arise.

We wish you the best of luck with your research!

Tom Hutcheon, Ph.D.
IRB Chair
Assistant Professor of Psychology
Bard College
thutcheo@bard.edu

Appendix D: Informed Consent

I am asking you to participate in a research study titled "Videos for Relaxation." This sheet summarizes the research and your potential involvement in it, if you choose to participate. I will be available to answer any questions you may have about the study.

Who am I?
Hi! My name is Julia Morin, a Senior Psychology student studying at Bard College. I am running this research as part of my Senior Project.

What is this study about?
In this study, I am interested in how people, such as yourself, experience videos designed to help people relax and whether you find that they work for you. The videos I would like to show you focus on certain sounds and actions like whispering, tapping on objects, or turning pages of a book. I am also interested in gaining insight on your general sleep habits, tactics you use to relax before bed, and whether or not you'd be interested in integrating videos such as the ones you were shown today in your bedtime routine.

What will you be asked to do in the study?
You will be asked to watch three 5-minute videos and fill out a questionnaire for each video about the experience (e.g., how much you like them). Once you've watched the three videos, you will be asked to rank the videos from least relaxing to most relaxing. This study will take approximately 40 minutes to complete.

Risks and Benefits
While you may or may not like all the videos to the same extent, watching them does not entail any known risks beyond what you might experience in your everyday life (e.g., hearing someone whisper unobjectionable things). While there are not any direct benefits for watching these videos, we hope that participants find their contributions to this research--and my Senior Project--a positive experience. Plus, you may find the videos entertaining and enjoyable to watch.

Is there any compensation for participation?
Participants will receive a notebook for participating in the study.

Is participation voluntary?
Your participation in this study is completely voluntary. You may stop participating at any time without penalty and may skip any videos or questions that make you uncomfortable by letting me know, leaving the question blank, or by leaving the theater.

What if you have other questions?

I'm happy to answer any questions you might have about the study now. You are also welcome to contact me at jm6181@bard.edu or 203-402-9455 if you have any questions after the study. If you have questions for my faculty advisor overseeing my work, you may contact Prof. Justin Hulbert in the Psychology Program at jhulbert@bard.edu or 845-752-4390. If you have any concerns, you are also welcome to contact Bard's Institutional Review Board at irb@bard.edu.

Is my participation confidential?

The information you provide as part of this study will be held confidentially. My research advisor and I will have access to it. The anonymized results of this work may appear in my Senior Project, which is warehoused in the library on Bard's campus as well as in the digital archive called the DigitalCommons. To protect your privacy, no names or identifying information will be included in my Senior Project or any related research outputs. This consent form, which would include your name, will be secured separately from the data, so that no link between you and your responses is maintained.

Statement of Consent

I have read the above information and I understand the nature and purpose of the study. I understand that my participation is voluntary and that I can withdraw at any time. I have received the answers to my questions and I understand that I can contact the researcher and the researcher's faculty advisor for further information after the study.

Please sign below if you agree to participate in this study.

Your Signature:_____Date_____

Your Name: (printed)_____

This consent form will be kept by the researcher for three years beyond the end of the study.

Appendix E: Debriefing Statement

Thank you for taking the time to participate in this study. Now that the study is over, I will describe the aims of this research and how it relates to my Senior Project. If you have any questions while reading this sheet, please feel free to ask them and I will do my best to answer them. After reading this, you will have the opportunity to make a decision on whether you would like to have your data included in this study.

What the study is really about

The purpose of the study was to gain insight on tactics people aged 65+ use to relax before bed, how they experience ASMR, and whether or not they'd be interested in integrating ASMR in

their bedtime routine. ASMR stands for autonomous sensory meridian response, a term used to describe a tingly sensation people experience in response to videos like the ones you watched today. These types of videos have recently become popular with people in my age cohort, with many reporting a heightened sense of wellbeing, deepened relaxation, and even a pleasant tingly sensation in the neck and scalp--like the tingle that people sometimes get when they listen to a moving piece of music. For my Senior Project, I am proposing a study that looks at the effects of ASMR videos on improving sleep quality for older adults with sleep disturbances. The data collected today will be used to inform my Senior Project.

Taking part is voluntary

Although you have already completed the study, your involvement is still voluntary, and you may choose to withdraw the data you provided without penalty or loss of compensation offered to you.

Privacy/Confidentiality

No names will be used in the study. If you agree to have your data included in this study, it will remain confidential. If you don't agree, your data will not be used in the study.

If you have any questions, please ask them now. If you have questions later, or would like to know more about my Senior Project and the results of the study, you may contact Julia Morin at jm6181@bard.edu or 203-402-9455. You may also contact my faculty advisor overseeing my work, Prof. Justin Hulbert in the Psychology Program at jhulbert@bard.edu or 845-752-4390. If you have any questions or concerns regarding your rights as a subject in this study, you may contact the Institutional Review Board (IRB) at https://www.bard.edu/irb/ or irb@bard.edu.

Appendix F: Survey Questions

1. What is your gender?
2. How old are you?
3. What time do you usually go to bed?

   Please circle your answer:

4. Do you watch TV before bed?

Yes	No

5. Do you listen to the radio before bed?

Yes	No

6. Do you read before bed?

Yes	No

7. Do you meditate before bed?

Yes	No

8. If you do something not mentioned above to help you relax before bed, please specify here:

Video 1: For the following questions, please circle your answer.

Did you enjoy watching this video?

Strongly Disagree 5	Disagree 4	Undecided 3	Agree 2	Strongly Agree 1

Did you find the video relaxing?

Strongly Disagree 5	Disagree 4	Undecided 3	Agree 2	Strongly Agree 1

Would you watch this video before bed?

Strongly Disagree 5	Disagree 4	Undecided 3	Agree 2	Strongly Agree 1

Did you have any problems with the video or additional thoughts you'd like to share with me?

Video 2: For the following questions, please circle your answer.

Did you enjoy watching this video?

Strongly Disagree 5	Disagree 4	Undecided 3	Agree 2	Strongly Agree 1

Did you find this video relaxing?

Strongly Disagree 5	Disagree 4	Undecided 3	Agree 2	Strongly Agree 1

Would you watch this video before bed?

Strongly Disagree 5	Disagree 4	Undecided 3	Agree 2	Strongly Agree 1

Did you have any problems with the video or additional thoughts you'd like to share with me?

Video 3: For the following questions, please circle your answer.

Did you enjoy watching this video?

Strongly Disagree 5	Disagree 4	Undecided 3	Agree 2	Strongly Agree 1

Did you find this video relaxing?

Strongly Disagree 5	Disagree 4	Undecided 3	Agree 2	Strongly Agree 1

Would you watch this video before bed?

Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree

5	4	3	2	1

Did you have any problems with the video or additional thoughts you'd like to share with me?

Final question:

Please rank the three videos (sand cutting, whispered story, and personal attention) from least relaxing to most relaxing, with 1 being most relaxing and 3 being least relaxing.

1.

2.

3.

Appendix G: Norming Study Budget

Pilot Study Budget:

20 Notebooks	$27.45
Total Cost	$77.45

Appendix H: Norming Study Data Analysis

- Aims
  - To get honest feedback on older adults' experience of asmr videos, learn about their bedtime/relaxation habits, and whether or not they would be interested in integrating asmr into their bedtime routine.
- Hypotheses to be tested
  - Exploratory research, the primary researcher does not have prior assumptions of hypotheses.
- Methods

  4.1. Study Population
  - Older adults aged 65 and up, members of the LLI

  4.2. Inclusion/exclusion criteria
  - Native english speakers, aged 65 and up, members of the LLI

- Participants with missing data will be excluded

4.3. Study measures

- Exposure variables: three 5 minute ASMR videos
- Outcome variables: sleep quality (Oura ring sleep score)

4.4. Sequence of planned analyses

- A one-sample binomial test of the highest rated asmr video will be conducted
- Bar graphs of Likert-scale data

Appendix I : Grant Proposal Preregistration

Date of Pre Registration: NA
Investigator's Name and Affiliation: Julia Morin, undergraduate student at Bard College
Names and Affiliations of Collaborators: Justin Hulbert, Professor of Psychology at Bard College
IRB Status:

- **IRB Review not necessary**
- Not submitted yet
- Submitted
- Approval received, date:

Study Title: A Grant Proposal for the Effects of Autonomous Sensory Meridian Response on Sleep Quality in Older Adults
VARIABLES

1. *What are your independent / grouping / predictor variables (including mediators and moderators) ? Explain how you operationalize each variable.*

The independent variable is the sleep intervention video that will be presented to participants, which are operationalized into two conditions: an ASMR video and a control video.

2. *What are your dependent / outcome variables? Explain how you operationalize each variable.*

The dependent variables participant's sleep quality during the two nights of sleep intervention (ASMR vs control). Sleep quality will be measured using the Oura Ring sleep score. The second dependent variable is participant's ASMR experience, measured by the ASMR-15.

3. *List any explanatory variables.These are variables that you included in your study but are not central to your main predictions.*
   Participants will fill out a demographic questionnaire (age, gender, race, ethnicity, education).

Did you create new or modify existing variables for this study? (select all that apply)

a. Some, or all, variables have been used in prior, published research, and no modifications were made
b. **Some variables were modified from their original form**

c. Some variables were created for this study

4. If you indicated above that 'Some variables were modified,' describe how you modified existing variables here:
   YouTube videos used as the stimulus presented to participants were shortened from their original length to 5 minutes.
5. If you indicated above that 'Some variables were created for this study,' list and describe the variables that you created for this study:
   The ASMR-15 was modified so that it also referred to visual stimuli in addition to sound.

HYPOTHESES

1. What are your primary study hypotheses / research questions?
   - Younger adults will have a higher sleep quality and ASMR experience score after watching the ASMR video
   - Older adults will have a higher sleep quality and ASMR experience score after watching the control video
   - How do older adults who have little to no exposure to ASMR or preconceived notions about ASMR experience ASMR? Could ASMR experience and sensitivity be attributed to a placebo effect?
2. Do you have any exploratory hypotheses / research questions? If so, describe them below
3. At the time of this preregistration, describe the status of data collection
   a. No new data collection is required for this project (e.g., meta-analysis)
   b. Data collection has not started for this study
   c. Data collection is in progress
   d. Data collection is complete
   e. Other:
4. If you indicated above that data collection is 'complete' or 'in progress,' have you (or anyone else) already conducted any statistical analyses?
   a. No data analyses have been performed
   b. Some preliminary analyses have been performed, but not those relevant to the primary or exploratory study hypotheses described above (e,g, you calculated descriptive statistics)
   c. Some, or all analyses of the primary or exploratory hypotheses have been performed
5. If you selected 'Some preliminary analyses have been performed' describe the analyses you have already conducted:

SAMPLING

1. What is your target sample size? **256 participants.**
2. How was your target sample size determined? (check all that apply)

   a. **Power analysis**
   b. Target sample size based on convention / past research
   c. Target sample size based on constraints / convenience (e.g., size of subject pool, available money to pay participants, access to participants)
   d. Other:

3. How will you determine when to stop collecting data (i.e., your stopping rule)?
   a. **When the target sample size is reached**
   b. A particular amount of time has passed (e.g., the end of the semester)
   c. Other:

RESEARCH DESIGN

1. What type of research design are you using?
   a. **Experiment**
   b. Quasi Experiment
   c. Correlation Study
   d. Other:

EXPERIMENTAL DESIGN ONLY

1. If you are conducting an experiment, what is the nature of the manipulation?
   a. between-participants
   b. within-participants
   c. **mixed (at least one between and one within factor)**
2. What are the total number conditions in your study? (e.g., a 2 x 2 design has 4 total conditions)
   A mixed 2 (ASMR video, control video) x 2 (older adults, younger adults) ANOVA with repeated measures.
3. Will the experimenters be aware of the condition to which a particular participant has been assigned?
   a. Yes, the experimenter will be aware of the condition to which a particular participant has been assigned
   b. **No, the experimenter will be blind to condition**
4. Will participants be randomly assigned to conditions?
   a. **Yes**
   b. No, (describe below)
5. If you selected 'No' for how you will assign participants to condition, please explain here:
6. If you are predicting an interaction (in your hypotheses), describe the nature of that interaction below.

DATA ANALYSIS PLAN

1. What will be your criterion for determining statistical significance?
   a. **p<.05**

   b. p<.01
   c. p<.005
   d. Other:
2. Will your tests of significance be:
   a. One-tailed
   b. Two-tailed
   c. A combination of one-and two-tailed tests
3. Will you exclude participants from data analysis based on any of the reasons listed below?
   a. Failed attention check
   b. Failed manipulation check
   c. Missing data
4. Describe any additional exclusion criteria here:

Inclusion: Native English speakers, bedtime no later than 12:30 pm, scores >5 on the PSQI, scores >5 on the GDS, and scores >10 on the GAI will be excluded from participating (Rawtaer, et al., 2021).

Exclusion: diagnosed with severe hearing loss, diagnosed with sleep disturbances, if participants plan to switch or start a new medication during the timeline of the study as it could interfere with their sleep quality.

5. What criterion (if any) will you use to determine whether a participant is an outlier?
   a. Greater than 3 standard deviations from the mean
   b. Other:
6. Which statistical tests will you use to conduct your data analyses? (check all that apply)
   a. ANOVA
   b. Correlation
   c. t-test
   d. Chi-square
   e. Regression
   f. Other/Additional
7. If you selected 'Other/Additional' for the statistical test above, describe the analyses you will conduct here:
8. If relevant, describe what types of follow-up tests you will perform (e.g., Tukey post-hoc; simple main effects). If you will conduct planned comparisons, explain the nature of those comparisons below:
   ANCOVA

9. For the analyses listed above, will you include any covariates or control variables? If so, describe them below and provide a justification:

Appendix J: Grant Proposal Informed Consent

I am asking you to participate in a research study titled "Videos for Relaxation." This sheet summarizes the research and your potential involvement in it, if you choose to participate. I will be available to answer any questions you may have about the study.

Who am I?
Hi! My name is Julia Morin, a Senior Psychology student studying at Bard College. I am running this research as part of my Senior Project.

What is this study about?
In this study, I am interested in how people, such as yourself, experience videos designed to help people relax and whether you find that they work for you. The videos I would like to show you focus on certain sounds and visuals like whispering, tapping on objects, or turning pages of a book.

What we will ask you to do
Two days before the start of the experiment, you would be trained on how to use the materials for this study and will fill out a demographic questionnaire. The materials for this study include headphones, a tablet, and the Oura Ring Generation 3, a device that can measure an individual's daytime and nightly activity. During the study, you will be asked to wear the Oura ring during the day and night. In addition, you will watch two videos (using the tablet and headphones) before you go to bed. Each video will be watched a week apart from each other. The mornings following the two days that you watch the videos, you will fill out a questionnaire on your experience of the video and a sleep diary. This study will take place over the course of 2 weeks and 2 days.

Risks and Benefits
While you may or may not like all the videos to the same extent, watching them does not entail any known risks beyond what you might experience in your everyday life (e.g., hearing someone whisper unobjectionable things). While there are not any direct benefits for watching these videos, I hope that participants find their contributions to this research a positive experience. Plus, you may find the videos entertaining and enjoyable to watch.

Is there any compensation for participation?

Informed consent for older adults: participants will be compensated with a goodie bag consisting of games and coloring books approximately $15 to thank them for their participation
Informed consent for younger adults: participants will be compensated $75

Your participation in this study is completely voluntary. You may stop participating at any time without penalty and may skip any videos or questions that make you uncomfortable by letting me know, leaving the question blank, or by leaving the theater.

What if you have other questions?
I'm happy to answer any questions you might have about the study now. You are also welcome to contact me at jm6181@bard.edu or 203-402-9455 if you have any questions after the study. If you have questions for my faculty advisor overseeing my work, you may contact Prof. Justin Hulbert in the Psychology Program at jhulbert@bard.edu or 845-752-4390. If you have any concerns, you are also welcome to contact Bard's Institutional Review Board at irb@bard.edu.

Is my participation confidential?
The information you provide as part of this study will be held confidentially. My research advisor and I will have access to it. The anonymized results of this work may appear in my Senior Project, which is warehoused in the library on Bard's campus as well as in the digital archive called the DigitalCommons. To protect your privacy, no names or identifying information will be included in my Senior Project or any related research outputs. This consent form, which would include your name, will be secured separately from the data, so that no link between you and your responses is maintained.

Statement of Consent
I have read the above information and I understand the nature and purpose of the study. I understand that my participation is voluntary and that I can withdraw at any time. I have received the answers to my questions and I understand that I can contact the researcher and the researcher's faculty advisor for further information after the study.
Please sign below if you agree to participate in this study.

Your Signature:_____Date_____

Your Name: (printed)_____

This consent form will be kept by the researcher for three years beyond the end of the study.

Appendix K: Grant Proposal Debrief Form

Thank you for taking the time to participate in this study. Now that the study is over, I will describe the aims of this research. If you have any questions while reading this sheet, please feel free to ask them and I will do my best to answer them. After reading this, you will have the opportunity to make a decision on whether you would like to have your data included in this study.

What the study is really about

The purpose of the study was to look at the effects of ASMR on the sleep quality in both younger adults and older adults. ASMR stands for autonomous sensory meridian response, a term used to describe an automatic, emotional and physiological response to certain kinds of audio and visual stimuli. These types of videos have recently become popular with people in my age cohort, with many reporting a heightened sense of wellbeing, deepened relaxation, and even a pleasant tingly sensation in the neck and scalp--like the tingle that people sometimes get when they listen to a moving piece of music. The video you were shown of the sand cutting with the audio is an example of an ASMR video. Removing the audio of the same video made this video non-ASMR. This study looked at how your sleep quality and ASMR experience was affected by the two videos you watched during the study. The Oura ring you wore actually measured your sleep quality and not your daily activity. I did not tell you the true purpose of this study or the true measure of the Oura ring because knowing this information might have affected the study's results. It was important to the study that your responses were genuine and not influenced by having this information.

Taking part is voluntary

Although you have already completed the study, your involvement is still voluntary, and you may choose to withdraw the data you provided without penalty or loss of compensation offered to you.

Privacy/Confidentiality

No names will be used in the study. If you agree to have your data included in this study, it will remain confidential. If you don't agree, your data will not be used in the study.

If you have any questions, please ask them now. If you have questions later, or would like to know more about my Senior Project and the results of the study, you may contact Julia Morin at jm6181@bard.edu or 203-402-9455. You may also contact my faculty advisor overseeing my work, Prof. Justin Hulbert in the Psychology Program at jhulbert@bard.edu or 845-752-4390. If you have any questions or concerns regarding your rights as a subject in this study, you may contact the Institutional Review Board (IRB) at https://www.bard.edu/irb/ or irb@bard.edu.

Appendix L: Likert scale data measuring the Participant rating of each ASMR video on enjoyment, relaxation, and interest in watching the video before bed.

Figure A

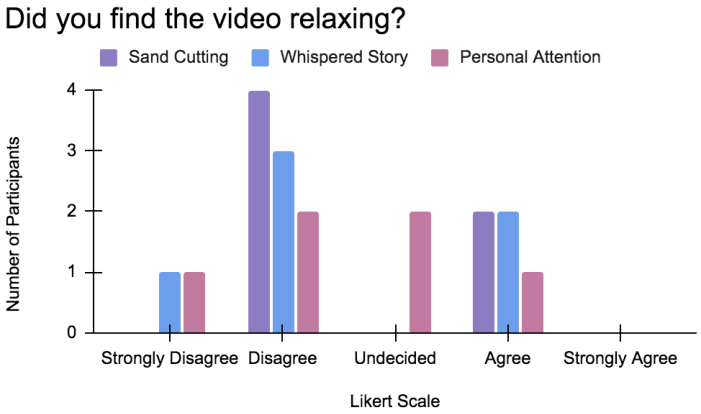


Figure B

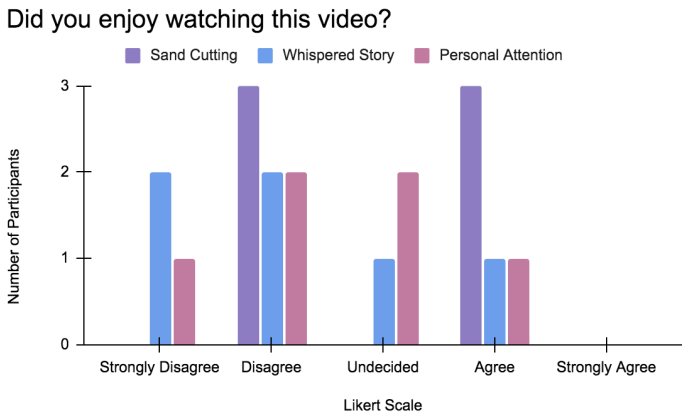
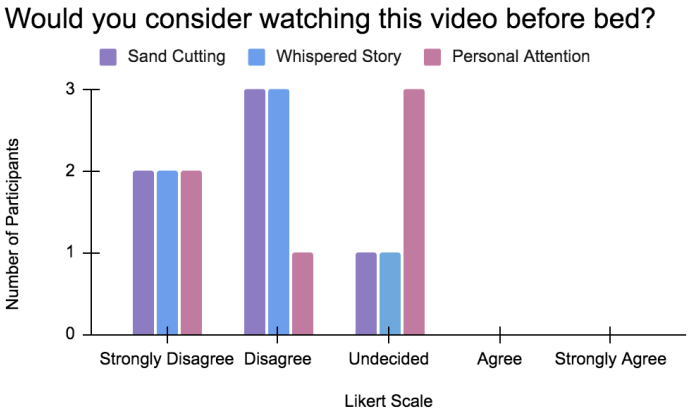


Figure C



Note. The graph displays the distribution of participant answers, on a 5 point likert scale, to the question: Did you enjoy the video? Did you find the video relaxing? Would you consider watching this video before bed? In Figure A, the majority of participants reportedly disagreed with the statement: did you find the video relaxing? On par with the relaxation ranking, the video with the highest number of participants that agreed that the video was enjoyable was for the sand cutting video (Figure B). Nonetheless, the sand cutting video's enjoyment rating was equally divided between disagree and agree amongst participants.The whispered story had the highest number of participants that either strongly disagreed or disagreed that the video was enjoyable. The personal attention video had the highest number of undecided participants in response to the question: would you consider watching this video before bed? (Figure C).The sand cutting and whispered story had identical distributions of answers between strongly disagree and undecided for the same question. None of the participants agreed to considering watching either of the three

videos before bed. For Figures A, B, and C, the overall distributions lean towards the strongly disagree and disagree side of the Likert scale.

Appendix M: Grant Proposal Budget

Description of Purchase	Quantity	Unit Price	Amount
Younger adult compensation	128	$75	$9,600
Older adult compensation	128	$15	$1,920
Oura Ring	128	$299	$38,272
Avantree Audition Pro Headset	64	$56.99	3,647.36
Fire HD 8 Tablet	64	$49.99	$3,199.36
2 Research Interns	2	$15 (30hr)	$450
		TOTAL:	$57,089

Appendix N: Grant Proposal Demographic Questions

1. What is your age? _____
2. What is your gender?
    1. Cisgender Male
    2. Cisgener Female
    3. Transgender Male
    4. Transgender Female
    5. Nonbinary
    6. Other [fill in]
3. What is your race? (Please select all that apply)
    1. American Indian or Alaskan Native
    2. South Asian
    3. East Asian
    4. Asian - Other
    5. Black or African-American
    6. Native Hawaiian
    7. White
    8. Other [fill in]
4. What is your ethnicity?
    1. Hispanic or Latino
    2. Non-Hispanic or Latino

3. Other

5. Education (highest degree completed):
    1. 12th grade or less
    2. Graduated high school or equivalent
    3. Some college, no degree
    4. Associate degree
    5. Bachelor's degree
    6. Post-graduate degree

Appendix O: ***The Pittsburgh Sleep Diary***

SLEEP DIARY WAKETIME KEEP BY BED study ID#.....

Please fill out this part of the diary first thing in the morning.

day..... date..... initials.....

went to bed last night at.....

lights out at.....

minutes until fell asleep.....

finally woke at.....

awakened by: (check one) alarm clock/radio.....
someone whom I asked to wake me.....
noises.....
just woke.....

after falling asleep, woke up this many times during the night (circle)
0 1 2 3 4 5 or more

total number of minutes awake.....

-woke to use bathroom (circle # times)
0 1 2 3 4 5 or more

-awakened by noises/child/bedpartner (circle # times)
0 1 2 3 4 5 or more

-awakened due to discomfort or physical complaint (circle # times)
0 1 2 3 4 5 or more

-just woke (circle # times)
0 1 2 3 4 5 or more

RATINGS (place a mark somewhere along the line)

SLEEP QUALITY:
very bad _____ very good

MOOD ON FINAL WAKENING:
very tense _____ very calm

ALERTNESS ON FINAL WAKENING:
very sleepy _____ very alert

Pittsburgh sleep diary 113

Note. Although designed to be filled out before bed and at waketime, for the same reasons that the ASMR-15 would not be administered before bed, the portion of this sleep diary meant to be filled out before bed would be omitted in this study.

Appendix P: ASMR-15

Autonomous Sensory Meridian Response Scale (ASMR-15; Roberts, Beath & Boag, 2018)

This survey is looking at how certain stimuli affect you. Some individuals experience intense physical and emotional responses upon hearing particular sounds. These sensations and feelings can be pleasant or unpleasant.

Sounds such as whispering, crackling, tapping or scratching may produce particular experiences described below. Using the scale, please indicate your level of agreement with each statement, upon hearing any of these, or similar sounds."

"When I hear certain sounds, such as whispering, crinkling, tapping..."

	Completely Untrue for Me (1)	*Somewhat Untrue for Me (2)*	*Neither True Nor Untrue for Me (3)*	*Somewhat True for Me (4)*	*Completely True for Me (5)*	*I Do Not Wish to Answer This Question*
1. I experience an unusual sensation in my head and body.						
2. The sensation feels "tingly".						
3. It feels like goosebumps on the back of my head.						
4. The sensation feels like a "wave of energy".						
5. The sensation spreads like a wave.						
6. I find the experience calming.						
7. I feel sleepy.						
8. I feel relaxed.						
9. The experience is blissful.						
10. I feel euphoric.						
11. I find the sensation intensely pleasurable.						
12. It feels like an altered state of consciousness.						
13. It feels like a different state of mind.						
14. It feels as though I have slipped into a hypnotic, trance-like state.						
15. I experience time distortions.						

Scoring the Autonomous Sensory Meridian Response Scale (ASMR-15)

The ASMR-15 produces a total score between 1 and 5. The total score is calculated by summing all 15-items, and dividing by 15.

There are also 4 subscales: Sensation, Affect, Relaxation, and Altered Consciousness.

Sensation = 5-Items (1 – 5)
Relaxation = 3-Items (6 – 8)
Affect = 3-items (9 – 11)
Altered Consciousness = 4-items (12 – 15)

Each subscale produces a score between 1 and 5, calculated as the sum of item scores, divided by the number of items (i.e. Sensation items (1 + 2 + 3 + 4 + 5) / 5).

Previous Means and Reliabilities

In previous work on a Reddit sample (N = 896; Roberts, Beath, & Boag, 2019), the following means and alphas were recorded. Note: This iteration of the measure did not include the contextual information before the items, and asked participants to respond to the stem "When I experience ASMR:"

ASMR-15 – (M = 3.72; SD = 0.53; α = .78)
Sensation – (M = 4.06; SD = 0.74; α = .72)
Relaxation – (M = 4.48; SD = 0.63; α = .74)
Affect – (M = 4.09; SD = 0.79; α = .74)
Altered Consciousness – (M = 2.44; SD = 1.02; α = .82)

In previous work on an undergraduate psychology student sample (N = 187; Roberts, Beath, & Boag, 2021), the following means and alphas were recorded.

ASMR-15 – (M = 2.44; SD = 0.88; α = .93)
Sensation – (M = 2.93; SD = 1.12; α = .87)
Relaxation – (M = 2.34; SD = 1.13; α = .88)
Affect – (M = 2.10; SD = 1.11; α = .93)
Altered Consciousness – (M = 2.15; SD = 0.98; α = .88)

If you have any questions about the administration or scoring of the ASMR-15, please contact Natalie Roberts (natalie.roberts@mq.edu.au).

Appendix Q: Geriatric Depression Scale

Geriatric Depression Scale (short form)

Instructions: Circle the answer that best describes how you felt over the past week.

1.	Are you basically satisfied with your life?	yes	no
2.	Have you dropped many of your activities and interests?	yes	no
3.	Do you feel that your life is empty?	yes	no
4.	Do you often get bored?	yes	no
5.	Are you in good spirits most of the time?	yes	no
6.	Are you afraid that something bad is going to happen to you?	yes	no
7.	Do you feel happy most of the time?	yes	no
8.	Do you often feel helpless?	yes	no
9.	Do you prefer to stay at home, rather than going out and doing things?	yes	no
10.	Do you feel that you have more problems with memory than most?	yes	no
11.	Do you think it is wonderful to be alive now?	yes	no
12.	Do you feel worthless the way you are now?	yes	no
13.	Do you feel full of energy?	yes	no
14.	Do you feel that your situation is hopeless?	yes	no
15.	Do you think that most people are better off than you are?	yes	no

Total Score _____

Appendix R: Geriatrix Anxiety Inventory

Please answer the items according to how you've felt in the last week.

Check the column under **Agree** if you mostly agree that the item describes you;
check the column under **Disagree** if you mostly disagree that the item describes you.

	Agree	Disagree
I worry a lot of the time.		
I find it difficult to make a decision.		
I often feel jumpy.		
I find it hard to relax.		
I often cannot enjoy things because of my worries.		
Little things bother me a lot.		
I often feel like I have butterflies in my stomach.		
I think of myself as a worrier.		
I can't help worrying about even trivial things.		
I often feel nervous.		
My own thoughts often make me anxious.		
I get an upset stomach due to my worrying.		
I think of myself as a nervous person.		
I always anticipate the worst will happen.		
I often feel shaky inside.		
I think that my worries interfere with my life.		
My worries often overwhelm me.		
I sometimes feel a great knot in my stomach.		
I miss out on things because I worry too much.		
I often feel upset.		

Original GAI reference: Pachana, N.A., Byrne, G.J., Siddle, H., Koloski, N., Harley. E., & Arnold, E. (2007). Development and validation of the Geriatric Anxiety Inventory. International Psychogeriatrics, 19, 103-114.

Appendix S: Grant Proposal Data Analysis Plan

Grant Proposal

- Aims
    - To test the effect of watching an asmr video before bed on an older adult's (65 and up) sleep quality compared to a control video, using younger adults as a comparison (18-30).
- Hypotheses to be tested
    - Younger adults will have a higher sleep quality and ASMR experience score after watching the ASMR video
    - Older adults will have a higher sleep quality and ASMR experience score after watching the control video
- Methods

4.1. Study Population

- Older adults aged 65 and up, living in assisted living facilities
- Young adults aged between 18 and 30 enrolled in college/universities
- Located in the state of New York within 50 miles of the researcher

4.2. Inclusion/exclusion criteria

- **Inclusion:**Native English speakers, bedtime no later than 12:30 pm, scores >5 on the PSQI, scores >5 on the GDS, and scores >10 on the GAI will be excluded from participating (Rawtaer, et al., 2021).
- **Exclusion:** diagnosed with severe hearing loss, diagnosed with sleep disturbances, if participants plan to switch or start a new medication during the timeline of the study as it could interfere with their sleep quality.

4.3. Study measures

- Exposure variables: sleep intervention condition (asmr vs control)
- Outcome variables: sleep quality (Oura ring sleep score), ASMR sensitivity (ASMR-15)
- Covariates/potential confounding variables: daytime activity
- Participants that fail to watch the video will be excluded

4.4. Data cleaning

- Missing values=exclusion criteria

4.5. Sequence of planned analyses

- Mixed design ANOVA with repeated measures

Appendix T: ASMR Video
https://www.youtube.com/watch?v=udm0umBnTsw

Notes. Only 5 minutes of the video will be used, because Barratt and Davis (2017) found that participants prefer a trigger length of 1-5 minutes. Furthermore, the subject of the video will be the same colored cube getting cut in different symmetrical directions. The control would be identical to the ASMR video, except that the sound would be removed from the video.

Appendix U: Tablet
https://www.amazon.com/Fire-HD-8-tablet/dp/B07TMJ1R3X

Appendix V: Headphones
https://www.amazon.com/Soundcore-Cancelling-Headphones-Wireless-Bluetooth/dp/B07NM3RSRQ/ref=sr_1_14?crid=1W3W310PN1Z7U&keywords=affordable+headphones&qid=1651687202&s=electronics&sprefix=affordable+headphones%2Celectronics%2C63&sr=1-14.

Appendix W: Pittsburgh Sleep Quality Index

Subject's Initials_____ID#_____Date_____Time_____AM PM

PITTSBURGH SLEEP QUALITY INDEX

INSTRUCTIONS:
The following questions relate to your usual sleep habits during the past month only. Your answers should indicate the most accurate reply for the majority of days and nights in the past month. Please answer all questions.

1. During the past month, what time have you usually gone to bed at night?

   BED TIME _____

2. During the past month, how long (in minutes) has it usually taken you to fall asleep each night?

   NUMBER OF MINUTES _____

3. During the past month, what time have you usually gotten up in the morning?

   GETTING UP TIME _____

4. During the past month, how many hours of actual sleep did you get at night? (This may be different than the number of hours you spent in bed.)

   HOURS OF SLEEP PER NIGHT _____

For each of the remaining questions, check the one best response. Please answer all questions.

5. During the past month, how often have you had trouble sleeping because you . . .

a) Cannot get to sleep within 30 minutes

Not during the past month_____	Less than once a week_____	Once or twice a week_____	Three or more times a week_____

b) Wake up in the middle of the night or early morning

Not during the past month_____	Less than once a week_____	Once or twice a week_____	Three or more times a week_____

c) Have to get up to use the bathroom

Not during the past month_____	Less than once a week_____	Once or twice a week_____	Three or more times a week_____