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An Examination of Relationships between Autonomous Sensory Meridian Response (ASMR) and Facets of Mindfulness

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Many descriptions of a phenomenon known as autonomous sensory meridian response (ASMR) are appearing online and in respected mainstream media outlets. ASMR is a non-scientific term used to describe a pleasant tingling sensation in response to certain sensory and/or affective triggers (Barratt & Davis, 2015). Given that "mindfulness can foster an enhanced sensitivity to internal and external stimuli", previous work by Harrison and Clark (2016; p. 3) correctly hypothesized a relationship between the Observing facet of trait mindfulness and heightened responses to works of art, including the aesthetic chill response. ASMR appears to share some similarities with the chill response, and this study aimed to investigate whether it might exhibit a similar relationship to mindfulness, particularly with respect to the Observing facet. Specifically, individuals who experience ASMR were compared to those who do not with respect to trait mindfulness and its facets, and it was investigated whether an individual's tendency to experience ASMR might predict higher scores in the Observing facet. Additionally, the study aimed to gain information about individuals' ASMR experiences and triggers and to investigate whether those with ASMR were more likely to experience other cross-sensory phenomena. As hypothesized, ASMR experiencers were found to score significantly higher on this facet. In addition, frequency of ASMR was a significant predictor of the Observe facet, accounting for 17 percent of the variance. Limitations are discussed as well as future potential avenues for this nascent line of research.

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In Memoriam

This work is dedicated to the memory of Dr. Thomas J. Kehle, a prolific scholar in the field of school psychology who passed away in February 2018. Dr. Kehle was a great supporter of intellectual risk-taking and encouraged me to follow my heart in pursuing this study. In addition to providing much sound advice in the design and completion of this study, he was a dear mentor and friend who served as a model of dedication to scientific inquiry. I think of him often and will miss him always. Dr, Kehle was proud of all of his students, and I have no doubt he would be proud today.

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Chapter 1: Introduction

Many descriptions of a phenomenon known as autonomous sensory meridian response (ASMR) have appeared online and in respected mainstream media outlets. ASMR is a non-scientific term used to describe a pleasant tingling sensation experienced by some in response to sensory and/or affective triggers (Barratt & Davis, 2015). It is usually described as originating in the scalp, and moving downwards into the neck and spine, and often the shoulders and limbs. People who regularly engage in ASMR-evoking activities report various therapeutic effects from doing so, including improvements in sleep and mood, as well as relief from stress, anxiety, or chronic pain. Despite sharing similarities with frisson (i.e. "chills"), a sensory response that is more recognized in the literature, descriptions of ASMR tend to feature several qualitative differences. These include distinct triggers and a calming, rather than arousing, effect. Fredborg, Clark, and Smith (2017) argued that these distinctions make ASMR worthy of scientific study in its own right. As such, a small number of empirical studies have recently emerged.

Trait mindfulness refers to an individual's baseline mindfulness, or tendency to be aware of the present moment in a non-judgmental manner and act in accordance with that awareness. Barratt and Davis (2015) identified aspects of ASMR consistent with a state of "flow" (Csikszentmihalyi & Csikszentmihalyi, 1992), a construct closely associated with mindfulness, which includes intense focus, immersion, and decreased awareness of the passage of time. Flow states are highly correlated with happiness and a sense of enjoyment. Tihanyi (2016) remarked that experiences such as ASMR and frisson might foster mindfulness by strengthening one's present moment bodily awareness. He further posited that peak experiences and pleasant physical sensations might be a mediator of the connection between music listening and a sense of

well-being or happiness.

Noting the central role of attention in both ASMR and frisson or aesthetic chills, del Campo and Kehle (2016) suggested that mindfulness underpins both phenomena, which seem to occur when there is simultaneous present-moment awareness of external sensory stimuli and internal cues. Given that "mindfulness can foster an enhanced sensitivity to internal and external stimuli", Harrison and Clark (2016; p. 3) correctly hypothesized a relationship between the Observing facet of trait mindfulness and heightened responses to works of art, including the aesthetic chill response.

Statement of the Problem

Although some individuals are intentionally engaging in activities to induce ASMR for perceived mental health benefits, to date there has been little scientific research on the phenomenon and even less is known about whether and how it could potentially function to reduce effects of stress. Harrison and Clark (2016) recently examined relationships between trait mindfulness and aesthetic experiences and found an association between aesthetic chills and the Observing facet of trait mindfulness. As ASMR and aesthetic chills appear to be separate but related phenomena, this study aims to investigate whether the experience of ASMR may demonstrate similar relationships to mindfulness. Understanding such associations could offer theoretical avenues to guide future research into potential therapeutic uses of ASMR.

Research Questions and Hypotheses

The primary aim of this study is to examine how facets of trait mindfulness may be related to the tendency to experience ASMR. Specifically, the study will examine whether there are differences between experiencers and non-experiencers of ASMR with respect to total trait mindfulness and each of the five facets of mindfulness: Observing, Describing, Acting with

Awareness, Non-reacting, and Non-judging. A secondary goal of this study is to add to the existing limited body of knowledge regarding triggers, experiences, and media utilization among those with ASMR. Finally, analysis of participant responses may help to further the limited understanding about overlap between frisson, ASMR, and misophonia among individuals who experience these phenomena.

Based on previous findings regarding characteristics of ASMR experiencers, it is not expected that these individuals will exhibit significantly higher levels of trait mindfulness overall. However, they may be more sensitive to their external environments and more likely to notice how their bodies respond, which is best represented by one particular facet of mindfulness, Observing. It is hypothesized that individuals with ASMR may be higher in this facet, just as Harrison and Clark found aesthetic chills to be associated with higher scores on this domain.

Chapter 2: Review of the Literature

Autonomous Sensory Meridian Response (ASMR): An Overview

Over the past decade, frequent descriptions of a psychophysiological phenomenon popularly known as autonomous sensory meridian response (ASMR) have appeared online and in mainstream media outlets. Coined by Jennifer Allen in 2010, ASMR is a non-scientific term used to describe a pleasant tingling sensation experienced by some individuals in response to sensory and/or affective triggers (del Campo & Kehle, 2016). It is usually described as originating in the scalp, and moving downwards into the neck and spine, and often the shoulders and limbs. For many, the experience increases in intensity as it spreads, especially if an individual is exposed to repeated or multiple triggers in a short time (Barratt & Davis, 2015). It is thought to be an atypical occurrence, though the prevalence is unknown at this time. People with ASMR can often trace their first recollection of the sensation to early childhood, usually between age five and ten. The most commonly reported age of onset in a recent study was five (Barratt & Davis, 2015).

Despite sharing similarities with frisson (i.e. "chills"), a sensory response that is more recognized in the literature, descriptions of ASMR tend to feature several qualitative differences, which will be discussed in this review. Fredborg et al. (2017) argued that these distinctions make ASMR worthy of scientific study in its own right. As such, a small number of empirical studies have recently emerged. These studies have examined factors such as triggers for ASMR, characteristics, and personality traits, and neural connectivity patterns associated with those who experience ASMR, and links between ASMR and other cross-sensory phenomena such as synesthesia and misophonia.

Common ASMR Triggers

Barratt and Davis (2015) conducted the first empirical peer-reviewed study investigating ASMR. They found a diverse array of triggers across auditory, visual, tactile, and affective domains, but certain stimuli were endorsed most frequently. Within the auditory domain, these included sounds of whispering (75%), and crisp sounds (64%), such as tapping nails or metallic foil. One of the most widely reported affective triggers was receiving "personal attention" from another person (69%), while about a third of participants could be triggered from observing someone else engage in "repetitive tasks". Visually, watching "slow movements" induced tingling in about half of their respondents. Fredborg and colleagues (2017) found that respondents identified activities such as watching someone draw, paint, open a package, or engage in grooming behaviors with someone else (e.g., watching makeup application or hair brushing). These may simultaneously engage visual, affective, and auditory domains. In other reports, "exposure to slow, accented, or unique speech patterns"; "watching a person in a diligent and attentive manner complete a task"; and "touch from another on head or back" have been noted (Ahuja, 2013; p. 444).

It can be said that one or more of these broadly recognized triggers is capable of eliciting a predictable visceral reaction for ASMR experiencers. However, the intensity of the response varies across and within members of this group, depending on how potent a specific trigger is for any particular individual. Some may only experience the response from auditory stimuli, while others report triggers in multiple sensory domains. For some, the experience is heightened when multiple triggers present simultaneously. In analyzing responses to their ASMR Checklist, Fredborg and colleagues (2017) found that common triggers could be grouped into five factors (Watching, Touching, Repetitive Sounds, Simulations, and Mouth Sounds). This led the authors

to raise the possibility of multiple distinct ASMR subtypes (Fredborg et al., 2017).

Perceived Therapeutic Benefits of ASMR among Video Users

People who regularly engage in ASMR-evoking activities report various therapeutic effects from doing so, including improvements in sleep and mood, as well as relief from stress, anxiety, or chronic pain.Barratt and Davis (2015) observed that those with higher symptom ratings reported deriving the strongest benefits from engaging in ASMR, though further research is needed to better interpret these findings. Despite scant scientific research on whether ASMR can actually be a useful therapeutic tool, it is apparent that many people do perceive this to be the case and intentionally seek out ways of inducing the response, such as through the use of media (del Campo & Kehle, 2016). To that end, a YouTube community has built itself around the content created by so-called ASMRtists, which frequently consists of role-play scenes or simulations. In making their videos, ASMRtists often creatively combine multiple triggers in an effort to produce the response in a large number of viewers. For example, a video simulation of a haircut or spa treatment may attempt to replicate the personal attention, sounds (e.g., brushing, crinkling, tapping), and visual cues (e.g., gesturing with hands) that might attend that experience in real life. A simulated "meditation retreat" could enable the viewer to listen to sounds produced by various instruments (e.g., chimes, bowls, woodwinds), perhaps while watching others attending closely to some type of repetitive ritual.

In addition to media intentionally created for ASMR, some videos gain a following in the community after they are accidentally discovered to trigger the same response. An example is the 80's PBS program "The Joy of Painting" with Bob Ross (Kloc, 2014). Episodes are now sought out by some for the multiple "accidental" triggers they contain, such as the sounds of tapping and brushing on the canvas, the calm and soft voice of the host, and his focused, yet relaxed attention

to the activity of painting.

Characteristics Associated with ASMR Experiencers

A few recent studies have investigated personality traits associated with experiencing ASMR. Results have generally indicated that those who report having ASMR tend to score higher on Openness to Experience and lower on Conscientiousness than those who do not (Fredborg et al., 2017; Janik-McErlean & Bannisy, 2017). Additionally, Barratt and Davis (2015) reported a finding that self-identified ASMR experiencers reported greater than average levels of depression . A study by Fredborg and colleagues (2017) examined characteristics of the five factor model of personality (FFM; Digman, 1990; McCrae & John, 1992) using the Big Five Inventory (BFI; John & Srivastava, 1999) with 290 adults with ASMR and 290 matched controls. The authorshypothesized that ASMR would be associated with higher levels of Openness to Experience based on previous findings of this trait among individuals reporting similar conditions (e.g., synesthesia, musically-induced chills or frisson). Given Baratt and Davis' (2015) finding of elevated depression levels, they also predicted higher levels of Neuroticism in the ASMR group. Both predictions were supported, and further, the level of intensity of reported ASMR sensations correlated with the deviation from the mean on dimensions of Openness and Neuroticism. The same study found ASMR experiencers reporting significantly lower levels of Conscientiousness, Extraversion, and Agreeableness.

In another study, Janik-McErlean and Bannisy (2017) also used the BFI, along with the Interpersonal Reactivity Index (IRI; Davis, 1983), which measures components of empathy, among 83 ASMR experiencers and 85 controls of similar age and gender. Their findings were similar to Fredborg et al. (2017) in that ASMR experiencers scored higher in Openness and lower in Conscientiousness, but no differences were found in Agreeableness or neuroticism, after

correcting for multiples. On the IRI, ASMR reporters scored higher in Empathic Concern and Fantasizing. Based on these findings, the authors commented on notable similarities to the personality profile associated with color synesthetes, who have also been shown to typically to score higher in Openness to Experience, lower in Conscientiousness, and higher in Fantasizing (Rouw & Scholte, 2016).

In both studies of personality traits (i.e., Fredborg et al., 2017; Janik-McErlean & Bannisy, 2017), the ASMR subjects were recruited from online social media groups dedicated to ASMR (e.g., Reddit and Facebook), while other methods were used to recruit control groups. This is almost certain to lead to some sampling bias which can result in flawed inferences when attempting to generalize the differences found in the ASMR groups in these studies to the larger population. The authors of both studies identified this as a potential confounding factor when attempting to investigate personality factors specific to ASMR (Fredborg et al., 2017; Janik McErlean & Bannisy, 2017).

One published study attempted to investigate neural structures and mechanisms associated with being an ASMR experiencer (Smith, Fredborg & Kornelson, 2017). The focus was on examining group differences in brain connectivity between ASMR experiencers and controls, specifically in areas of the sensory cortex and the default mode network (DMN). The DMN involves a network of several brain regions that is usually active when a person is awake but at rest (e.g., during mind-wandering, passive listening, reflecting on self or others), hence "by default". In contrast, the DMN is deactivated during certain external goal-directed activities, such as tasks of visual attention or working memory. The regions associated with the DMN are not spatially adjacent, but their functional connectivity has been demonstrated by neurons firing in a coordinated pattern, at a separate rate from other neural networks.

Areas associated with the DMN have shown distinct patterns of activity during mindful meditation practice, particularly reduced activity in the medial prefrontal cortex (MPFC), an area involved in self-referential processing (i.e., processing information or stimuli relevant to the self) (Farb et al., 2007). Previous work has also shown weaker connectivity between DMN regions among various groups with altered perceptual experiences (Alderson-Day, McCarthy-Jones, & Fernyhough, 2015; Jardri, Thomas, Delmaire, Delion, & Pins, 2013), leading Smith and colleagues (2017) to predict the same would be true for those with ASMR. They also hypothesized increased activity in the sensory cortices during DMN activation. Both hypotheses (i.e., reduced connectivity in typical DMN areas and increased functional connectivity in some sensory cortex areas) were supported. The authors considered that this unusual resting pattern could perhaps foster increased openness to unfamiliar sensory experiences. Moreover, the ASMR group showed decreased connectivity in the thalamus. In a few case studies, patients developed atypical blending of sensory and emotional perceptions following damage to the thalamus (Ro et al., 2007; Schweizer et al., 2013). The authors remarked that the statistical differences found in their study were not indicative of pathology, however, and do not necessarily occur at the individual level (Smith et al., 2017).

Comparison with Frisson: A Related Phenomenon?

While scientific inquiry into the ASMR phenomenon is in a nascent stage, the likely related phenomenon of frisson (i.e., musically or aesthetically induced chills) has been more widely researched. Anecdotal reports suggest that the experience of ASMR is distinct from frisson, but there are some apparent similarities (del Campo & Kehle, 2016). Both are usually described as pleasant or euphoric, with a "static-like or tingling feeling" (Barratt & Davis, 2015; Harrison & Loui, 2014) that ripples or spreads down the spine and through the body

(Fairyington, 2014; Harrison & Loui, 2014) and may occur in waves in response to specific triggers. Yet individuals who claim to be familiar with both sensations commonly note a number of specific differences (Collins, 2012; del Campo & Kehle, 2016). The most notable is that ASMR is said to produce a subdued, relaxing effect, while frisson is associated with emotional arousal (Collins, 2012, del Campo & Kehle, 2016) and resting physiological arousal (Mori & Iwanaga, 2014). This is further supported by findings suggesting that musical chills are accompanied by dopamine release and the activation of neural pathways involved in motivation and reward (Blood & Zatorre, 2001; Salimpoor, Benovoy, Larcher, Dagher, & Zatorre, 2011). The formation of goosebumps on the body is almost always listed as a correlate of frisson, but this appears to be less often named as a defining feature of ASMR. When localizing the sensation, frisson experiencers are more likely to report a sudden and strong but brief wave that occurs over a larger expanse of the body. In contrast, ASMR is often described as lasting for several minutes or longer at lower levels of intensity (del Campo & Kehle, 2016), with experiencers more often identifying the head or scalp as the primary region of the tingling sensation.

Like ASMR, frisson is commonly associated with auditory perception (i.e., listening to music) but may be triggered by other experiences. The term "aesthetic chills" is sometimes used to apply to a range of these experiences in relation to listening to musical compositions or viewing works of art or scenes of beauty (Silvia & Nusbaum, 2011). Goldstein (1980) used the term "thrills" to describe a physiological "shudder, chill, or tingling sensation" (p. 128) when it occurs with any type of "emotionally stirring situation or event, such as a natural scene of transcendent beauty, a magnificent work of art or drama, a musical passage, a poignant personal encounter, a rousing speech, or a sudden intellectual insight" (p. 127).

Though it is assumed that aesthetic chills (i.e., frisson) is more widely experienced than ASMR, the prevalence is essentially unknown, with past studies suggesting anywhere from 25% to 90% of the population experience the phenomenon (Nusbaum & Silvia, 2011). Experiencers of both apparently have high sensory sensitivity, experiencing tactile and emotional perceptions concurrent with other sensory information. Therefore, it seems likely that ASMR would occur with a higher frequency among frisson reporters and vice-versa. The tendency to experience frisson has been associated with higher scores on the big five personality trait of Openness to experience (McCrae, 2007; Silvia & Nusbaum, 2011). In fact, McCrae (2007) identified the experience of aesthetic chills to be the strongest predictor of the Openness trait across cultures, among 240 items on the revised Neuroticism-Extraversion-Openness Personality Inventory (NEO-PI-R).

Possible Links to Misophonia and Synesthesia

It has also been speculated that ASMR and misophonia may have the same neurobiological basis in heightened sensitivity to sounds, existing on opposite ends of an affective continuum (Barratt & Davis, 2015; Janik McErlean & Bannisy, 2017; Rouw and Erfanian, 2017). Misophonia, meaning "hatred of sound", is the experience of strong negative emotional and/or physiological reactions to emotionally neutral sounds. Rouw and Erfanian (2017) found it remarkable that about half of the participants in their large-scale study of misophonia "reported experiencing euphoric, relaxing, and tingling sensations with particular sounds or sights", which the authors labeled as ASMR. The sound that triggers a pleasant ASMR response for one person might be experienced as decidedly unpleasant for someone else (Barratt & Davis, 2015; del Campo & Kehle, 2016). For example, while "mouth sounds" have been reported as a relatively common trigger for ASMR, Janik-McErlean and Bannisy (2017) reported

that about a quarter of their 83 respondents with ASMR found "eating sounds" to be unpleasant. Similarly, Barratt and Davis (2015) suggested possible associations between ASMR, misophonia, and synesthesia, a phenomenon in which a stimulus associated with one sense elicits an automatic response in a different sensory domain. They raised the question of whether ASMR and misophonia might be considered a sound-emotion form of synesthesia. Among participants in their study, 5.9% reported having a recognized form of synesthesia. This was not significantly higher than the overall prevalence of synesthesia (4.4%) recently reported by Sinner et al. (2006), but synesthesia has been estimated to occur at much lower rates in previous studies (e.g., Baron-Cohen, Smith-Laittan, Harrison, & Bolton, 1996). As with ASMR, the prevalence of synesthesia is difficult to ascertain because of the challenge in measuring the response objectively and differing interpretations of the term. Additionally, some individuals with synesthesia may fail to recognize it as such.

Mindfulness: Definitions, Research, and Measurement

Definitions of mindfulness vary depending on whether they are applied to a state (i.e., present process), a trait (i.e., dispositional characteristic) or a practice, such as mindfulness meditation (Black, 2011; Brown, Ryan, & Creswell, 2007). As a state, or process, mindfulness is a particular manner of engaging with one's internal and external experience. Jon Kabat Zinn (1994) describes this as "paying attention in a particular way: on purpose, in the present moment, and nonjudgmentally" (Kabat-Zinn, 1994, p. 4). Subjectively, this is experienced as a state of awareness that is at once relaxed, alert, and open. When referring to meditative practice, or "mental training", mindfulness is one of many forms of meditation. Mindfulness meditation involves repeatedly and intentionally "bringing awareness back to current experience" (Bishop et al., 2004, p. 232), with the result of cultivating a state of being characterized by increased

"attention regulation and emotional equanimity" (Britton et al., 2014, p. 264). Davis (2012) proposed the following definition, which incorporates the process, state, and outcome aspects of mindfulness:

> the practice of paying attention towards the present moment free from identification with thoughts and feelings, which is associated with the experience of feeling free and more awake, resulting in a meta-cognitive approach to experience and a flexible cognitive state (Davis, 2012, p. 34).

Such a state seems consistent with recognition and acceptance of fleeting visceral experiences, such as frisson or ASMR. Mindfulness seems to involve "attention to present sensory stimuli and simultaneous awareness of internal cues" (del Campo & Kehle, 2016, p. 5), and as such may facilitate a capacity for heightened awareness of atypical perceptual experiences.

Mindfulness Interventions

Research suggests that dispositional mindfulness may be increased with training, such as through mindfulness meditation and associated techniques. Within the last several decades, there has been increasing interest within mental health fields and the scientific community in the therapeutic use of mindfulness-based techniques to enhance personal well-being. Research based interventions such as the Mindfulness Based Stress Reduction (MBSR) program and Mindfulness Based Cognitive Therapy (MBCT) have been found beneficial in the management of chronic pain, psoriasis, substance abuse, anxiety, eating disorders, depression, and numerous other conditions (Baer, 2003; Burke, 2010). It has been suggested that such interventions may help individuals to cultivate a more mindful attitude in their day-to-day lives, resulting in greater emotional regulation and self-compassion, along with reductions in rumination and experiential avoidance (Chiesa, Anselmi, & Serretti, 2014).

Mindfulness and the Brain

Hölzel and colleagues (2011) found that individuals participating in an 8-week MBSR intervention exhibited changes in gray matter in cortical regions associated with emotional regulation, learning and memory, and self-referential thinking. Subsequent studies have also suggested that regular practice of mindfulness results in alterations to gray and white brain matter (Hernández, Suero, Barros, Gonzalez-Mora, & Rubia, 2016; Pickut et al., 2013) cortical thickness (Kang et al., 2013; Yang et al., 2019), and connectivity in various neural regions (Taylor et al., 2013),with corresponding positive changes to baseline psychological, emotional and mental functioning (Santarnecchi et al., 2014; Yang et al., 2019).

Some changes in neural DMN activity have been observed following mindfulness training; for example, Grant and colleagues (2011) found that individuals processed aversive stimuli with diminished MPFC activity following training. Furthermore, differences have been observed among people who are more experienced practitioners of mindfulness meditation. Taylor et al. (2013) found that these individuals exhibited weaker connectivity between DMN areas involved in self-referential processing and emotional appraisal with greater connectivity between other DMN regions (i.e., dorso-medial PFC and right inferior parietal lobe).The finding of reducedconnectivity between areas involved in self-relevant thinking and emotional appraisal seems consistent with how mindfulness fosters a more objective and accepting perspective of the present moment, while decreasing the tendency to judge or ruminate.

Mindfulness as a Trait

Trait or dispositional mindfulness refers to an individual's tendency to live in the mindful state, with awareness of moment-to-moment experience rather than in a state of preoccupation with the past or future (Brown et al., 2007). This characteristic has been shown positively related

to positive affect, optimism, self-regulation, and self-actualization; negative associations have been found for rumination, negative affect, depression, and anxiety (Brown & Ryan, 2003). Examining relationships between trait mindfulness and factors of personality of the Five Factor Model (McCrae & Costa, 1999), the strongest and most consistent associations are found in the inverse relationship between mindfulness and Neuroticism (Giluk, 2009). There is also preliminary empirical support for positive relationships with Conscientiousness and with Agreeableness. Findings have been mixed with respect to investigations of links between mindfulness and Extraversion, and between mindfulness and Openness to Experience (Rau & Williams, 2016). In early adolescents, dispositional mindfulness has been associated with strengths in the executive functions of inhibitory control and working memory (Riggs, Black, & Ritt-Olson, 2015). Studies (e.g., Kee & Wang, 2008) also show correlations with some subscales of flow (Csikszentmihalyi, 1990), including action-awareness merging and loss of self-consciousness. While earlier research often represented trait mindfulness as a solitary factor defined as present moment awareness (Brown & Ryan, 2004), it is most often measured and understood as a multidimensional construct within contemporary literature (Kharlas & Frewen, 2015). Various instruments have been developed and validated to measure trait mindfulness, with the Five Factor Mindfulness Questionnaire (FFMQ) being one of the most recognized and widely used (Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006).

Facets of Mindfulness

Baer et al. (2006) found support for a multifactor model of mindfulness and developed the five-facet mindfulness questionnaire (FFMQ) used in the present study, which contains the five factors of Observe, Describe, Act with Awareness, Nonjudge, and Nonreact. Evidence of the FFMQ's validity as a tool for measuring mindfulness has been found across many diverse

groups, languages, and cultures (e.g., Christopher, Neuser, Michael, & Baitmangalkar, 2012; Giovannini et al., 2014; Hou, Wong, Lo, Mak, & Ma, 2014; Watson-Singleton, Walker, Loparo, Mack, & Kaslow, 2017). As described by Baer et al. (2008), the Observe factor refers to the tendency to notice and attend to internal and external experiences; Describe is the ability to label or express one's internal experiences (e.g., thoughts, feelings, beliefs, sensations) in words; Act with Awareness describes the practice of maintaining focus on one's present activities without being distracted or on "auto-pilot"; Nonjudge refers to an attitude towards one's thoughts that is accepting without evaluating; and Nonreact refers to allowing thoughts and feelings, whether positive or negative, to pass through the mind without getting carried away, getting stuck, or seeking to immediately relieve or amplify the experience.

Baer and colleagues (2008) found all facets associated with reduced levels of psychological symptoms in a student sample. Excluding the Observe facet, the same findings extended to their highly educated sample, with the remaining four facets (Describe, Act with Awareness, Nonjudge, Nonreact) also predicting psychological well-being among those participants. All facets were found positively associated with emotional intelligence and self-compassion in a sample of meditation-naïve undergraduates, while three of five (Observe, Describe, Nonreact) were positively correlated with Openness to Experience (Baer et al., 2006). Rau & Williams (2016) reported that Act with Awareness is associated with lower threat sensitivity and avoidance-based coping styles, while the Act with Awareness and Nonjudge facets are both reliably associated with reduced Neuroticism.

Rau and Williams (2016) argued that the construct of dispositional mindfulness is distinct from learned mindfulness, which may be cultivated using mindfulness training practices, such as meditation. They encouraged researchers to discuss characteristics of their samples, including

prior exposure to such techniques. After controlling for age and education, meditation experience has been shown to have significant and positive correlations with four of the five FFMQ factors (excluding Act with Awareness), (Baer et al., 2008).

Baer and colleagues (2006) encountered some unexpected findings with respect to the Observe factor's correlations with several maladaptive tendencies, including dissociation, absent-mindedness, psychological symptoms, and thought suppression. Similarly, among individuals with mood and anxiety disorders, Curtiss and Klemanski (2014; p. 683) reported that the Observe facet appeared to be "antagonistic to overall mindfulness" and found a positive relationship to "anxious arousal". The authors cited several studies that link anxiety disorders to an individual's tendency to allocate attentional resources towards observing signals of threat, both externally in the environment or internal somatic symptoms (Ehlers & Breuer, 1996; Morrison & Heimberg, 2013; Rapee & Heimberg, 1997). Proposing that the structure of mindfulness may be different in the context of psychopathology, Curtiss and Klemanski's confirmatory factor analyses (CFA) found the best fit for their clinical sample was a four factor model without Observe.

Relationships between the Observe facet and maladaptive tendencies have not been replicated in studies that assessed mindfulness in experienced meditators Furthermore, among meditators, there appear to be strong positive correlations between the Observe facet and psychological well being (e.g., Baer et al. 2008; de Bruin, Topper, Muskens, Bögels, & Kamphuis, 2012). This may be explained in that many forms of meditation train the mind to remain open to noticing and experiencing all internal and external stimuli with acceptance, thus discouraging selective attention toward that which is perceived as unpleasant (Baer et al., 2008). People who are more naturally observant may experience more angst if a greater amount of

stimuli enters their consciousness that is perceived as negative. As reasoned by Curtiss and Klemanski (2014), "observation may exhibit psychologically advantageous properties only in the context of an overall more mindful perspective, which may be lacking in individuals with psychopathological features" (p.691). However, those who meditate may be able to shift their attention more flexibly across a range of stimuli.

These findings generally lend support for the understanding of mindfulness as a multifaceted construct, as conceptualized by the FFMQ. The tendency to be observant of one's own moment-to-moment experience is understood as a central feature of mindfulness in most recognized definitions, but if observation is accompanied by high arousal, strong judgment, or an urge to react, it can become maladaptive and inhibit the ability to stay present, adopting an attitude of acceptance, and acting with focused awareness. Mindfulness can be best understood as occurring when all of its facets are acting together strongly.

Mindfulness in the Context of ASMR and Similar Sensory Responses

Barratt and Davis (2015) identified aspects of ASMR consistent with the experience of "flow" (Csikszentmihalyi & Csikszentmihalyi, 1992). Flow, a construct associated with mindfulness, describes a state of experience involving intense focus, immersion in activity, and decreased awareness of the passage of time. Flow states are highly correlated with happiness and a sense of enjoyment. They have frequently been studied in the context of music listening (e.g., Lowis, 2002), and Csikszentmihalyi (1997) theorized that musical activities are particularly conducive to reaching a flow state. In the case of musical frisson, the experience is more likely to occur when the listener's attention is fully on the music, rather than while multitasking (Grewe, Nagel, Kopiez, & Altenmüller, 2007; Nusbaum et al., 2014).

Harrison and Clark (2016) examined the question of how mindfulness might be related to

aesthetic experiences, and found an association between trait mindfulness and the tendency to experience aesthetic chills (Harrison & Clark, 2016). Given that "mindfulness can foster an enhanced sensitivity to internal and external stimuli", Harrison and Clark (2016; p. 1) hypothesized a relationship between the Observing facet of trait mindfulness and heightened responses to works of art, including the aesthetic chill response. Controlling for gender and aesthetic fluency, they found that Observe significantly predicted frequency of aesthetic experiences (AES), which was operationalized to include "feeling touched" and "absorption" in addition to chills. This model accounted for 14% of the variance in AES. A second model, which included five facets of mindfulness in addition to sex and aesthetic fluency, accounted for 22% of the variance. Here, both the Observe and Nonreact facets positively predicted AES, while Non-judging was a negative predictor. With respect to the chills subscale specifically, a multivariate analysis demonstrated a significant positive relationship with Observing and a negative relationship with Non-judging (Harrison & Clark, 2016).

Harrison and Clark's (2016) finding suggests that there could be a relationship between mindfulness and the capacity for heightened or atypical perceptual experiences such as ASMR, which involve "close attention to present sensory stimuli and simultaneous awareness of internal cues" (del Campo & Kehle, 2016, p. 5). Noting the central role of attention in both ASMR and aesthetic chills, del Campo and Kehle (2016) suggested that mindfulness may be an element underlying these phenomena, with both experiences occurring when there is simultaneous present-moment awareness of external sensory stimuli and internal cues. Similarly, Tihanyi (2016) remarked that such experiences might foster mindfulness by strengthening one's present moment bodily awareness and suggested that peak experiences involving pleasant physical sensations may mediate the connection between music-listening and a sense of well-being or

happiness (Tihanyi, 2016). While ASMR shares some key features with aesthetic chills, or frisson, "phenomenological characteristics that differentiate it from experiences such as frisson and synesthesia suggest that this condition is a valid topic of scientific inquiry" (Fredborg et al., 2017; p. 2). Therefore, the aim of this study is to examine how facets of trait mindfulness may be related to the tendency to experience ASMR.

Research Questions and Hypotheses

The principle aim of this study is to examine how facets of trait mindfulness may be related to the tendency to experience ASMR. Secondarily, the study aims to add to the existing limited body of knowledge regarding triggers, experiences, and media utilization among those with ASMR. Furthermore, it is hoped that analysis of participant responses may help to further the limited understandings about overlap between frisson, ASMR, and misophonia among individuals who experience these phenomena.

As such, the primary research questions have addressed the following aims:

1) Examining whether there are differences between experiencers and non-experiencers of ASMR with respect to total trait mindfulness

2) Examining for differences between each of the five facets of mindfulness: Observing, Describing, Acting with Awareness, Non-reacting, and Non-judging.

3) Exploring whether ASMR predicts differences in the Observing facet of the FFMQ.

Secondary questions were exploratory in nature and attempted to investigate the following:

1) How is ASMR triggered and felt by those who claim to experience it?

2) Are individuals with ASMR more likely to experience of frisson and can they distinguish the sensations?

3) Are individuals with ASMR more likely to experience misophonia?

Based on previous findings regarding characteristics of ASMR experiencers, these individuals were not expected to exhibit significantly higher levels of trait mindfulness overall. However, it was predicted that they may exhibit higher scores in the Observe facet, just as Harrison and Clark found aesthetic chills to be associated with higher scores on this domain. It seems likely that an individual's degree of ASMR can be partially explained by increased sensitivity to the external environment and awareness of how their bodies respond to stimuli, which is most consistent with this facet of mindfulness. It was further expected that frequency of ASMR experiences would be able to explain some of the variance in Observing.

Chapter 3: Procedures and Methodology

This study utilized a survey design with the purpose of gathering information from individuals both with and without ASMR, allowing for the comparison of the two groups on variables of interest. It also collected information specifically about ASMR experiences among those who reported experiencing it. This section will present information about the survey, procedures, instrumentation, participants, and methods of data analysis utilized in the study.

Survey Design

The survey was developed with Qualtrics online survey software, which employs a secure distribution website through the University of Connecticut (UConn). A proposal of goals, procedures, and materials was submitted to the UConn Institutional Review Board for the protection of human subjects. Data collection using the online survey was initiated following the IRB determination that the study fell in the "exempt" category due to the anonymity of data collection procedures.

No personally identifying data or IP addresses were collected from respondents. The first page contained all details necessary for informed consent, and provided an option to consent to participate. Following the consent page, the first section obtained demographic information, including participant age, gender, and role within the university (undergraduate student, graduate student, faculty, other staff member). All survey items were voluntary and did not force responses for participants to progress.

The second section consisted of the FFMQ, the 39-item mindfulness instrument that was administered to all participants. After completing it, participants were asked to indicate whether they engage in meditation or other formal mindfulness practice. Those who answered "yes" were asked to estimate the frequency with which they practice.

Section three assessed participant familiarity with ASMR ("Had you heard of Autonomous Sensory Meridian Response prior to participating in this study?"), introduced examples of videos created to induce ASMR, and classified participants into responders and non-responders. Participants who were aware of ASMR were asked to identify the source(s) where they had learned of it and to rate their subjective understanding of the phenomena. Before querying participants on whether or not they were experiencers of ASMR, the phenomenon was described in the following manner: "a pleasant tingling sensation in response to certain triggers. It originates in the scalp and sometimes spreads into the neck, shoulders, and limbs. Common triggers include sounds such as whispering or other soft voices; sounds of scratching, tapping, foil crinkling, or paper shuffling; receiving personal attention from someone else; watching slow, repetitive movements; and watching someone engaged in an activity in a focused manner. The tingling sensation is usually described as calming and may occur in waves."

Sample videos were embedded in section three to better familiarize participants with ASMR and to support self-reports of having experienced it. The videos were selected to include a range of common triggers and each had received a large amount of positive feedback from viewers who reported having the sensation during the video. Because of the diversity of triggers across individuals, six different videos were included, with various triggers such as whispering, scratching, tapping, and hand movements. In addition to reporting on ASMR history, all participants were queried on whether they recalled having ever experienced chills in response to a) music, b) seeing something beautiful, and c) a "strong emotion or sudden insight". Another item assessed whether participants had any history of misophonia.

The fourth and final section of the survey, which specifically related to ASMR

experiences, was presented only to those who identified themselves as having "probably" or "definitely" having it. It included the ASMR Checklist (Fredborg et al., 2017), which assessed the presence and intensity of 16 different triggers identified by the authors of the list. Other items assessed included age of first ASMR recollection, the frequency of ASMR, and frequency and purpose of ASMR video use.

Recruitment

Participants were recruited via the University of Connecticut's (UConn) Daily Digest, a listserv that distributes a daily list of announcements to the campus community. The study was advertised under the "Research" section of the digest on 7 days between December 8th 2017 and January 2nd, 2018. The notice was sent to students, staff and faculty of the Storrs campus and the UConn Health Center in Farmington. Interested individuals learned more about the study after clicking on the headline, which opened to a page of general information and included an anonymous link to the survey, hosted by Qualtrics software. Participants granted their consent electronically prior to initiating the survey.

Power analysis was conducted using G*Power (Erdfelder, Faul, & Buchner, 1996) to determine the sample size needed to provide 0.8 statistical power to a single factor MANOVA with five dependent variables, with the aim of detecting a medium effect size ($f = 0.25$) at the 0.05 significance level. Given that previous studies have found weak correlations among the FFMQ factors (e.g., Medvedev, Siegert, Kersten, & Krägeloh, 2017), this analysis assumed a 0.2 correlation among the measures. Results indicated that a sample size of 48 (24 ASMR experiencers and 24 controls) would be sufficient to meet these parameters. While most respondents self-identified as ASMR experiencers, the survey remained open until an acceptable number of responses had been collected from controls (i.e., those responding they "probably" or

"definitely" did not have ASMR. Ultimately, a self-selected sample of 134 adults (108 female, 20 male, 6 gender non-binary or unspecified) accessed and submitted the online survey. Of these, 88 responded that they definitely or probably experienced ASMR, 25 responded that they most likely or definitely did not, and 21 were unsure.

Data Handling

A review of current media reports and conflicting opinions in online forums suggests some lack of clarity about ASMR in the general population. Furthermore, ASMR is not well understood or fully defined in scientific literature, though researchers have argued that it should be considered separately from other types of thrills, chills, or frissons (e.g., Fredborg et al., 2017). In an attempt to form an ASMR group more representative of "true" ASMR, rather than one muddled with experiencers of related phenomena, the decision was made to include only individuals who could report a real-time viewing response when analyzing the primary research questions. However, the broader sample was used in exploring perspectives for the secondary research questions.

The narrower sample was obtained by having participants report on whether or not they had experienced ASMR-like tingling from watching the survey-embedded videos. Based on responses to this item, a smaller subset of individuals was classified into "ASMR responders" and "controls". Where the term "ASMR responders" is used in presenting results, it refers specifically to those who experienced the sensation while viewing the videos embedded in the survey. This subset of individuals comprised the sample used for analysis of the primary research questions (i.e., those specifically involving the relationship of ASMR to mindfulness and facets of mindfulness). While viewing videos had been presented as optional to participants who already felt certain of whether or not they had ASMR (i.e., responded "definitely yes"), a larger

pool of responses was gathered than expected, permitting the decision to create this subset of ASMR responders based on viewing response. This meant that any ASMR experiencers who had opted not to view videos were excluded from the multivariate and regression analyses. Although there was no method of verifying self-report of a real-time response, this was considered the most feasible means of minimizing false positives and increasing specificity for ASMR for the primary purpose of this study.

Table 3.1 provides a breakdown of how many respondents were classified into a group (ASMR responders or controls) or excluded from the primary analyses based on their survey responses. As shown,this system resulted in exclusion of the 33 individuals who did not view the sample videos, 24 of whom believed themselves to be "probable or "definite" ASMR experiencers. Ten more individuals who self-identified as ASMR experiencers but who experienced no response from viewing the samples were also excluded, as were the five individuals who reported being unsure if they experienced ASMR while viewing the samples. In addition, one participant who did report a tingling feeling while viewing the samples was excluded because he had responded "definitely not" when asked whether he believed he was an ASMR experiencer."Controls"(i.e., non-responders) were those participants who had not self-identified as "definite" or "probable" ASMR experiencers and who viewed the videos without experiencing a response. The resulting classification yielded a sample of 73 individuals (45 ASMR responders, 28 controls) to be included in regression and multivariate analyses. ASMR responders and controls classified in this manner did not differ significantly with respect to the proportion of students in each group [X^2 (1, N = 73) = 3.649, p = n.s.], the males and females represented [X^2 (1, N = 73) = 0.059, p = n.s.], or whether or not respondents had prior awareness of ASMR in general [X^2(1, N = 73) = 3.362, p = n.s.].

Table 3.1

Participant Classification by Video Response and Self Report

	Responses to "Do you believe that you experience ASMR?"					
Self-reported response to samples	Definitely Yes	Probably Yes	Unsure	Probably Not	Definitely Not	Total
Viewed samples & experienced tingles	25 *ASMR Responder*	15 *ASMR Responder*	5 *ASMR Responder*	0	1 *Excluded*	45 ASMR Responders
Viewed samples/ & experienced no tingles	4 *Excluded*	6 *Excluded*	10 *Control Group*	16 *Control Group*	2 *Control Group*	28 Control
Did not view samples	9 *Excluded*	15 *Excluded*	4 *Excluded*	5 *Excluded*	0	
Viewed but unsure	0	3 *Excluded*	2 *Excluded*	0	0	
Total	25 ASMR	15 ASMR	5 ASMR 10 Controls	16 Controls	2 Controls	45 ASMR 28 Controls 49 Excluded

It was understood that viewing the particular videos offered at the time of survey completion might not have elicited the response in some individuals who do in fact experience ASMR at other times. Elsewhere in the study, participants may be referred to as "those who reported experiencing ASMR" based on self-identification, regardless of whether or not they viewed the sample videos and the response they had while viewing. The perspectives of these individuals were still considered valuable in contributing to current knowledge about ASMR. Thus, descriptive statistics and some general correlational analyses were performed with this

larger group, some of whom did not view the videos or did not experience ASMR while viewing videos.

Measures

Five Facet Mindfulness Questionnaire (FFMQ)

The Five Facet Mindfulness Questionnaire (FFMQ; Baer et al., 2006) is a 39 item self-report questionnaire designed to measure trait mindfulness across five facets. These include Observing ("I pay attention to sounds, such as clocks ticking, birds chirping, or cars passing"), Describing ("I can easily put my beliefs, opinions, and expectations into words"), Acting with Awareness ("I don't pay attention to what I'm doing because I'm daydreaming, worrying, or otherwise distracted"), Non-judging ("I criticize myself for having irrational or inappropriate emotions"), and Non-reacting ("I watch my feelings without getting lost in them"). Items are scored on a 5-point Likert scale from 1 = never or very rarely true to 5 = very often or always true. Higher global scores suggest that an individual tends to exhibit greater mindfulness across situational contexts in daily life.

Since its development, the psychometric properties of the FFMQ have been investigated with clinical and non-clinical samples in various countries and languages (e.g., Aguado at al., 2015; Bohlmeijer, Peter, Fledderus, Vehof, & Baer, 2011; Deng, Liu, Rodriguez, & Xia, 2011; Dundas, Vøllestad, Binder, & Sivertsen, 2013; Giovannini et al., 2014; Heeren, Douilliez, Peschard, Debrauwere, & Philippot, 2011;Lilja et al., 2011; Sugiura, Sato, Ito, & Murakami, 2012). Internal consistency of the five scales has been shown to be adequate to good ($\propto$=0.67−0.93) (Park, 2013). Most recent confirmatory factor analyses (CFAs) have suggested that a correlated 5-factor model offers the best fit(Aguado et al., 2015).

Modified ASMR Checklist

Fredborg and colleagues (2017) developed the ASMR Checklist while studying personality factors associated with ASMR.It was designed to "establish which types of stimuli tend to elicit the most intense ASMR experiences" by assessinga rater's subjective intensity of response to each identified trigger. The checklist has offered further support that diverse types of triggers may give rise to a predictable, physical sensation in some individuals that is commonly described as ASMR, and the authors commented on the potential for fine-tuning as more information becomes available. (Fredborg et al., 2017).

The original checklist contained 16 previously identified triggers and simulations reported in the literature and in online forums used by the ASMR community. For each trigger, the intensity of the response is rated on a 7-point scale (0=No Tingles, 3=Moderately Intense, 6=Most Intense ASMR Experience) or designated as "Unknown". In addition, the latency of the response is assessed ("How many seconds after its onset do you feel the tingles?"). Optional items allow respondents to identify and rate any personal triggers not included on the checklist. In assessing psychometric properties, the authors dropped two of their original 16 items because of a large number of "unknown" responses. Their resulting analysis demonstrated good internal consistency (Cronbach's alpha = 0.81). A principal components factor analysis suggested a possible multi-factorial structure corresponding to five stimulus categories of Watching, Touching, Repetitive Sounds, Simulations, and Mouth Sounds.

The checklist was modified in the present study to include additional questions assessing other aspects related to participants' current and past experiences with ASMR, such as age of onset, frequency of ASMR, how often they use ASMR media to sleep or relax, and their subjective sense of pleasure associated while experiencing ASMR. Additionally, respondents

were surveyed about whether they have ever experienced 'chills' from listening to music, seeing something beautiful, or from having a strong emotion or sudden realization, and asked to report whether their experience of ASMR could be distinguished from these other, presumably similar sensations. They were also asked whether they ever experience "an inexplicably strong negative feeling (emotional or physical) in response to certain neutral sounds" (i.e., misophonia).

Data Analysis

Characteristics and FFMQ Scores of Sample

Demographic characteristics of the entire sample were as the subset classified by viewing response. The FFMQ was analyzed for internal consistency of the instrument and correlations among the factors. Descriptive statistics (i.e. means and standard deviations) were calculated on FFMQ scores of study participants by age group and gender. Gender differences were further explored with ANOVA and MANOVA. Means and percentages for individual items are based on the number of participants that responded to the item. Chi square tests were performed on the entire sample to examine whether participants self-identification was related to prior awareness of ASMR.

Analyses of the Primary Research Questions

A planned multivariate analysis of covariance (MANCOVA) was conducted on the subset of the sample that could be classified into ASMR-responders or controls on the basis of viewing response. The MANCOVA investigated whether there were differences between experiencers and non-experiencers of ASMR with respect to total the five facets of the FFMQ. Pre-specified covariates included participant age, gender, and use/frequency of formal mindfulness or other meditative practice. Due to the high correlations between the global mindfulness score and the five facet scores, the total score was not included as a dependent

variable in the MANCOVA analysis. Instead, a separate ANCOVA was conducted to examine for potential differences in global mindfulness, controlling for age group, gender, and frequency of any regular formal meditative practice. A planned multiple regression analysis attempted to explain variance in the Observing trait using the predictor variables ASMR frequency, age, and gender. After viewing the correlations between the Observing facet and these variables of interest, follow-up regression analyses were conducted that included predictors of ASMR frequency, frequency of meditative/mindfulness practice, and experience of chills in response to emotional stimulation.

Analyses of Secondary Research Questions

Descriptive information was reported regarding ASMR characteristics and experiences for respondents who self reported as "probable" or "definite" ASMR experiencers ($N = 85$). Information was summarized regarding these participants' perceptions of whether there is a difference between ASMR and various frisson experiences. Correlational analyses were conducted to identify relationships between experiencing ASMR and experiencing chills in other domains. Finally, correlations were examined with respect to ASMR experiences and misophonia.

Chapter 4: Results

Characteristics of Sample

Unless otherwise noted, discussion of the sample characteristics is based on the data of all 134 participants. Fifty percent was comprised of students, including undergraduates (39.6%) and graduate students (10.4%). Also represented was UConn staff, both non-faculty (40.3%) and faculty (4.5%). About five percent were UConn alumni and/or not directly affiliated with UConn at the time of taking the survey. Classified by age, respondents fell into the following ranges: 18-23 (41.8%), 24-29 (14.9%), 30-39 (17.2%), 40-49 (12.7%), 50-59 (9.0%), and 60 or over (3.7%). Characteristics of both the overall sample and the smaller subset included in the multivariate analysis are presented in Tables 4.1 and 4.2 for age/gender and role (i.e., undergraduate student, graduate student, faculty, alumni) respectively.

Table 4.1

Age Range and Gender of Overall Sample and Sample Subset

	Overall Sample[a]		Sample Subset[b]	
Age range	*N*	%	*N*	%
18-23	56	41.8	35	47.9
24-29	20	14.9	7	9.6
30-39	23	17.2	11	15.1
40-49	17	12.7	10	13.7
50-59	12	9.0	9	12.3
60 or over	5	3.7	1	1.4
Gender				
Female	108	80.6	58	79.5
Male	20	14.9	12	16.4
Non-binary/Unspecified	6	4.5	3	4.1

Table 4.2

Respondent Role

	Overall Sample		Sample Subset	
Role	*N*	%	*N*	%
Students	67	50.0	39	53.4
Undergraduate	53	39.6	33	45.2
Graduate	14	10.4	6	8.2
Faculty	6	4.5	5	6.8
Staff	54	40.3	28	38.4
Alumni/Other	7	5.2	1	1.4
Total	134	100.0	73	100.0

ASMR Awareness/ Familiarity Prior to Study Participation

Over half of all respondents (53.7%) reported having heard of ASMR prior to taking the survey. Of these 72 individuals with prior awareness, most (68%) reported having learned of it through some form of social media, and YouTube in particular was specified numerous times. Word-of-mouth and newspaper/magazine articles were also commonly cited sources.Table 4.3 displays the frequency with which participants cited various sources where they had heard of ASMR.

Table 4.3

Source(s) of Participants' Prior Awareness of ASMR

Source	*N*	%
Social media outlet (any)	49	68.1
YouTube	12	16.7
Word of mouth	26	36.1
Magazine or newspaper article (online or print)	13	18.1
Podcast	3	4.2
TV program	3	4.2
School course	1	1.4

Research article	1	1.4

When asked whether or not they believed themselves to be ASMR experiencers, most survey respondents (65.7%) felt they probably or definitely did experience ASMR, with close to 37 percent of all respondents responding with "definitely". A relatively smaller proportion of individuals remained uncommitted (15.7%). Members of the 18-23 age group more often identified as ASMR experiencers and expressed this with more certainty. Table 4.4 shows respondents' perceptions in this regard, overall and broken down by age group.

Table 4.4

Percentage of respondents reporting whether or not they believe themselves to experience ASMR, overall and by age group

Category	"Do you believe you experience ASMR?"				
	Definitely yes	Probably yes	Might or might not	Probably not	Definitely not
Total	36.6	29.1	15.7	15.7	3.0
Age range					
18-23	53.6	19.6	12.5	14.3	0.0
24-29	30.0	30.4	15.0	20.0	0.0
30-39	43.5	30.4	17.3	4.4	4.4
40-49	17.7	41.2	11.8	23.5	5.9
50-59	0.0	41.7	25.0	33.3	0.0
60 or over	0.0	40.0	40.0	0.0	20.0

Participants' self identification as ASMR experiencers or non-experiencers appears to be influenced by whether or not they had previously heard of ASMR, as supported by a significant chi square test of independence [X^2 (1, N = 113) = 4.03, p = 0.045]. Those who had some prior awareness of ASMR were significantly more likely to identify as probable or definite experiencers of the phenomenon, while those who did not recall hearing of it in the past were more likely to identify themselves as probable or definite non-experiencers. The 21 participants

who reported being unsure if they experience ASMR (i.e.,"might or might not") were omitted from this chi square analysis. As previously reported in the Data Handling section, another chi square analysis was conducted on the smaller subset of participants who viewed the sample videos and were classified as either ASMR responders or controls on the basis of their responses to those videos. Within this smaller subgroup, the ASMR responders were no more likely to have previously heard of ASMR than the controls [$X^2(1, N = 73) = 3.362$, p = n.s.].

Analyses of FFMQ Instrument

The reliability of the 39-item FFMQ in measuring general trait mindfulness was supported in the sample of ASMR responders and controls ($\propto$=.91). Internal consistency was likewise demonstrated across the five facet scales of Observe (8 items; $\propto$= .80), Describing (8 items; $\propto$=.90), Act with Awareness (8 items; $\propto$= .90), Nonjudge (8 items; $\propto$= .93), and Non-react (7 items; $\propto$=.86). As seen in Table 4.5, all five facets were positively correlated with the total FFMQ score (Total Mindfulness). There were multiple small but significant correlations demonstrated amongst the five factors.

Table 4.5

Correlations among Facets of FFMQ and Total Score

	Observe	Describe	Act with Awareness	Nonjudge	Nonreact
Observe	--				
Describe	.242*	--			
Act with Awareness	-.121	.359**	--		
Nonjudge	-.035	.360**	.386**	--	
Nonreact	.247*	.327**	.226	.423**	--
Total Mindfulness	.361**	.737**	.616**	.728**	.682**

Note: Based on responses of the viewing response subsample (N=73) *p< 0.05; **p < 0.01

Mean FFMQ Scores among Study Participants

Table 4.6 presents descriptive statistics of the FFMQ scores among the sample overall

and by gender and age level defined as under 30 (18-29) or 30 and over. The mean global mindfulness score of males (M = 130.7, SD = 18.0) was not significantly different than that of females (M = 126.8, SD = 19.2); $t(68) = -0.639$, p = n.s. However, individuals 30 and over did generally score higher in overall mindfulness (M = 132.8, SD = 17.9) than those under 30 (M = 124.0, SD = 18.6); $t(71) = -2.05$, $p = .044$. Correlational analyses showed an association between participant age group and the Nonjudge facet ($r = .334$, $p < 0.01$). Multivariate analyses did not reveal significant gender differences for any of the five measured facets of mindfulness.

Table 4.6

Means and Standard Deviations of FFMQ Scores Overall, and by Gender and Age Group

	Female (N=58)		Male (N=12)		All (N=73)	
All (N=73)	*M*	*SD*	*M*	*SD*	*M*	*SD*
Observe	28.5	4.6	26.4	5.4	28.1	5.0
Describe	28.0	6.4	28.3	5.4	27.9	6.2
Act w/Awareness	23.7	6.0	25.3	6.3	24.1	6.0
Nonjudge	25.7	7.1	28.7	6.0	26.4	7.1
Nonreact	20.8	5.0	21.9	4.9	21.2	5.1
Total	126.8	19.2	130.7	18.0	127.7	18.7
Under 30	Female (N= 33)		Male (N =6)		All (N=42)	
	M	*SD*	*M*	*SD*	*M*	*SD*
Observe	28.3	5.1	29.2	6.0	28.3	5.5
Describe	26.9	6.5	28.5	6.1	26.9	6.3
Act w/Awareness	23.4	6.1	23.3	6.0	23.5	6.0
Nonjudge	23.3	6.7	27.5	6.5	24.4	7.0
Nonreact	20.2	5.2	21.3	6.6	20.8	5.6
Total	122.0	18.7	129.8	20.4	124.0	18.6
Over 30	Female (N=25)		Male (N=6)		All (N = 31)	
	M	*SD*	*M*	*SD*	*M*	*SD*
Observe	28.8	3.8	23.7	3.1	27.8	4.1
Describe	29.5	6.0	28.2	5.2	29.3	5.8
Act w/Awareness	24.2	5.9	27.3	6.5	24.8	6.1

Nonjudge	29.0	6.5	29.8	5.8	29.1	6.3
Nonreact	21.6	4.8	22.5	2.8	21.8	4.5
Total	133.1	18.4	131.5	17.2	132.8	17.9

Note: Based on responses of the viewing response subsample (N=73)

Analyses of Primary Research Questions

Research Question 1: Are there differences between ASMR responders and non-responders with respect to global mindfulness?

Examination of the means did not suggest differences between ASMR responders and controls. Additionally, ANCOVA was conducted to test for influence of group (ASMR responder, control) with covariates of participant age group, frequency of any regular formal meditative practices, and gender. As hypothesized, there was no significant difference [$F(1, 64) = .156$, p = n.s.] between ASMR responders ($M = 126.77$, $SD = 18.92$) and controls ($M = 128.59$, $SD = 19.2$) on overall trait mindfulness.

Research Question 2: Are there differences between ASMR responders and non-responders with facets of mindfulness, in particular Observe?

An initial MANOVA was performed to examine the effect of group (ASMR, controls) on each of the five facet scales, entered as dependent variables. Age group, meditative practice frequency, and gender were entered as covariates. Box's test of homogeneity of variance-covariance matrix yielded a nonsignificant M, suggesting that assumption had been met. A significant multivariate effect was observed for group (ASMR responders vs. controls), with Wilks observed for group (ASMR responders vs. controls), with Wilks$\lambda = .85$, $F(5, 65) = 2.35$, $p = .05$, partial $\eta^2 = .153$. The subsequent univariate analyses on each of the five dependent variables showed a significant effect of group on the Observing facet of the FFMQ [$F(1, 69) = 8.94$, $p < .01$, partial $\eta^2 = .115$]. No significant effects were observed for any of the other facets, either. Table 4.7 displays the mean scores and standard deviations of the five facets among

ASMR responders and controls.

Table 4.7

Mean FFMQ Scores among ASMR Responders and Controls

Item	ASMR Responders		Controls	
	M	*SD*	*M*	*SD*
FFMQ Total	127.2	18.7	128.54	18.7
Observe*	29.7	4.7	25.6	4.3
Describe	27.9	6.6	27.9	5.5
Act w/Awareness	23.1	5.5	25.7	6.5
Nonjudge	25.1	7.1	28.4	6.5
Nonreact	21.5	5.5	20.9	4.6

*$p < .05$

Research Question 3: Does frequency of ASMR predict differences in Observing?

The planned multiple regression analysis aimed to predict the dependent variable of Observe based on the independent variables of age, gender (dummy coded to account for male, female, and non-binary respondents), and frequency of ASMR experiences. The regression equation, $F(4, 68) = 3.384$, $p < .05$, was significant, with $r^2 = .166$. While 17% of the variance in Observe was explained through ASMR frequency, gender, and age, only ASMR frequency was a significant predictor. After examining correlations of variables of interest (see Table 4.8), a follow-up regression was performed, eliminating the non-significant predictors (age and gender) and adding a new predictor, meditation frequency. Taken together, the reported frequency of ASMR experiences and frequency of engagement in formal meditative practices were significant predictors of the Observe facet. This simpler, two-variable model [$F(2,70) = 10.495$, $p < .001$] was able to account for a greater proportion of the variance ($r^2 = .23$).

Finally, a third variable (experience of chills accompanying a strong emotion/insight) was added to the other independent variables (meditation frequency, ASMR frequency). Results of

the three-predictor regression [$F(3,69) = 11.308$, $p < .001$] yielded an r^2 of .33 (adjusted $r^2 = .30$), indicating that these three factors together can account for 33 percent of variance in Observe. ASMR frequency ($\beta = .325$, $p < .01$), meditation frequency ($\beta = .303$, $p < .01$), and the experience of frisson with emotion/insight ($\beta = .317$, $p < .01$) were each independently significant predictors.

The correlation matrix presented in Table 4.8 also shows that a modest but significant correlation was observed between ASMR frequency and a history of experiencing frisson (i.e., "visual-aesthetic chills") on seeing something beautiful. ASMR frequency was also significantly correlated with age in a negative direction. Visual-aesthetic chills and musical chills were both associated with chills accompanying strong emotion or insight but were not associated with one another. A significant relationship was seen between misophonia and the experience of emotionally-based chills only.

Table 4.8

Correlations among Observe Facet, ASMR Frequency, Meditation Frequency, Frisson Experiences, and Misophonia

	Observe	ASMR Freq[a]	Med Freq[b]	Vis-Aes Chills[c]	Music Chills	Emo Chills[d]	Miso-phonia
	r	*R*	*r*	*r*	*R*	*r*	*R*
ASMR Freq	0.39**	--					
Med Freq	0.32**	0.10	--				
V.Aes Chills	0.30*	0.41**	0.13	--			
Music Chills	0.18	0.13	0.01	0.12	--		
Emo Chills	0.34**	0.11	-0.05	0.36**	0.29*	--	

Miso-phonia	0.126	0.12	-0.07	0.14	0.23	0.27*	--
Age Group	-0.135	-0.35**	0.06	-0.17	0.27*	-0.11	0.15

Note: [a] Frequency of ASMR (Never, once a year or less, several times per year, several times per month, several times per week, at least once per day); [b] Meditation frequency (Never/Less than once/week, 1-2 times/ week, 3-4 times/week, 5 times/week +); [c] Visual-Aesthetic Chills (i.e., chills or tingles in response to seeing something beautiful; [d] Chills along with strong emotion or sudden insight; *p< .05; **p < .01

Analyses of Secondary Research Questions

Research Question 4: What are the characteristics of ASMR among survey participants?

The second section of the survey included the ASMR Checklist (Fredborg et al., 2017) and was presented only to those respondents who believed they "definitely" or "probably" were ASMR experiencers. The findings represent the data for the 85 survey respondents who completed this section. In addition to inquiries about specific known triggers, respondents were asked about age of onset, frequency of ASMR experiences, and use of media to induce ASMR.

Consistent with previous reports (e.g., Barratt & Davis, 2015), most respondents (69.7%) recalled their first ASMR experience occurring between the ages of five and ten (M = 9.1, SD = 4.5). The median age of onset was eight, with a range from age two to 25. Of 75 participants reporting on the frequency of their ASMR experiences, most indicated that it occurs several times per month (30.7%) or week (25.3%). Some individuals (18.7%) reported having very frequent occurrences (i.e., once a day or more), while about a quarter reported it being a relatively rare experience, happening only several times per year (16%) or even less (8%).

The eighty-five participants who believed they were ASMR experiencers were asked whether they independently use some form of media to induce ASMRfor the purpose of helping them relax or sleep. This was fairly common, with approximately half (50.6%) indicating that they have done so. For these 43 individuals, use for relaxation was reported by nearly half (48.4%) while use for sleep was somewhat less frequent. More than half of the media users

(53.4%) reported engaging on a very regular basis, with 14 reporting daily use and another nine at least two to three times per week. Eight respondents reported relatively sporadic media use (i.e. once a month or less).

The most commonly endorsed trigger, whispering, was acknowledged by a large majority (85%). Other prevalent triggers included scratching (71%) tapping (68%), and watching someone paint (68%) or draw (65%), open a package (65%), and touch another person's hair (67%). Table 4.9 presents a list of all triggers presented on the ASMR Checklist, and the percentage of respondents reporting a strong, moderate, mild, and no response. Items are presented in order of overall frequency with which they were endorsed as eliciting tingles, regardless of intensity.

Table 4.9

Prevalence (%) and intensity of triggers endorsed from the ASMR Checklist (n = 85)

	Strong Tingles[a]	Moderate Tingles[b]	Mild Tingles[c]	No Tingles	Unknown
Whispering	38.1	23.8	22.6	12.9	2.4
Scratching	30.6	18.8	22.4	27.4	2.4
Tapping	26.2	23.8	17.9	27.4	4.7
Watching someone paint	17.6	29.4	21.2	27.1	4.7
Watching someone touch another person's hair	20.0	31.8	15.3	24.7	8.2
Watching someone draw	20.0	24.7	20.0	28.2	7.1
Watching someone open a package	11.8	29.4	23.5	29.4	5.9
Watching someone apply makeup/nail polish to another person	12.9	24.7	14.1	36.5	11.8
Watching someone cook	4.7	20.2	24.7	43.5	7.1
Watching someone touch his/her own hair	7.1	20.0	21.2	43.5	8.2
Watching someone apply makeup to his/herself	16.5	15.3	14.1	42.4	11.8

Chewing sounds	5.9	16.5	22.4	51.8	3
Dentist simulations	4.7	16.5	18.8	43.5	16.5
Watching someone sweep	4.7	10.6	20.0	52.9	11.8
Watching someone refill fountain pens	4.7	10.6	10.6	44.7	29.4

Note: [a] rating of 5-6 on intensity scale; [b] rating of 3-4 on intensity scale; [c] rating of 1-2 on intensity scale

Participants were also provided opportunities to write in triggers not included on the checklist. In a previous study, responses on the ASMR Checklist were clustered into five domains: Watching, Touching, Repetitive Sounds, Simulations, and Mouth Sounds. While these domains generally encompass the majority of triggers identified in the present study, many triggers seem to overlap across these categories rather than cleanly fitting into a single domain. For example, when asked to name their triggers, several participants reported viewing others engage in mundane, repetitive tasks (e.g., ironing, lint rolling, organizing/decluttering); however, some of the same activities could also be associated with a repetitive sound (e.g., watching someone sweep, cap and uncap jars, or color). Similarly, the reported triggers of "watching a river flow over a bed of rocks" and "watching someone crack knuckles" might be associated with a combination of visual, auditory, and physical sensations. Triggers of a more purely visual nature were occasionally mentioned (e.g., "watching Christmas lights festivals" or images of nature or art).

Repeated mentions were made of certain specific sounds, such as bag crinkling (4) and typing (4). Other auditory triggers included nature sounds (2), flipping book/newspaper pages (2), soft or accented voices (3), and animal sounds such as purring (1), mouth sounds (2), and brushing (2). Five individuals identified viewing massage or massage simulation as a trigger. Feeling a rug or cloth or watching someone else touch something soft were also noted. Very specific details were sometimes included in some responses, such as "tapping on wood", "old,

clunky typewriters", and "heels on linoleum".

Triggers for some involve watching activities that invoke a sense of touch or social bonding without involving actual physical contact with the viewer. Watching grooming activities has been reported to elicit tingles for some with ASMR (Fredborg et al., 2017). In this study, respondents frequently endorsed checklist items involving hair touching and application of makeup and nail polish. Overall, more individuals reported being triggered by watching grooming performed for another person as opposed to watching someone self-grooming, though both types of activities were commonly endorsed. Several of the participants' written responses could also fall into this category, such as "watching others cuddle", seeing "cute things like babies or children playing", watching massage, and "inaudible whispering".

As used by Fredborg and colleagues (2017), the term "simulations" refers to scenarios in which the viewer imagines himself or herself participating in some activity virtually. Simulations often involve the video producer playing a defined role in which he or she directs attention to the camera in a way that is intended to feel interactive and personal to the viewer. Cited simulations included visiting the doctor or eye doctor, receiving a haircut, or going to the spa. A few respondents identified these and other actual (non-simulated) situations in which they receive personal attention as potential ASMR triggers in real life. These included examples such as having one's opinion queried on telephone surveys, having someone view one's work, and "when someone is explaining something to me or showing me how to do something."

Only 42 of 85 respondents answered an optional item asking whether participants experienced ASMR in as a response to any particular scent. Of these, 16 (38%) indicated that they did experience ASMR from certain scents. This may be a less common occurrence however, as it seems likely that most who did not respond have not found scents to trigger their

ASMR. Most scents named were unique to the individual, suggesting the response to scent is subject to personal associations of a highly idiosyncratic nature. However, two respondents named the same scent, lavender, as a trigger for their ASMR. Also, one person cited cinnamon ("like Big Red gum") while another named apple cinnamon. Other responses given included clean linen, roses, mint, Drakar cologne, the smell of a hair salon, "industrial smells, like a car mechanic's shop", and "childhood blanket or clothing of loved ones". ASMR intensity ratings for scent ranged from mild to strong, with a mean of 4.5 on a scale of 1-6, which corresponds with a rating of moderate-to-strong.

Research Question 5: Are there associations between ASMR and other frisson ("chill") responses?

As reported in Table 4.10, the experience of chills, or frisson, in response to some type of stimuli was very common among survey participants. Tingles or chills occurring while listening to music was by far the most common, with nearly 80 percent of all respondents reported having had this experience. Just over two-thirds reported having experienced frisson in association with strong emotion or sudden insight (67.9%), and most (61.7%) could also recall frisson experiences accompanying the sight of something beautiful. The percentage of the sample self-reporting "definite" or "probable" ASMR (65.7%) was similar to the proportion reporting these latter two experiences.

It was of interest whether having any of these frisson experiences were associated with experiencing ASMR. This question was initially examined through the correlation matrix (see Table 4.8) that had been generated using the data smaller subset of participants (N = 73) classified based on response to survey videos. In that subsample, a significant association was observed between ASMR frequency and the experience of chills or tingles when viewing

something beautiful (r = .41; p< .01), but not with chills in response to emotion/insight or listening to music. It was interesting to note that the experience of frisson in response to emotion or insight was significantly related to responses to both visual beauty (r = .329; p< .001) and music (r = .253; p< .01). However, individuals who experience chills from music were not significantly more likely to experience them from visual beauty (r =.157; p = n.s.). These findings did not generalize to the broader sample of survey 134 respondents classified individuals on the basis of self-report. Chi square analysis suggested that individuals reporting that they "probably" or "definitely" experience ASMR are not significantly more likely to have experienced frisson responses from any of the three named stimuli of music (X^2 (1, N = 134) = 1.54, p = .22), visual aesthetic experiences (X^2 (1) = 1.99, p = .16), or emotion/insight (X^2 (1) = 0.76, p = .38).

Table 4.10

Number and percentage of respondents reporting tingle/chill responses associated with each stimulus

Respondent class	Music		Visual Beauty		Strong Emotion/ Insight	
	N	*%*	*N*	*%*	*N*	*%*
All respondents (N = 134)	107	79.9	82	61.7	91	67.9
ASMR reporters (N = 88)	73	83.0	58	65.9	62	62.9
ASMR non-reporters[a] (N = 46)	34	73.9	24	52.2	29	63.0

Note: Participants responding "probably not", "definitely not", or "might or might" not in response to self-report of ASMR

Investigating the perceptions of those who claim to experience both frisson and ASMR may provide clues about the relationship between these phenomena and whether they can be distinguished from one another. Among 73 respondents who self-reported experiencing both ASMR and tingles/chills in response to music, 48 (65.8%) indicated that the sensation of ASMR

differs from musical chills. Similarly, most individuals who claim to experience both ASMR and emotion/insight-based chills can distinguish ASMR as a separate sensation (62.9%). About half (52.6%) of the participants reporting both ASMR and visual-aesthetic chills could differentiate between those two feelings.

Research Question 6: Is the experience of misophonia more common among people who experience ASMR and/orsimilar responses?

A single item assessed the presence of misophonia in the sample, with frequencies described in Tables 4.11 and 4.12. Of 131 respondents who answered this question, over two-thirds (67.9%) reported having experienced the phenomenon, which was described as "an inexplicably strong negative feeling (emotional or physical) in response to certain neutral sounds". It was incidentally found that females were significantly more likely than males to report having some history of misophonia [$X^2(1, N = 125) = 4.32, p = 0.038$]. Further, approximately one-third of females indicated that they "often" or "very often" experience misophonia, while no males reported frequent experiences, though such findings are not readily interpretable due to the much higher rate of female respondents. As seen in Table 4-12, misophonia was most commonly reported in the18-29 age group.

Table 4.11. *Frequency of misophonia experiences among male and female respondents*

	Never		Seldom		Sometimes		Often/ Very Often	
	N	*%*	*N*	*%*	*N*	*%*	*N*	*%*
Female respondents (N = 105)	28	26.7	23	21.9	29	27.6	25	23.8
Male respondents (N = 20)	10	50.0	5	25.0	5	25.0	0	0.0
All respondents (N = 131)	42	32.1	28	21.4	35	26.7	26	19.8

Table 4.12.

Number and percentage of respondents who answered that they do experience misophonia, overall and by age group

	N	%
Total (N = 89)	89	68.5
Age group		
18-29 (N = 76)	57	75.0
30-39 (N = 23)	15	65.2
40-49 (N = 17)	11	64.7
50 or over (N = 14)	6	42.9

Note: N = sum of "seldom", "sometimes", "often", or "very often" responses

Chi square analyses were conducted to explore relationships between experiences of ASMR and misophonia. In analyzing the broader sample based on self report, the 21 individuals who reported being unsure of whether they experience ASMR were classified as experiencers (n = 5) and non-experiencers (n = 9) based on their reported tingle responses to viewing survey videos. The remaining six who did not view videos were excluded, as were three participants who did not provide a response to the misophonia item, yielding $N = 125$. Results suggested that those who identify as ASMR experiencers were slightly more likely to report having at least some history of misophonia (yes or no) than non-experiencers [$X^2(1, N = 125) = 6.135$, $p < 0.05$]. In the smaller subsample classified by real-time viewing response ($N = 72$), misophonia was observed to occur in a higher proportion of ASMR responders (.68) as compared to controls (.46); however, this difference was not statistically significant when subjected to chi-square analysis [X^2 (1, $N = 72$) = 3.37, p = .07 (n.s.)].

Examining again the responses of all participants, misophonic individuals were also significantly more likely to experience chills along with a strong emotion or sudden insight (r =.229; $p < .01$). In addition, there was a small but significant correlation between musical frisson and misophonia (r = .176; p = .045). No association was observed between frisson in

response to visually appealing stimuli and misophonia.

Chapter 5: Summary and Discussion

The primary goal of this study was to examine how trait mindfulness and its facets as described in the FFMQ (Observe, Describe, Act with Awareness, Non-react, and Non-judge) may be related to the self-reported experience of ASMR. Another goal of this study was to add to currently limited field of research-based perspectives on the phenomenon of ASMR as reported by those who claim to experience it. Finally, it has been proposed in the literature that there may exist relationships between experiences of frisson, ASMR, and misophonia, but these links are poorly understood at present. It was hoped that analysis of participant responses to survey items might help to shed some light on this question.

Results of the study suggested that, as predicted, individuals who experience ASMR have higher trait levels of the Observe facet of the FFMQ. No other facets of the FFMQ were significantly related to ASMR, nor was the total FFMQ score. Furthermore, scores on the Observe varied as a function of ASMR frequency. That is, those who reported having ASMR more often tended to score higher in Observe, accounting for 16.6 percent of the variance in the measured trait. Meditation frequency and the experience of emotionally-triggered chills (i.e., frisson) also independently predicted differences in the Observe facet. Taken together, these three variables explained 33 percent of the variance.

This study's hypothesis was predicated on Harrison and Clark's (2016) findings with respect to the Observe facet's associations with the experience of chills evoked by the arts. Although it has been proposed that ASMR is likely phenomenologically distinct from the typical experience of frisson or "chills", (e.g., Fredborg et al., 2017), both experiences would seem to arise from a tendency towards heightened awareness of one's internal, bodily sensations while simultaneously engaging the senses in observation of the external environment. Specifically,

Harrison and Clark (2016) found that Observe was significantly and positively related to the aesthetic experience of chills, while a significant inverse relationship was found between chills and Nonjudge. They also found that higher levels of Observe were associated with more frequent occurrences of all three forms of aesthetic experiences that were measured in their study (i.e., chills, feeling "touched", and being absorbed).

In the current study, half of the sample identified their primary role as student (undergraduate or graduate), while the other half was comprised of mostly staff, with a small number of faculty and alumni. Generally speaking, participant responses suggested that ASMR does appear to be a fairly well-known phenomenonwithin the population of a large, public university among individuals under age 40. It stands to reason that the study's title as advertised in the university's online bulletin would have drawn the attention of individuals with a particular interest in ASMR, perhaps based on personal experience; such individuals might be especially motivated to volunteer to take the survey.

More than half of the participants (53.7 %) had heard of ASMR before taking the survey, with younger respondents considerably more likely to have prior awareness. Over 70 percent of individuals ages 18-29 and 65 percent of those between 30 and 39 recalled having heard of ASMR in the past. In stark contrast, only 2 of the remaining 32 individuals who were 40 or older reported prior awareness. Moreover, nearly eighty percent of those with prior awareness believed that they themselves were ASMR experiencers. The use of ASMR evoking media to aid in sleep and relaxation was fairly typical among those who reported prior awareness of ASMR *and* believed themselves to experience it. Of the 56 respondents falling in that category, over 70 percent indicated that they do use media (e.g., video or audio files) for these purposes and a substantial proportion (37.5%) reported quite regular use (i.e., 2-3 times per week or more)

By gathering responses from a substantial number of individuals who believe they experience ASMR, this investigation was able to build on some current understandings regarding the phenomenon and triggering stimuli. Reported age of onset was broadly consistent with Barratt and Davis (2015), with the first recalled experiences typically occurring in childhood between ages 5-10. There appears to be considerable individual variability in frequency of ASMR occurrences, ranging from ASMR occurring less than once per year for some to multiple times per day for others.

While the current study did not include a large enough number of ASMR experiencers toperform factor analysiswith the ASMR Checklist, the prevalence and intensity of triggers were broadly consistent with those identified by Fredborg and colleagues (2017) and in previous studies. Whispering and the sounds of tapping and scratching were the most commonly endorsed triggers and tended to evoke the most robust responses. Other frequently endorsed triggers included watching others engage in certain activities such as opening a package, drawing or painting, or grooming others or self. Participants volunteered various other auditory triggers (e.g., brushing, page turning, accented voices), as well as simulations (e.g., doctor, spa) and viewing of others engaging in social bonding (e.g., watching children playing or people cuddling) and repetitive activities (e.g., erasing a chalkboard, ironing). It was noted that triggers often are multisensory in nature (i.e., simultaneously associated with specific visual and auditory stimuli) and sometimes appear to be very unique and specific to the individual. Though far less common, ASMR associated with particular scents was occasionally reported.

In exploring individuals' propensities to experience ASMR and various forms of frisson, findings were not totally conclusive. However, the experience of chills in response to seeing something beautiful was positively correlated with frequency of ASMR experiences. Only about

half of those reporting ASMR and chills from seeing something beautiful reported differences in the two experiences. Meanwhile, among individuals who reported experiencing both ASMR and frisson from music, nearly two thirds felt the two sensations were different. A similar proportion of those reporting both ASMR and chills from strong emotion/insight also distinguished between those two sensations.

In examining the relationship between misophonia and ASMR, results did not illustrate a clear connection. In the sample classified with real time viewing response, misophonia was observed in a higher proportion of ASMR responders than non-responders, but not significantly so. When analyzing the responses of all participants based on self-identification, those who identified as ASMR experiencers were slightly more likely to report some history of misophonia. Similarly, misophonic individuals were more likely to experience chills along with a strong emotion or insight, as well as being more likely to report chills in response to music.

Limitations

One of the main limitations of this inquiry lies in the inherent challenge of studying a phenomenon that is both heterogeneous and presently in the early stages of being described. In research on ASMR to date, there has been little attention on the existence of the related phenomenon of frisson and precisely what differentiates typical frisson responses from ASMR. Without adequate clarity in terms, people participating in an ASMR study may have difficulty in ascertaining whether or not they experience it.They may assume they regularly experience ASMR, when the response they are recalling might be better described as frisson.

One way the present study attempted to address this issue was by providing a clear and relatively narrow definition of ASMR based on existing research. Despite this effort, some individuals felt unsure of whether they experience ASMR, which underscores the challenge in

defining the response in an immediately recognizable manner and distinguishing it from similar tingle-inducing phenomena. To offer further clarification, sample videos that were particularly popular for inducing ASMR on YouTube were embedded in the survey, but some individuals remained uncommitted even after viewing the sample videos.

Given that this inquiry aimed to statistically compare ASMR responders to non-responders, obtaining the purest possible sample of ASMR responders was necessary to address the primary research questions with validity.To increase specificity for ASMR, the decision was made to include only responses of individuals who reported that they felt the tingling ASMR response while viewing embedded survey videos which contained triggers specifically associated with ASMR.In this way, they offered real-time verification of their self-identification as ASMR experiencers. However, considering the heterogeneity of triggers, it was recognized that the videos presented may not offer the right triggers for inducing ASMR in everyone who experiences it. Thus,this requirement likely excluded some individuals who experience ASMR from the analysis.This methodology still relied on participant self-report, which may be subject to error, but presently no methods have been developed to verify ASMR in a more objective or standardized fashion.

The correlational design successfully offered an exploratory investigation into the relationships between ASMR and aspects of trait mindfulness. It did not allow for the ability to make causal inferences. While a significant association was found between Observe and the tendency to experience ASMR, no such relationships were found for other facets of mindfulness, and ASMR was not correlated with overall mindfulness. Given the multifaceted nature of trait mindfulness, the practical significance of this finding is not known at this time. It is further complicated by the fact that previous research with the FFMQ suggests that the role of Observe

within trait mindfulness appears rather complex.

Future Directions

Future research into ASMR would likely benefit from continued efforts to clearly define and describe the phenomenon in the scientific literature, which may be aided by the development and validation of instruments for use in ASMR research. As part of this process, attention should be placed on distinguishingASMR from other tingle or chill responses. It may be noted here that one of the research questions of this study was specifically aimed at obtaining additional confirmation that the sensation of ASMR is experienced as distinct from frisson responses to music, aesthetic beauty, and emotional content. While most respondents do differentiate between these sensations, additional research would help to clarify these distinctions with more specificity.

Currently, many individuals are using ASMR for stress reduction and other perceived benefits. Well-designed intervention studies are needed to investigate whether engaging in ASMR truly has therapeutic effects,and both single subject and randomized controlled trials can be valuable for answering these questions experimentally. The development of more objective and reliable ways of measuring an ASMR response will greatly enhance the validity of future research, especially when conducting experimental research that investigates ASMR as a potential intervention. Researchers now investigating ASMR might consider using biometrics to examine what physically observable correlates tend to occur during ASMR, such as changes in skin conductance or respiration.

Regarding the relationship of mindfulness and ASMR, a potentially interesting avenue for future research may be exploring the possibility of using ASMR as a bridge to cultivating more mindful states of awareness through observation. Some previous research has indicated

that the Observe factor is not always well correlated with overall mindfulness except in the case of more experienced practitioners of meditation and mindful awareness. While individuals who experience ASMR may already show strong observational skills, they do not necessarily exhibit other facets of mindfulness. Interventions might be designed to build on these individuals' strengths by encouraging continued observation of what is perceived internally and externally when engaging in ASMR, while also training other aspects of mindfulness, such as encouraging a non-evaluative stance and maintaining present moment awareness, without reacting or attaching to the perceived sensations.

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