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The awesome as well as the awful: heightened sensory sensitivity predicts the presence and intensity of Autonomous Sensory Meridian Response (ASMR),

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The awesome as well as the awful: Heightened sensory sensitivity predicts the presence and intensity of Autonomous Sensory Meridian Response (ASMR)

Abstract

ASMR is a complex positive emotion experienced by some people in response to triggers including auditory, visual, interpersonal and tactile stimuli. We propose that the ability to experience ASMR and its resulting intensity might be underlined by individual differences in sensory sensitivity to exteroceptive and interoceptive cues. In a pre-registered study (N = 557), we examined whether sensory sensitivity measures (1) differentiated ASMR from non-ASMR responders and (2) predicted ASMR intensity. Results showed that people with (stronger) ASMR had greater interoceptive sensitivity (MAIA2) and bodily awareness (BPQ-BA) and were more likely to be classified as highly sensitive (HSPS). Results are discussed in relation to individual differences in environmental sensitivity, interoception, and emotional appraisal processes.

Keywords: ASMR; Autonomous Sensory Meridian Response; sensory sensitivity; interoception; bodily awareness; highly sensitive person; well-being; tingling

Highlights

- Results show that those with (stronger) ASMR have heightened sensory sensitivity
- Specifically, sensitivity to interoceptive cues and positive appraisals of stimuli
- The Highly Sensitive Person construct emerged as central for predicting ASMR
- ASMR may involve heightened interoceptive sensibility and body-emotion awareness
- Findings shed new light on mechanisms underlying individual differences in ASMR

Introduction

Everyday sensory stimuli such as the sound of someone eating, the feel of washing your hair or the smell of someone’s perfume can produce different emotional responses between people. At the extreme end of the spectrum, hyper-sensitivity to sensory stimuli has been implicated in a range of clinical conditions (Ben-Sasson et al., 2019; Bijlenga et al., 2017; Liss et al., 2008; Rieke & Anderson, 2009). But might there also be *beneficial* emotional outcomes for those with heightened sensory sensitivity? Here we explore the possibility that Autonomous Sensory Meridian Response (ASMR) may be a positive emotional consequence of enhanced sensory sensitivity.

ASMR is a complex positive emotional state experienced by some people in response to triggers including auditory stimuli (e.g., whispering, soft-speaking, and tapping), visual stimuli (e.g., delicate hand movements, repetitive actions), interpersonal stimuli (e.g., close personal attention, caring) and touch (e.g., tracing fingers on the back) (Barratt & Davis, 2015). The feeling is a tingling sensation that begins at the crown of the head spreading down the body; it is an immersive 'trance-like' state that has been likened to flow and is accompanied by feelings of both euphoria and relaxation (Roberts et al., 2019).

Since the term 'ASMR' was coined in 2010, there has been an explosion of interest in ASMR and the emergence of an online ASMR community. "ASMR" is currently the 3rd most searched term on YouTube worldwide (Hardwick, 2020) with hundreds of thousands of YouTube videos created to induce the ASMR state in viewers. Although ASMR can be experienced in daily life situations, ASMR videos allow people to experience ASMR 'on-demand'. As a result, ASMR videos are being self-prescribed by many experiencers as a method of regulating emotion, promoting sleep, and improving well-being (Barratt & Davis, 2015).

Anecdotal reports of the benefits of ASMR for well-being are now supported by empirical evidence (Poerio et al., 2018). ASMR is associated with reliable increases in self-reported positive affect and significant reductions in heart rate (average 3.41bpm), physiological effects comparable to recognised interventions of mindfulness and music-based stress reduction (Campbell-Sills et al., 2006). Although there is evidence that ASMR is a genuine and reliable emotional experience with the potential to enhance well-being, we lack an understanding of the determinants of ASMR. Why are only a proportion of the population able to experience and derive emotional benefit from ASMR? And why, even amongst ASMR-sensitive individuals, do some experience a more intense response? Generating greater insight into the determinants of ASMR is important for this emerging field and has the potential to reveal insights into individual differences in both (1) the integration between sensory input and emotional responding, and (2) emotional complexity and its potential to improve well-being.

ASMR and sensory sensitivity

Individual differences in sensory sensitivity may explain why only some people experience the complex emotion of ASMR. We define sensory sensitivity as self-reported perceptions of how an individual processes and responds to internal and external sensory cues. This definition refers to *subjective* sensory sensitivity (i.e., first-person reports) rather than behavioural (i.e., individual differences in the ability to detect and discriminate sensory stimuli) or neural (i.e., the extent of neural activation induced by sensory stimuli) sensory sensitivity (Ward, 2019). Our definition encompasses sensory processing of *exteroceptive* cues originating externally (e.g., sights and sounds) and *interoceptive* cues coming from within the body (Craig, 2002).

We propose that the ability to experience ASMR and its resulting intensity may be underlined by heightened sensory sensitivity to exteroceptive and interoceptive cues. We speculate that (stronger) ASMR is underlined by at least two component processes involved in the translation of external input to subjective feelings:

(1) heightened sensory sensitivity to external cues involving greater salience to ASMR triggers (which may therefore be difficult to disengage from) and

(2) enhanced interoceptive awareness involving the translation of sensory stimuli to stronger internal emotional responses (enhancing the intensity of emotional responses to ASMR triggers).

The proposal that these component processes underline the presence and intensity of ASMR is based on research (reviewed below) on the related phenomena of aesthetic emotions and misophonia, which are likely to have similar underlying mechanisms to ASMR.

Aesthetic emotions and ASMR

Like ASMR, the experience of complex emotional states known as aesthetic emotions (e.g., awe, elevation, frisson) are not universal and vary in intensity between people. For example, not everyone experiences frisson (a tingling sensation on the back of the head resulting in goosebumps) (Grewe et al., 2011) or the tingling sensations associated with elevation (Haidt, 2003) or feeling moved (Menninghaus et al., 2015). Although ASMR is qualitatively different to other aesthetic emotions, they are related and may have similar underlying determinants. Frisson and ASMR are significantly positively correlated, (Kovacevich & Huron, 2019; Roberts et al., 2019), they show similar neural activation patterns (Lochte et al., 2018), and 87% of ASMR respondents reported experiencing frisson (Fredborg et al., 2017).

Individual differences in complex emotional states may reflect neurodevelopmental differences in how sensory input is translated into subjective emotional responses. For instance, those who experience more intense emotional responses to music have stronger white matter connectivity between neural regions involved in sensory and emotional processing (Sachs et al., 2016), suggesting that individual differences in the way that people experience emotion as a result of external sensory stimuli (e.g., music) may reflect differences in the structural organisation of the brain. ASMR may also be associated with comparable neural differences in how sensory input and emotional experience are integrated. People with ASMR show reduced functional connectivity within the Default Mode Network (a constellation of brain regions involved in self-referential processing; Poerio et al., 2018), but increased functional connectivity between the DMN and clusters in executive-control and visual resting state networks (Smith et al., 2017). This has led to the suggestion that ASMR is driven by an inability to inhibit sensory-emotional responses.

Individual differences in interoception (internal sensory sensitivity) are also important for aesthetic emotions. Tingling (e.g., chills, goose-tingles) is a prototypical feature of aesthetic emotions (Menninghaus et al., 2019) and is the canonical feature of ASMR (where tingling is located primarily on the head). Tingling can be conceptualised as spontaneous and sub-conscious afferent signals from neurons at the skin being brought to conscious awareness via interoceptive attention (see Tihanyi et al., 2018). Individuals who are more sensitive to interoceptive cues experience more frequent 'spontaneous' tingling sensations with greater intensity (Michael et al., 2015; Tihanyi & Köteles, 2017). Individual differences in interoception also explain variation in subjective emotional experience. People who are more sensitive to interoceptive cues experience emotions more intensely (Wiens et al., 2000) and place greater emphasis on information from the arousal component of core affect (Feldman-Barrett et al., 2004).

Misophonia and ASMR

Misophonia is a condition describing aversive and angry feelings in response to certain sounds (e.g., tapping, chewing, lip smacking, and pen clicking) (Wu et al., 2014). Although one might expect ASMR and misophonia to be negatively associated because similar triggers produce opposite emotional reactions, research shows that they commonly co-occur. ASMR-sensitive individuals have elevated levels of misophonia (McErlean & Banissy, 2018), just under half of ASMR participants (43%) experience misophonia (Barratt et al., 2017), and 49% of misophonics experience ASMR (Rouw & Erfanian, 2018). One explanation for the unlikely co-occurrence of ASMR and misophonia is that they share a common mechanism, both being underpinned by an increased sensitivity to external sensory stimuli, particularly sound. Contextual factors and associated emotional appraisal processes might then determine whether the same stimulus (e.g., eating sounds) is evaluated as positive or negative by the same individual (Samermit et al., 2019).

A range of studies provide evidence that misophonia may be underlined by heightened sensory sensitivity. Correlational evidence shows that misophonia is positively associated with the severity of sound sensitivity, external sensory sensitivity more generally, and internal body awareness (McKay et al., 2018; Wu et al., 2014; Zhou et al., 2017). Research on the neural basis of misophonia also indicates that the condition is driven by altered sensory sensitivity (Kumar et al., 2017). Misophonics show hyperactivity of the anterior insular cortex when exposed to trigger sounds (e.g., eating, breathing), a key region involved in interoception and emotion processing (Gu et al., 2013). Misophonics also score higher on subjective interoceptive awareness suggesting that they may be better able to decipher internal bodily states. Whether or not similar processes are at play during ASMR is an open question, but the association between the two phenomena points to potentially shared mechanism of heightened sensory external and internal sensitivity, which deserves further investigation. In the present study, we examine for the first time the relationships between ASMR and interoceptive awareness, body awareness, and sensitivity to exteroceptive cues.

Mindfulness

Although not a form of sensory sensitivity itself, trait mindfulness is also relevant to ASMR and sensory sensitivity. Mindfulness describes the tendency to apply cognitive thought processes to enhance the awareness and acceptance of ones' present phenomenological experience, including internal and external sensory input (Gibson, 2019). The 'awareness' component can be thought of as a meta-sensory sensitivity - the ability to direct attention towards sensory information. The 'acceptance' component relates to the downregulation of over-reactive cognitive and behavioural responses to sensory stimuli (Gibson, 2019). Indeed, the ‘awareness’ component is positively correlated with interoception measures (Hanley et al., 2017), whereas the ‘acceptance’ component is negatively correlated with behavioural measures of sensory sensitivity (Takahashi et al., 2019).

With respect to ASMR, ASMR-sensitive individuals typically score higher than controls on global aspects of mindfulness (Fredborg et al., 2018). In particular, they have higher rates of mindful awareness compared to controls, a feature which also predicts an increased reported frequency of ASMR and aesthetic chill experiences (Del Campo, 2019). This latter finding echoes research that aesthetic chills are positively associated with mindful awareness but negatively associated with mindful acceptance (e.g., non-judging; Harrison & Clark, 2016). Here, we test whether this observation also applies to ASMR and extend previous research (Fredborg et al., 2018) by employing a measure of mindfulness (the Five-Factor Mindfulness Questionnaire, FFMQ; Baer et al., 2008) which separates out awareness and acceptance aspects of the construct.

The present study

The research reviewed above provides theoretical support for our proposal that ASMR may be underlined by heightened sensory sensitivity to exteroceptive and interoceptive cues. In this study, we sought to provide more direct empirical evidence for our proposal using both:

(1) A correlational approach examining the extent to which individual differences in sensory sensitivity measures can explain variability in ASMR intensity.

(2) A categorical approach examining whether there are substantial differences in sensory sensitivity between people who are able to experience ASMR and those who are not.

Given that sensory sensitivity is a multifaceted construct with different but overlapping conceptualisations depending on the area of study (Ward, 2019), we took a broad approach by measuring individual differences in sensory sensitivity using six different but complementary measures encompassing sensitivity to interoceptive and exteroceptive cues, affective and behavioural self-report measures, and mindfulness.

Method

Transparency

The study design (including justifcation of sample size), hypotheses, exclusion criteria, measurements, and analysis plan were pre-registered. Ethical approval for the study was obtained from the *** Health, Psychology and Social Care Research Ethics and Governance Committee (ref: 10751). This information is available along with data, code, and study materials on the study OSF page: https://osf.io/****/.

Participants

ASMR sample

Participants were recruited via Reddit and the social media channels of ASMR video creators. There were 567 complete questionnaire responses, of which 66 were excluded due to not experiencing ASMR (after a two-step screening process), or failing data quality checks. Full details of this process and the exclusions are available on the OSF page. The final ASMR sample consisted of 501 participants (M_{age} = 30.07, *SD* = 9.11; Range: 18-70; 76% female, 2% non-binary) who were predominately white (91%) and from either the USA (44%) or the UK (26%).

Non-ASMR sample

Control participants were recruited through UK University staff and student mailing lists. These participants went through the same ASMR screening process; only participants who did not experience ASMR were included here. The final sample consisted of 56 participants (M_{age} = 31.80, *SD* = 13.53; Range: 18-71; 71% female, 2% non-binary).

Measures

ASMR Trigger Intensity

The ASMR checklist (Fredborg et al., 2017) measured the intensity of ASMR to 16 different triggers (e.g., ‘whispering’ and ‘tapping sounds’). For each trigger, participants rated its intensity from 1 to 6(most intense). Respondents selected ‘0’ if they did not experience ASMR from a trigger and ‘unknown’ if they did not know. We scored the ASMR checklist with two methods. First, we recoded responses ‘0’ and ‘unknown’ as missing and then counted the number of ASMR triggers for each person (this gave us a variable to show the number of ASMR triggers out of 16 that participants responded to: $M = 12.72$, $SD = 2.91$, *Range* = 1-16). Next, we calculated the average intensity score of the ASMR triggers for each respondent such that higher scores indicated greater ASMR trigger intensity (considering the number of triggers: $M = 3.54$, $SD = .79$, *Range*: 1.50-5.60). Second, we coded the checklist in line with Fredborg et al. (2017): mean scores were calculated for each participant from the non-unknown responses (i.e., including ‘0’), with two triggers removed. These methods of scoring were significantly positively correlated, $r(509) = 0.79$, $p < .001$.

ASMR Response Intensity

The ASMR-15 (Roberts et al., 2019) measured the intensity of multiple components of the ASMR response. Participants rated their experience of ASMR on 15 items from 1(*completely untrue for me*) to 5(*completely true for me*). Four subscales captured the following facets of the ASMR experience: (1) Altered Consciousness (4-items, $\alpha = .78$), (2) Sensation (5-items, $\alpha = .68$), (3) Relaxation (3-items, $\alpha = .58$) and (4) Affect (3-items, $\alpha = .65$). Items were averaged to provide scores for each of the four subscales as well as an overall score where higher scores indicated greater ASMR response intensity ($\alpha = .78$).

Multidimensional Assessment of Interoceptive Awareness Scale (MAIA-2)

The MAIA-2 is an updated 37-item version of the MAIA (Mehling et al., 2012) with improved psychometrics (Mehling et al., 2018). The scale measures the multiple dimensions of interoceptive awareness accessible to self-report. The scale does not purport to measure the *accuracy* of this perception, but rather the strength of the conscious experience of interoceptive awareness. Participants rated each item from 0(*Never*) to 5(*Always*). Eight subscales provide a measure of the following dimensions of interoceptive awareness: (1) Noticing (4-items, α =.62.) measuring the awareness of uncomfortable, comfortable, and neutral body sensations, (2) Not-Distracting (6-items, α =.77) measuring the tendency not to ignore or distract oneself from sensations of pain or discomfort, (3) Not-Worrying (5-items, α =.77) measuring the tendency not to worry or experience emotional distress with sensations of pain or discomfort, (4) Attention Regulation (7-items, α =.81) measuring the ability to sustain and control attention to body sensations, (5) Emotional Awareness (5-items, α =.79) measuring awareness of the connection between body sensations and emotional states, (6) Self-Regulation (3-items[1], α =.78) measuring the ability to regulate distress by attention to body sensations, (7) Body listening (3-items, α =.71) measuring active listening to the body for insight, and (8) Trusting (3-items, α =.77) measuring the experience of one’s body as safe and trustworthy. Negatively worded items were reverse-coded and items were averaged to provide scores for each subscale and an overall score where higher scores indicated greater interoceptive awareness (α = .87).

Five Facet Mindfulness Questionnaire (FFMQ)

The 15-item FFMQ (Baer et al., 2008) measured trait mindfulness. Participants rated each item from 1(*never or very rarely true*) to 5(*very often or always true*) within the following five facets of mindfulness, each with 3-items: Observing (α = .56), Describing (α = .86),

[1] This subscale usually comprises four items; however, due to human error the item “When I bring awareness to my body I feel a sense of calm” was not included in the questionnaire.

Acting with Awareness (α = .69), Non-Judging (α = .84), and Non-Reactivity to inner experience (α = .78). Negatively worded items were reverse-coded and items were averaged to provide scores for each subscale and an overall score where higher scores indicated greater trait mindfulness (α = .78).

Glasgow Sensory Questionnaire (GSQ)

The 42-item GSQ (Robertson & Simmons, 2012) was originally developed as a clinical measure to assess sensory sensitivity in Autism Spectrum Disorder, but it is also used in non-clinical populations (e.g., Panagiotidi et al., 2018). The GSQ indexes sensory sensitivity as deviation from normal sensory processing, reflecting either hyper- (overactive) or hypo- (underactive) processing in seven sensory modalities (visual; auditory; gustatory; olfactory; tactile; vestibular and proprioceptive). Participants rated each item from 0(*Never*) to 4 (*Always*). Items were averaged to create an overall score for sensory sensitivity where higher scores reflect greater deviation from typical sensory processing (α = .88); separate subscales for overactive (α = .84) and underactive (α = .77) sensory processing were also created; these subscales were significantly positively correlated ($r(557) = 0.64$, $p < .001$).

The Sensory Sensitivity subscale of the Adult Sensory Profile (ASP-SS)

The ASP (Brown et al., 2001) operationalises sensory sensitivity as the behavioural manifestation of a type of sensory processing, based on Dunn’s (1997) model of sensory processing. Different sensory profiles are considered as interactions between orthogonal axes of neurological threshold (low-high) and behavioural response (accordance-counteract). The 15-item sensory sensitivity subscale captures information about the accordance-low threshold quadrant, reflecting those who have a strong behavioural response and slow habituation to sensations. Participants rated each item from 1(*Almost Never*) to 5(*Almost Always*). Items were averaged to create an overall score where higher scores reflect greater negative reactions to sensory simulation in visual, auditory, and tactile modalities (α = .79).

Highly-Sensitive-Person Scale (HSPS)

The 27-item HSPS measures individual differences in sensory processing sensitivity to both negative and positive environments (physical, social and emotional), with 15-20% of the population considered high on this trait (Aron & Aron, 1997). Sensory processing sensitivity indexes the depth of information processing, emotional reactivity and empathy, awareness of environmental subtleties, and ability to be overstimulated. Participants rated positive and negative emotional and cognitive responses to various environmental stimuli such as art, loud noises and smells from 1(*Not at all*) to 7(*Extremely*) within three subscales (Smolewska et al., 2006): (1) Low Sensory Threshold (6-items, α = .76) measuring sensitivity to subtle external stimuli, (2) Ease of Excitation (12-items, α = .83) measuring the tendency to be easily overwhelmed by internal and external stimuli, and (3) Aesthetic Sensitivity (7-items, α = .67) measuring openness for, and pleasure of, aesthetic experiences and positive stimuli. Items were averaged to provide scores for each subscale and an overall score where higher scores indicated greater sensory processing sensitivity (α = .90).

The Body Awareness subscale of the Body Perception Questionnaire (BPQ-BA)

This 26-item subscale (Cabrera et al., 2018) of the BPQ is a measure of sensitivity for internal bodily functions and operationalises sensory sensitivity as awareness of the functioning of the autonomic nervous system (ANS) and the body's neural system that transmits signals from internal organs to the brain. It is explicitly based on Polyvagal Theory (Porges, 2011) and captures awareness of specific ANS activation. Participants rated each item from 1(*Never*) to 5(*Always*). Items were averaged to provide an overall score where higher scores reflect hypersensitivity to bodily functions (α = .95).

Procedure

The survey was administered online via Qualtrics. Once informed consent and demographic information (age, gender, nationality and ethnicity) were collected, participants were screened for ASMR status. ASMR participants then completed the ASMR measures. Participants completed the six sensory sensitivity measures in a random order. Items within every measure was also individually randomised.

Results

Analytical approach

We performed a series of pre-registered multiple regressions to examine the predictive relationships between measures of sensory sensitivity and our two dependent measures of ASMR: (1) *ASMR Trigger Intensity* and (2) *ASMR Response Intensity*. All six sensory sensitivity measures were included as predictors in each of the regression models. When a sensory sensitivity measure with subscales significantly predicted ASMR trigger or response intensity, we ran additional regressions with subscale scores as independent variables. Using the same analytical approach, we examined the predictive relationships between our six measures of sensory sensitivity and the four sub-components of ASMR response intensity (i.e., ASMR-15 subscales). To examine differences in measures of sensory sensitivity (and their subscales) between ASMR and non-ASMR participants we ran a series of Welch's t-tests (for unequal sample sizes; Delacre et al., 2017). Finally, we ran a chi-square test on the relative proportion of HSPS subtypes among ASMR and non-ASMR participants.

Descriptives

Means, standard deviations and correlations between key variables for ASMR participants are displayed in Table 1.

Table 1.

Means, standard deviations and correlations between key study variables for ASMR participants (N = 501)

	M	**SD**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
(1) ASMR Trigger Intensity	3.54	0.78	.35**	.16**	.05	.10*	.11*	.18**	.03
(2) ASMR Response Intensity	3.69	0.53		.24**	.05	.18**	.14**	.22**	.15**
(3) MAIA2	2.61	0.55			.57**	-.10*	-.16**	-.01	.05
(4) FFMQ	3.08	0.54				-.33**	-.26**	-.17**	-.08
(5) GSQ	1.35	0.43					.59**	.49**	.30**
(6) ASP-SS	2.62	0.63						.64**	.24**
(7) HSPS	4.74	0.87							.24**
(8) BPQ-BA	2.74	0.87							

Note. MAIA2 = Multidimensional Assessment of Interoceptive Awareness Version 2; FFMQ = Five Factor Mindfulness Questionnaire; GSQ = Glasgow Sensory Questionnaire ASP-SS = Sensory Sensitivity subscale of the Adult Sensory Profile; HSPS = Highly Sensitive Person Scale; BPQ-BA = Body Awareness subscale of the Body Perception Questionnaire.**p<.001, *p<.05

ASMR trigger intensity

As shown in Figure 1, Panel A (top) the assessment of interoceptive awareness (MAIA2) and the highly sensitive person scale were significant positive predictors of ASMR trigger intensity (MAIA2: $B = .26$, $SE = .08$, $\beta = .18$, $t = 3.33$, $p < .001$, 95%CI[.10, .41]; HSPS: $B = .14$, $SE = .05$, $\beta = .16$, $t = 2.66$, $p = .008$, 95%CI[.04, .24]). More intense ASMR trigger responses were predicted by higher levels of interoceptive awareness and being highly sensitive.

Further subscale analyses (Figure 1, Panel A, middle and bottom) showed that the emotional awareness subscale of the MAIA2 ($B = .17$, $SE = .05$, $\beta = .22$, $t = 3.73$, $p < .001$, 95%CI[.08, .26]) and the aesthetic experiences subscale of the HSPS ($B = .13$, $SE = .05$, $\beta = .14$, $t = 2.81$, $p = .005$, 95%CI[.04, .22]) were driving these effects. More intense ASMR trigger responses were predicted by higher awareness of the connection between body sensations and emotional states and higher appreciation for aesthetic experiences. Similar results were obtained with the old scoring method of the ASMR checklist (the non-distracting subscale was a significant negative predictor; the self-regulation subscale was a significant positive predictor). These results and full regression tables for all analyses are available on the study OSF page.

ASMR response intensity

As with the ASMR trigger intensity, the assessment of interoceptive awareness (MAIA2) and the highly sensitive person scale were significant positive predictors of ASMR response intensity (MAIA2: $B = .27$, $SE = .05$, $\beta = .29$, $t = 5.59$, $p < .001$, 95%CI[.18, .37]; HSPS: $B = .10$, $SE = .03$, $\beta = .17$, $t = 3.09$, $p = .002$, 95%CI[.04, .17]). Additionally, the GSQ ($B = .14$, $SE = .07$, $\beta = .12$, $t = 2.10$, $p = .037$, 95%CI[.01, .27]) was also a significant positive predictor of ASMR response intensity (see Figure 1, Panel B, top). Participants reporting higher levels of interoceptive awareness, with greater deviations from typical sensory processing, being highly sensitive also reported a greater ASMR response intensity in general.

As with ASMR trigger intensity, further subscale analyses (Figure 1, Panel B, middle and bottom) showed that the emotional awareness subscale of the MAIA2 ($B = .12$, $SE = .03$, $\beta = .23$, $t = 4.03$, $p < .001$, 95%CI[.06, .18]) and the aesthetic experiences subscale of the HSPS ($B = .13$, $SE = .03$, $\beta = .22$, $t = 4.47$, $p < .001$, 95%CI[.07, .19]) were driving these effects. Subscale analyses of the GSQ indicated that response intensity was positively predicted by both overactive and underactive sensory processing, but these did not reach statistical significance (Overactive: $B = .11$, $SE = .06$, $\beta = .11$, $t = 1.90$, $p = .058$, 95%CI[.004, .22] Underactive: $B = .13$, $SE = .07$, $\beta = .10$, $t = 1.80$, $p = .072$, 95%CI[-.01, .27]).

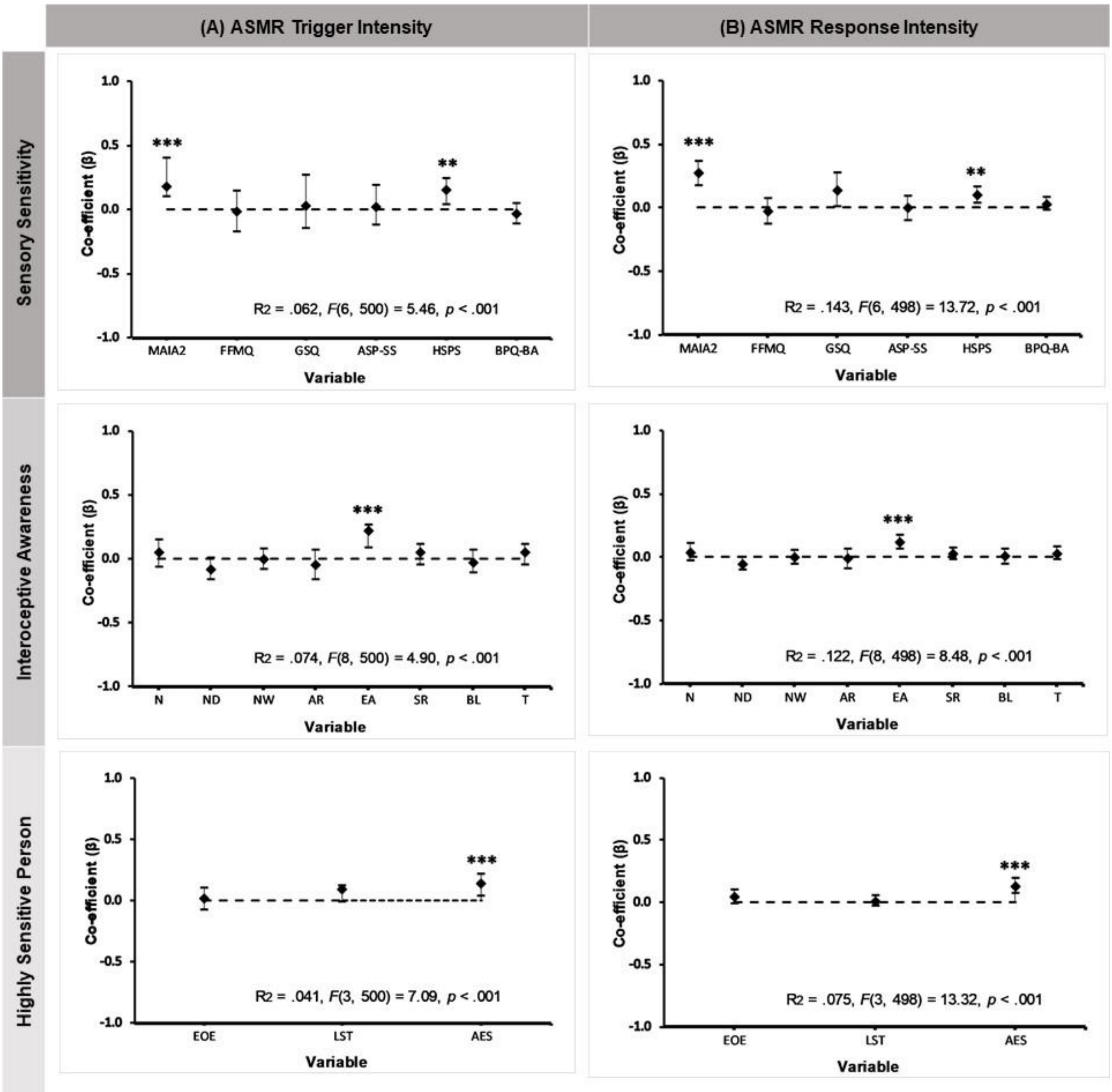

Figure 1. Predictors of ASMR Trigger/Response Intensity. Predictors are six sensory sensitivity variables (top row), MAIA2 subscales (middle row) and HSPS subscales (bottom row). Error bars indicate 95% confidence intervals. ***p<.001, **p<.01.

Components of ASMR Response Intensity

To explore the associations between sensory sensitivity and ASMR response intensity as a multi-dimensional construct, we performed separate multiple regressions with the four subscales of the ASMR-15 (Altered Consciousness, Sensation, Relaxation, and Affect) as dependent variables and our six measures of sensory sensitivity as independent variables. Key results are presented in Figure 2.

Interoceptive awareness (MAIA2) was a significant positive predictor of all the subscales except Relaxation (Altered Consciousness: $B = .44$, $SE = .09$, $\beta = .25$, $t = 4.70$, $p < .001$, 95%CI[.25, .62]; Sensation: $B = .18$, $SE = .07$, $\beta = .14$, $t = 2.55$, $p = .011$, 95%CI[.04, .32]; Affect: $B = .38$, $SE = .08$, $\beta = .27$, $t = 5.04$, $p < .001$, 95%CI[.23, .53]). Further subscale analyses showed that: (1) the emotional awareness and self-regulation components of the MAIA2 were significant positive predictors of Altered Consciousness (Emotional Awareness: $B = .28$, $SE = .06$, $\beta = .30$, $t = 5.07$, $p < .001$, 95%CI[.17, .39]; Self-Regulation: $B = .10$, $SE = .05$, $\beta = .12$, $t = 2.10$, $p = .036$, 95%CI[.01, .19]); (2) the non-distracting component was a significant negative predictor of Sensation ($B = -.09$, $SE = .04$, $\beta = -.10$, $t = -2.24$, $p = .025$, 95%CI[-.17, -.01]), and (3) the ‘Trusting’ subscale was a significant positive predictor of Affect ($B = .14$, $SE = .04$, $\beta = .19$, $t = 3.35$, $p = .001$, 95%CI[.06, .22]).

The Highly Sensitive Person Scale was a significant positive predictor of all the subscales except Altered Consciousness (Sensation: $B = .12$, $SE = .05$, $\beta = .14$, $t = 2.44$, $p = .015$, 95%CI[.02, .21]; Relaxation: $B = .07$, $SE = .03$, $\beta = .13$, $t = 2.13$, $p = .033$, 95%CI[.01, .13]; Affect: $B = .12$, $SE = .05$, $\beta = .13$, $t = 2.34$, $p = .020$, 95%CI[.02, .22]). Further subscale analyses showed that the aesthetic experiences scale was a significant positive predictor of Sensation ($B = .19$, $SE = .04$, $\beta = .22$, $t = 4.57$, $p < .001$, 95%CI[.11, .27]) and Affect ($B = .12$, $SE = .05$, $\beta = .14$, $t = 2.72$, $p = .007$, 95%CI[.03, .21]) whereas the Ease of Excitation subscale positively predicted Relaxation but did not reach statistical significance ($B = .05$, $SE = .03$, $\beta = .11$, $t = 1.93$, $p = .055$, 95%CI[.001, .11]).

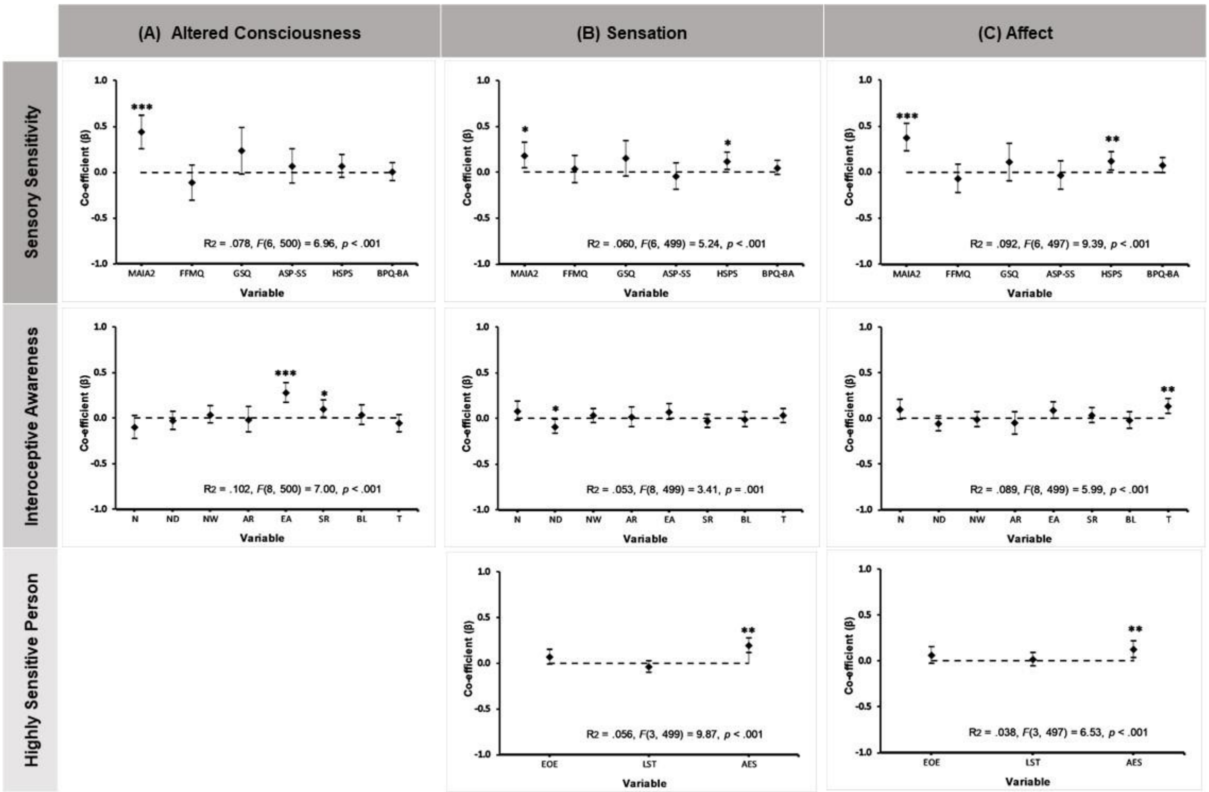

Figure 2. Predictors of components of ASMR. Predictors are six sensory sensitivity predictor variables (top row), MAIA2 subscales (middle row) and HSPS subscales (bottom row). Error bars indicate 95% confidence intervals. ***p<.001, **p<.01.

Sensory sensitivity differences between ASMR and non-ASMR participants

We conducted a series of Welch Tests to examine differences in sensory sensitivity measures (and their subscales) between ASMR and non-ASMR participants. Results showed that ASMR participants scored significantly higher than non-ASMR participants on overall measures of (1) The Highly Sensitive Person Scale (M_{diff} = 0.50, *Welch's F*(1, 66.99) = 15.78, *p* < .001, *d* = .57) and (2) The Body Awareness scale (M_{diff} = 0.50, *Welch's F*(1, 822.23) = 30.82, *p* < .001, *d* = .59) (see Figure 3, Panel A). Additional analyses showed that ASMR participants scored higher on all three subscales of the highly sensitive person scale: (1) Ease of Excitation (M_{diff} = 0.44, *Welch's F*(1, 69.28) = 11.54, *p* = .001, *d* = .46), (2) Low Sensory

Threshold (M_{diff} = 0.52, *Welch's* $F(1, 68.94) = 8.71$, $p = .004$, $d = .40$), and (3) Aesthetic Experiences (M_{diff} = 0.53, *Welch's* $F(1, 64.61) = 14.87$, $p < .001$, $d = .61$) (see Figure 3, Panel B). Differences between the groups were also observed for three subscales of the interoceptive awareness measure (see Figure 3, Panel C). Noticing and Emotional Awareness – where ASMR participants scored significantly higher than non-ASMR participants (Noticing: M_{diff} = 0.32, *Welch's* $F(1, 66.25) = 6.13$, $p = .016$, $d = .37$; Emotional Awareness: M_{diff} = 0.29, *Welch's* $F(1, 69.71) = 4.50$, $p = .038$, $d = .28$). Not worrying, where ASMR participants scored significantly lower than non-ASMR participants (M_{diff} = -0.30, *Welch's* $F(1, 70.46) = 5.66$, $p = .020$, $d = -.31$). ASMR participants also scored significantly higher on the Observing subscale of the Five Facets of Mindfulness (M_{diff} = 0.27, *Welch's* $F(1, 65.24) = 5.00$, $p = .029$, $d = .34$) (see Figure 3, Panel D).

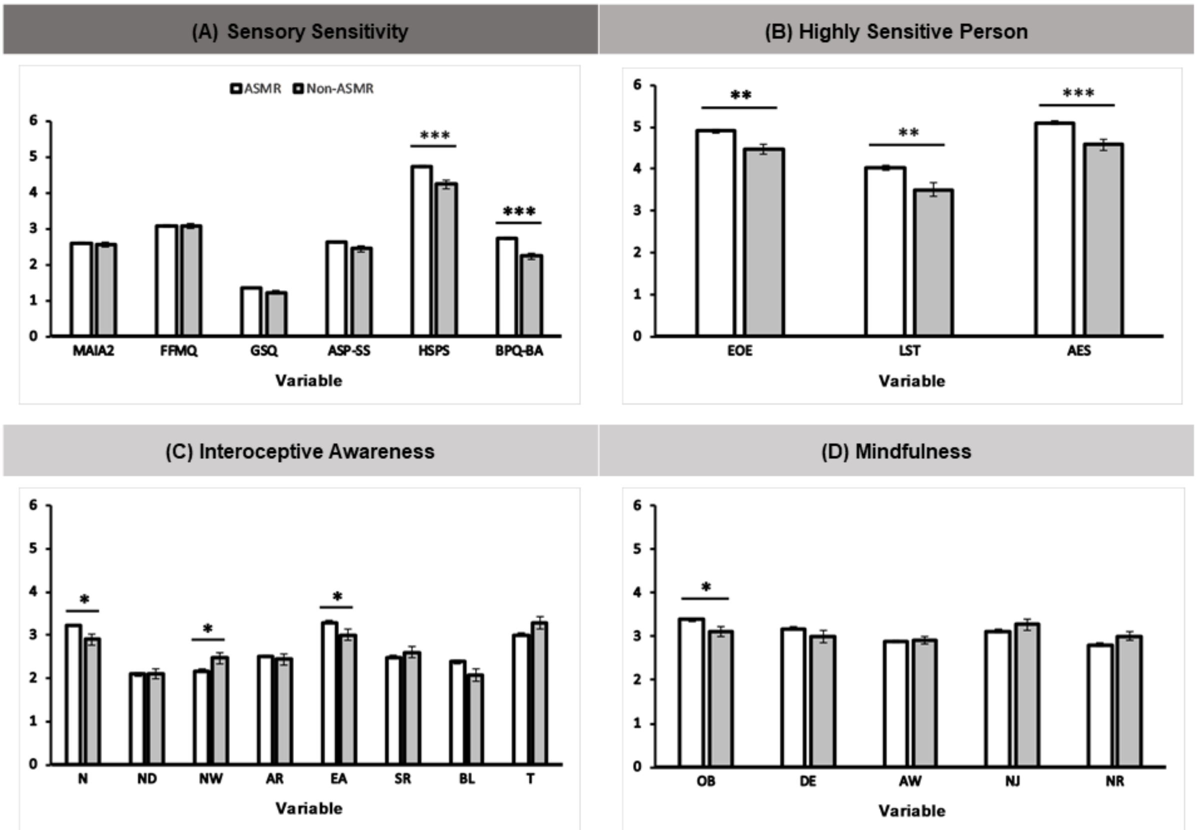

Figure 3. Differences between ASMR and non-ASMR participants on key variables. Error bars are SEM ***p<.001, **p<.01, *p<.05.

PCA Approach to Analyses

To further explore the relationship between ASMR and sensory sensitivity, and to allay concerns over potential suppression effects from entering conceptually similar scales as simultaneous predictors in our regressions, we re-analysed our data using principal components analysis to reduce the number of variables in the dataset. To do this, we decomposed the 161 questionnaire items from the MAIA2, HSPS, FFMQ, BPQ, ASP, and GSQ using principal components analysis (PCA) describing our sensory sensitivity measures. This revealed four components with eigenvalues greater than one and with a clear elbow after the fourth component observed in the scree plot (see supplementary materials on the OSF page).

The four orthogonal components accounted for 28% of the total variance and varimax rotation produced component loading patterns shown in supplementary Table X (available on our OSF page) and described below. We computed standardized component scores for each of our four components for each participant and used these as independent variables in the subsequent analyses:

Component 1 – *External hypersensitivity* – individuals with a high weighting on this component tended to report being highly sensitive to external stimuli such as noise and movement and bothered by those stimulations. This component was mostly composed of the HSP ease of excitation and low sensory threshold subscale items, the GSQ hypersensitivity subscale items and items from the ASP scale.

Component 2 – *Body perception* – was entirely composed of the 26 items from the BPQ. Individuals with a high weighting on this component report heightened awareness of internal bodily signals.

Component 3– *Body and mind regulation* – individuals with a high weighting on this component tended to report control over their attention towards their body and emotional and mental states. This component was mostly composed of the MAIA2 subscales, the FFMQ and the HSP aesthetic sensitivity subscale.

Component 4 – *Hyposensitivity* – individuals with a high weighting on this component reported underactive sensitivity to external and internal sensations such as touch, pain, and interoceptive signals. Although this component consisted mainly of the GSQ hyposensitivity subscale there were a number of items indicating certain aspects of hypersensitivity (but mainly related to repetitive behaviours, visual disturbance, and texture).

Differences between ASMR and non-ASMR participants on component scores

We conducted a series of Welch Tests to examine differences in each of the four PCA components between ASMR and non-ASMR participants. Results showed that ASMR participants scored significantly higher than non-ASMR participants on component scores of *External hypersensitivity* (*Welch's* $F(1, 66.88) = 13.67$, $p < .001$, $d = .54$) and *Body Perception* (*Welch's* $F(1, 85.79) = 26.69$, $p < .001$, $d = .53$).

Regressions with component scores as predictors

We performed two multiple regressions with the four PCA components as predictors and ASMR trigger intensity and ASMR response intensity scores as dependent variables.

Component scores for *Body and mind regulation* ($B = .17$, $SE = .03$, $\beta = .22$, $t = 5.08$, $p < .001$, 95%CI[.11, .24]) and *External hypersensitivity* ($B = .15$, $SE = .04$, $\beta = .15$, $t = 3.40$, $p = .001$, 95%CI[.05, .19]) were significant positive predictors of ASMR trigger intensity.

For ASMR response intensity, all four components were significant positive predictors. *Body and mind regulation* was the strongest predictor ($B = .15$, $SE = .02$, $\beta = .29$, $t = 6.94$, $p < .001$, 95%CI[.11, .20]) followed by *Hyposensitivity* ($B = .08$, $SE = .02$, $\beta = .15$, $t = 3.69$, $p < .001$, 95%CI[.04, .12]), *External hypersensitivity* ($B = .08$, $SE = .02$, $\beta = .15$, $t = 3.52$, $p < .001$, 95%CI[.04, .12]) and *Body perception* ($B = .06$, $SE = .02$, $\beta = .11$, $t = 2.67$, $p = .008$, 95%CI[.02, .10]).

Further analyses with the subscales of the ASMR-15 as dependent variables (presented in Table 2) showed that *Body and mind regulation* was consistently the strongest significant positive predictor of the experience of Altered Consciousness, Sensation, and Affect dimensions of ASMR. In contract, the Relaxation dimension of ASMR was significantly positively predicted *by External hypersensitivity* and *Body Perception* components.

Table 2.

Regression output for analyses with ASMR-15 subscales as dependent variables and orthogonal PCA variables as predictors.

Dependent Variable	Predictor	Unstandardized B	Std Error	Beta	*t*	*p*	95%CI (Lower)	95%CI (Upper)
Altered Consciousness	EH	.109	.042	.112	2.60	.010*	.027	.192
	BP	.032	.040	.035	.805	.421	-.047	.111
	BMR	.216	.041	.227	5.286	<.001**	.135	.296
	H	.136	.041	.143	3.33	.001*	.056	.216
Sensation	EH	.060	.032	.081	1.86	.064	-.003	.124
	BP	.051	.031	.072	1.65	.099	-.010	.112
	BMR	.145	.032	.199	4.59	<.001**	.083	.207
	H	.091	.031	.126	2.89	.004*	.029	.153
Affect	EH	.080	.035	.097	2.27	.024*	.011	.150
	BP	.102	.034	.129	3.01	.003*	.035	.168
	BMR	.189	.034	.235	5.48	<.001**	.121	.256
	H	.069	.034	.086	2.02	.044*	.002	.137
Relaxation	EH	.071	.024	.132	2.98	.003*	.024	.117
	BP	.058	.023	.113	2.56	.011*	.013	.103
	BMR	.044	.023	.085	1.93	.055	-.001	.090
	H	.003	.023	.005	.122	.903	-.042	.048

Note: EH = External Hypersensitivity, BP = Body Perception, BMR = Body and mind regulation, H = Hyposensitivity.

*$p < .05$; **$p < .001$

Discussion

Over the past decade, ASMR has attracted substantial public attention with millions of people watching ASMR content online to enhance their well-being. Despite immense public popularity, we know little about the underpinnings of this intensely pleasurable, but non-universal emotion. Here we proposed that the ability to experience ASMR and its resulting intensity might be underlined by heightened sensory sensitivity, broadly defined as the subjective response to both exteroceptive and interoceptive sensory cues. To explore this idea this study examined whether a range of subjective sensory sensitivity measures (1) differentiated ASMR from non-ASMR responders and (2) predicted ASMR intensity.

Our results support the proposal that people with (stronger) ASMR are more sensitive to certain kinds of sensory cues. Amongst our diverse array of measures used for the first time alongside measures of ASMR, the scales which assessed more expansive and complex conceptualisations of sensory sensitivity - including sensitivity to interoceptive cues, and positive affective appraisals of sensory stimuli (MAIA and HSP) - were the ones which consistently differentiated ASMR from non-ASMR responders and predicted ASMR intensity. In contrast, measures which indexed sensitivity to information from primarily exteroceptive cues such as sound and touch (GSQ) or were based on narrower models of physiological responding to sensory stimuli (ASP, BPQ) did *not* differ significantly between ASMR responders and non-responders and were weaker predictors of ASMR intensity.

Our data-driven PCA approach which decomposed all the questionnaire items into four principal components also revealed important findings. First, these analyses suggest that individuals with trait ASMR are more likely than non-responders (1) to score higher on measures describing hypersensitivity to external stimulation such as being bothered by noise and movement, and (2) to report heightened bodily awareness. Second, these analyses suggest that ASMR-responders with greater ASMR trigger intensity were likely to report heightened exteroceptive sensitivity and ability to regulate their attention towards their body and emotional and mental states.

ASMR and environmental sensitivity

The concept of the Highly Sensitive Person (HSP) emerged as central for differentiating ASMR-responders from non-responders, as well as predicting ASMR intensity. The HSP scale conceptualises sensory processing sensitivity as a trait-like characteristic encompassing heightened sensitivity in several domains including external and internal cues, the social environment (e.g., other peoples' moods) and responses to aesthetic stimuli.

HSPs process information in a deeper and more reflective way, particularly to socially relevant stimuli such as faces; a process mediated by neural regions involved in sensory integration, empathy and emotional meaning making (Acevedo et al., 2014). The fact that HSPs typically have stronger reactions to socially relevant stimuli is thought to underpin the ability of HSPs to be more attuned and responsive to others' emotions and needs. Previous research has linked ASMR to heightened self-reported empathy (McErlean & Banissy, 2017) and associated neural circuity (Lochte et al., 2018). Our findings suggest that these effects may be driven by enhanced and deeper processing of social stimuli and others' emotions, characteristic of HSPs. Research using behavioural measures to index socio-emotional processing would provide more direct support for the idea that those with (stronger) ASMR show enhanced processing found with the HSP trait.

The clear association between the HSP concept and (stronger) ASMR fits well with previous work highlighting the social nature of ASMR triggers. ASMR can enhance social connectedness (Poerio et al., 2018), and the strongest ASMR triggers often simulate situations involving interpersonal closeness, intimacy, vocal sounds, and affective touch (Andersen, 2015; Liu & Zhou, 2019; Poerio et al., 2018, Study 1; Roberts et al., 2020; Smith

& Snider, 2019). It may be that those capable of experiencing ASMR not only process subtle social stimuli at a deeper level, but that they are also able to derive more emotional benefit from positive socially induced emotions (e.g., through voice and touch), perhaps through enhanced interoceptive awareness (Terasawa et al., 2014). One fascinating possibility is that the canonical touch-like tingling of ASMR reflects the ability of ASMR responders to simulate social touch from non-tactile stimuli. Thus, part of the benefit of ASMR may be a consequence of the ability to amplify the benefits of affective touch for stress reduction and enhanced well-being (see Gallace & Spence, 2010, for a review), both during actual touch and non-veridical touch (likening ASMR to mirror/auditory-touch synaesthesia, Poerio, 2016).

More broadly, the association between the HSP concept and (stronger) ASMR links the ASMR trait to theoretical frameworks of variability in environmental sensitivity (Greven et al., 2019). Here the concept of sensitivity does not equate to vulnerability, two concepts which are often conflated, especially within the context of psychopathology (e.g., diathesis stress, Belsky & Pluess, 2009; see also Evans & Rothbart, 2008 for a distinction between sensory attention and sensory discomfort in relation to neuroticism). Instead, differential susceptibility models emphasise that highly sensitive individuals are more reactive to the *positive* as well as negative aspects of the environment. Indeed, we found that ASMR intensity was positively predicted by the aesthetic experience subscale of the HSPS, linking ASMR with a greater openness towards, and pleasure for, positive stimuli and aesthetic experiences (e.g., being deeply moved by the arts). This fits well with previous research connecting ASMR to other aesthetic experiences (e.g., music induced chills), and traits of 'openness to experience' and absorption (Fredborg et al., 2017; McErlean & Osborne-Ford, 2020). One intriguing irony, however, may be that the very same underlying sensitivity that enables an individual to generate intense emotional pleasure from ASMR may also underlie the drive to seek these experiences in the first place (e.g., being more adversely affected by environmental stressors).

ASMR and interoceptive awareness

ASMR responders had greater awareness of their bodily sensations across multiple measures (BPQ-BA MAIA2-Noticing, FFMQ-Observing[2]) and reported a stronger connection between their bodily states and emotional experiences (MAIA2-NW, MAIA2-EA). Enhanced body-emotion awareness was also a positive predictor of ASMR intensity and the extent to which ASMR feels like an altered state of consciousness. Taken together these novel results highlight the importance of enhanced bodily awareness for ASMR and, in particular, the process of how bodily states are *appraised and translated* into emotional states. They also extend previous research linking other aesthetic emotions and experiences to interoception (Tihanyi et al., 2018).

ASMR is associated with specific bodily changes - reduced heart rate and increased skin conductance level - reflecting activation and deactivation of the autonomic nervous system (Poerio et al., 2018). This distinct physiological profile together with subjective reports of ASMR as a combination of pleasant activation and deactivation (e.g., relaxation and euphoria; Roberts et al., 2019), identifies ASMR as a complex emotional response (Berrios, 2019). Our findings suggest that ASMR responders' enhanced interoceptive sensitivity means they are likely to be both more aware of any physiological changes caused by ASMR stimuli (e.g., whispering, affective touch) as well as the interface between those bodily states and their subjective emotional experience of ASMR. For ASMR responders, internal cues may be more intense (e.g., greater signal to noise ratio), perceived differently (e.g. with greater accuracy) or integrated differently with other sensory information during

[2] Note that this facet of mindfulness has been conceptualised as a measure of interoceptive awareness (Rudkin et al., 2018) which may help to explain associations between ASMR and mindfulness more generally.

appraisal (see Samermit et al., 2019). These suggestions are not mutually exclusive; there are likely to be multiple interacting top-down and bottom-up levels of altered interoceptive processing in ASMR.

Linking ASMR to the growing field of interoception promises to shed light on the precise neurobiological mechanisms underlying the development of the ASMR trait and the generation of the ASMR state. Understanding the role of interoceptive processes, we believe, is also likely to transform our knowledge of how ASMR is related to affective touch and empathy (Arnold et al., 2019; Murphy et al., 2017), and why ASMR is often characterised as an emotional experience directed at social affiliation, integration and connectedness (Lochte et al., 2018). Much literature has focused on the role of interoceptive dysregulation in negative emotional states and clinical disorders (Khalsa et al., 2018; Murphy et al., 2017). Here we highlight the benefit of enhanced interoceptive sensitivity for *positive* emotional states, which can, and are, being used as a tool to enhance well-being. Studying ASMR may therefore enrich our understanding of how bodily processes and their cognitive interpretation are integrated to generate intensely positive emotional experiences which may improve well-being (see Fredrickson, 2013).

Cognitive appraisal processes are also likely to be important for understanding how bodily changes are translated to emotional experiences in response to ASMR stimuli. Understanding the modulating role of context may help to explain why typically positive ASMR triggers (and presumably similar interoceptive and exteroceptive sensory input) can often result in a fundamentally different emotional response (e.g., misophonia) within the same individual (e.g., Rouw & Erfanian, 2018). Trait emotional awareness theory (Smith, Kilgore, & Lane, 2018) may provide a useful theoretical framework here because it can be used to explain why different individuals produce differing emotional reactions in similar situations, which could be applied to ASMR.

Components of ASMR

Further exploratory analyses examined how sensory sensitivity measures predicted different components of ASMR (e.g., tingling sensation, time distortion, pleasure, and relaxation). Interoceptive emotional awareness was a significant positive predictor of variation in 'altered consciousness', the component of ASMR concerned with a state of flow and time distortions. In contrast, the HSP 'aesthetic experiences' subscale was a significant positive predictor of the sensation (relating to the tingling feeling) and affective (related to the pleasurable aspect of ASMR) components of ASMR. These results suggest that there may be different types of ASMR experience, explained by individual differences in aspects of sensory sensitivity, such that some people are more prone to experiencing a certain 'flavour' of ASMR (e.g. a stronger flow experience but reduced tingling) compared to others.

No sensory sensitivity measures significantly predicted variation in the relaxation component of ASMR. This is consistent with recent findings by Roberts et al. (2020) who found that none of their predictors (variables relating to individual differences in consciousness and perception) were significantly related to relaxation. We share their view that this may be due to restricted variance in scores for the relaxation variable, and note that viewing ASMR content as relaxing may be more commonplace than other components of the experience (e.g., immersion in the experience). This may be a point for consideration in future iterations of the ASMR-15 scale.

Our data-driven PCA approach also suggests that the attention and regulation of bodily states and their relationship to emotion may be important for understanding the dimensions of experience underlying the ASMR response. PCA component "*Body and mind regulation*" was the strongest predictor of all dimensions of the ASMR experience indexed by the ASMR-15 (except relaxation). This PCA component was composed mainly items from the MAIA-2, FFMQ observing scale, and HSP aesthetic emotions subscale, and broadly reflected the ability and tendency to direct attention towards bodily sensations and emotional states, and regulate them. Future research work should attempt to disentangle these associations to understand features that could be trained to enhance complex positive emotional experiences such as ASMR.

Limitations

Finding should be considered given the following limitations of the study. First, although we had a large sample of ASMR participants (N=501), the sample of control participants was comparably small (N=52), which is a substantial limitation. This means the estimate of non-ASMR participants' sensory sensitivity is less accurate, however we mitigated this to a certain extent when making comparisons between the groups by using Welch's tests (Delacre et al., 2017). Future replications should recruit larger and matched control samples.

Second, both ASMR and non-ASMR samples were recruited though opportunity sampling which is likely to have resulted in selection bias. This may be particularly pertinent for the ASMR group because they were predominately recruited through social media and as such may not be representative of the ASMR population in general. ASMR responders who engage with the ASMR community (e.g., through watching videos, discussing in online forums, following ASMRtists) may inadvertently bias results if they engage with the community because they consistently experience and seek out ASMR experiences. In terms of the present study, it is not clear whether engaging with ASMR communities would systematically predict enhanced sensory sensitivity, and indeed there is evidence to suggest that ASMR participants recruited through Facebook are less, not more, sensitive to misophonic sounds (McErlean & Banissy, 2018, supplemental results). Nevertheless, future research efforts would benefit from the careful selection of ASMR-responders and (matched) controls, for example using services that enable the recruitment of more representative samples.

Third, the transparency of describing our study as exploring the relationship between ASMR and sensory sensitivity may have introduced participant demand, especially in the ASMR sample. For example, it seems plausible that those with ASMR may have implicit or lay theories about ASMR and sensory sensitivity (e.g., that stronger ASMR is associated with greater sensory sensitivity) which may have influenced their responding. However, if participants were responding in line with these implicit assumptions then it is not immediately clear why they would respond desirably to some (sub) scales (interoception) but not others (mindfulness, exteroceptive sensitivity measures). Regardless, it would be prudent to minimise the potential for participant demand through various methods such as embedding measures of interest within other unrelated measures, assessing socially desirable responding, probing lay theories regarding ASMR and variables of interest, and using funnel debriefing techniques to evaluate participants' awareness of hypotheses.

Fourth, we were only able to use self-report measures to assess differences in *subjective* sensory sensitivity. Therefore, the results cannot speak to the contribution of behavioural or neural differences in sensory sensitivity to ASMR (Ward, 2019). Future research should employ objective measures of sensory sensitivity, in particular interoceptive awareness, to examine whether the subjective self-reported differences we observed are supported by objective physiological differences (Murphy et al., 2019)

Finally, we should note that our analytical approach assumes that trait ASMR is simultaneously categorical (a person either experiences it or not) and continuous (people who do experience ASMR vary in the frequency and intensity of the experience) (see Hostler, Poerio, & Blakey, 2019). Although this characterisation reflects anecdotal reports of ASMR, it may lead to an underestimation of the relationship between ASMR and sensory sensitivity. The categorical approach underestimates effects because it treats ASMR responders as if they were the same, and the continuous approach underestimates effects because it eliminates a large group of people who would score zero on ASMR measures.[3] Future research should examine patterns of ASMR responding and their consistency over time to understand the extent to which the phenomenon should be treated as continuous or categorical (e.g., strong vs. weak responding to ASMR triggers), as well as using unbiased samples with appropriate statistical methods (such as Poisson regression) and employing ASMR measures that can be used with both ASMR-responders and controls (for a recent example of this approach using an adapted ASMR-15 see Roberts et al., 2020).

Conclusion

Notwithstanding the limitations of this study, our findings offer new insights into the potential mechanisms underlying the presence and intensity of ASMR. By meaningfully linking ASMR to more well-established constructs and theoretical frameworks in psychological science (e.g., interoception, environmental sensitivity) we hope to galvanise future research efforts for understanding this unique emotional experience, efforts which may ultimately inform interventions aimed at harnessing ASMR for social and emotional well-being.

Open Practices

The study in this article earned the Preregistration, Open Materials, and Open Data badges for transparent practices. Preregistration, materials and data for the study are available at https://osf.io/....

[3] We thank an anonymous reviewer for this insight.

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