BRILL *Multisensory Research (2024)* DOI:10.1163/22134808-bja10136 brill.com/msr

Research Priorities for Autonomous Sensory Meridian Response: An Interdisciplinary Delphi Study

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Received 18 June 2024; accepted 3 November 2024; published online 28 November 2024

Abstract
Autonomous Sensory Meridian Response (ASMR) is a multisensory experience most often associated with feelings of relaxation and altered consciousness, elicited by stimuli which include whispering, repetitive movements, and close personal attention. Since 2015, ASMR research has grown rapidly, spanning disciplines from neuroscience to media studies but lacking a collaborative or interdisciplinary approach. To build a cohesive and connected structure for ASMR research moving forwards, a modified Delphi study was conducted with ASMR experts, practitioners, community members, and researchers from various disciplines. Ninety-eight participants provided 451 suggestions for ASMR research priorities which were condensed into 13 key areas: (1) Definition, conceptual clarification, and measurement of ASMR; (2) Origins and development of ASMR; (3) Neurophysiology of ASMR; (4) Understanding ASMR triggers; (5) Factors affecting the likelihood of experiencing/eliciting ASMR; (6) ASMR and individual/cultural differences; (7) ASMR and the senses; (8) ASMR and social intimacy; (9) Positive and negative consequences of ASMR in the general population; (10) Therapeutic applications of ASMR in clinical contexts; (11) Effects of long-term ASMR use; (12) ASMR platforms and technology; (13) ASMR community, culture, and practice. These were voted on by 70% of the initial participant pool using best/worst scaling methods. The resulting agenda provides a clear map for ASMR research to enable new and existing researchers to orient themselves towards important questions for the field and to inspire interdisciplinary collaborations.

Keywords
ASMR, Delphi, priorities, research agenda

1. Introduction

Autonomous Sensory Meridian Response (ASMR) is a multisensory perceptual experience associated with feelings of relaxation and altered consciousness, described as pleasant and relaxing. It can be elicited by audiovisual,

tactile, or interpersonal stimuli (often called 'triggers') which include whispering, tapping, scratching sounds, repetitive movements, and close personal attention (Poerio *et al*., 2023). ASMR content designed to elicit the sensation has a growing role in popular culture, with 'ASMR' being the third most popular search term of all time on YouTube (Hardwick, 2021). Many ASMR content creators known as ASMRtists have millions of people subscribed to their channels, and some of the most popular have over 1.5 billion total views of their content (Portas Ruiz, 2022).

The 'ASMR community' is a growing population of millions of cybernauts worldwide who share a common interest in ASMR. A characteristic aspect of this virtual community is that, often, not only do its members consume but also create its content, contributing to the communal culture and fostering a sense of belonging and collective identity through the ASMR phenomenon.

Public popularity of ASMR videos has been mirrored, albeit to a lesser extent, by an exponential growth in academic ASMR research, which now represents a substantial body of work (Lohaus *et al*., 2023a). ASMR is a unique physiological and psychological sensation embedded within a distinct socio-cultural context *via* the ASMR community. Thus, research into ASMR requires an interdisciplinary approach and has already been conducted in a range of disciplines from neuroscience (e.g., Lochte *et al*., 2018; Smith *et al*., 2022; Swart *et al*., 2022a) to media studies (e.g., Andersen, 2015; Klausen, 2019; Klefeker *et al*., 2020). Despite growing research interest, the field of ASMR is still relatively new and disjointed, providing a unique opportunity to collaboratively define future research directions.

Given substantial interest in ASMR from researchers and the public, a research agenda is needed to provide direction and orientation to the field. Such an agenda would allow funding agencies, institutions, researchers, and the wider ASMR community to engage with, and contribute effectively to, the ASMR knowledge base by identifying priority areas for meaningful and valued ASMR research. Using collaborative methods, the aim of the current study is to provide such an agenda for the field. A brief history of ASMR research is presented, followed by the methodology used to derive the agenda and the key priority topics.

1.1. A Brief History of ASMR Research

The term 'Autonomous Sensory Meridian Response' was coined in 2010 by Jennifer Allen to provide a more clinical-sounding term for the sensation, compared to various other suggested terms that were circulating on the internet at that time (Richard, 2016). Online communities adopted the term and began sharing content that was designed to elicit ASMR. Content creators, who were already producing ASMR-eliciting videos, began embracing the ASMR nomenclature, which led to the related term 'ASMRtist'. Alternative terms

such as audiovisual elicitation of somatosensation (AVES) have been proposed (Niven and Scott, 2021), which suggest the sensation stems from the interaction between auditory and somatosensory pathways (within particular social contexts). However, recent studies confirm that ASMR is not just elicited by audiovisual triggers but also, and perhaps most commonly, from touch (Gillmeister *et al*., 2022; Poerio *et al*., 2023). Hence, the term 'Autonomous Sensory Meridian Response' has prevailed despite some criticisms (Niven and Scott, 2021), and is the term used most consistently across academic research, the online community around ASMR videos, and the media.

The first reference to ASMR in academic literature was by Ahuja (2013) who compared the sensation with literature describing pleasure from receiving clinical diagnoses. This was followed by the work of Andersen (2015) who described the ASMR community, and the roles of intimacy and care in their attraction to ASMR media. The first empirical study was published soon after, in which Barratt and Davis (2015) presented data on the common triggers and reasons for watching ASMR videos. ASMR has since been considered in numerous academic disciplines, aiming to investigate its psychological and neurophysiological correlates (e.g., Fredborg *et al*., 2021), potential clinical applications (e.g., Smejka and Wiggs, 2022; Vardhan *et al*., 2020; Zhou, 2023), potential for technology design (e.g., Klefeker *et al*., 2020; Peng *et al*., 2023), and cultural impact and relationship to aesthetic appreciation (Gallagher, 2016; Lewkowich, 2022). These diverse approaches have harnessed different tools and methodologies (e.g., questionnaires, fMRI, EEG, behavioural tasks, clinical interventions, etc.), and have explored different facets of ASMR from ranging theoretical perspectives. The next section provides a brief sense of the wide-ranging scope of current ASMR research endeavours encompassing various theoretical interpretations, methodological approaches, and disciplinary perspectives including both the sciences and the humanities (for a comprehensive review of ASMR research, see Mahady *et al*., 2023).

1.2. Theoretical Approaches

ASMR has a canonical 'tingling' sensation, which is a focal point in both anecdotal, theoretical, and empirical explorations of ASMR (Poerio *et al*., 2023; Trenholm-Jensen *et al*., 2022; Valtakari *et al*., 2019). In this vein, researchers have attempted to draw parallels between ASMR and other more well-established sensory phenomena including synaesthesia (Gillmeister *et al*., 2022; Poerio *et al*., 2022) and musically-induced aesthetic chills or frisson, which is a pleasurable physical response to music (Schoeller *et al*., 2024). However, whilst ASMR resembles some aspects of those experiences (Roberts *et al*., 2020), there are studies that highlight divergences among them (del Campo and Kehle, 2016; Kovacevich and Huron, 2019). ASMR has also been

linked to misophonia, a disorder where repetitive sounds, like chewing or sniffing, cause discomfort (Rouw and Erfanian, 2018). In ASMR, certain sounds induce pleasurable sensations and positive affect, while in misophonia, similar sounds provoke negative reactions, suggesting they could be linked to early heightened sensitivities (Mednicoff *et al*., 2022) or auditory processing on a sound sensitivity spectrum (McErlean and Banissy, 2018), leading to contrasting emotional responses (McGeoch and Rouw, 2020). More research is needed to determine the mechanisms of these responses and the ways in which these sensations may or may not be related at the biological, psychological, and socio-cultural levels.

Research has also considered ASMR as a complex emotional experience. Barratt and Davis (2015) were the first published study to describe ASMR as inducing euphoric and calming emotions, as well as enhancing mood more broadly. Subsequent experiments confirmed these effects of ASMR on mood, along with electrophysiological and neuroimaging observations (Morales *et al*., 2021; Poerio *et al*., 2018). Other approaches have studied ASMR as an altered state of consciousness, linked to altered time perception or focused attention, characteristic of flow states or absorption traits (McErlean and Osborne-Ford, 2020; Roberts *et al*., 2019). ASMR tendencies positively correlate with measures of mindfulness, reinforcing this view (Fredborg *et al*., 2018; Glim *et al*., 2022; Poerio *et al*., 2022b). Studies aiming to measure the multifaceted nature of ASMR have incorporated the concept of an altered state of consciousness as a critical dimension alongside affect, relaxation, and sensory dimensions (Kilborn *et al*., 2022; Lohaus *et al*., 2023b; Sakurai *et al*., 2021).

Within a perspective that involves more cultural, social, and philosophical aspects, other researchers have highlighted the social nature of some ASMR content (Starr *et al*., 2020; Waldron, 2016), alongside its capacity to create intimacy through digital media (Andersen, 2015; Wang, 2023). Both points combine to create a cultural phenomenon that uses technology to induce affective and somatic outputs (Klausen, 2021; Smith and Snider, 2019). These lines of research have important philosophical implications, insofar as the ASMR phenomenon may require us to reconsider the relationship between art and instrumentality, and the distinction between art for art's sake or for a particular use such as for therapeutic benefit (Gallagher, 2019). ASMR as a broadly defined genre of audiovisual and interpersonal content has entered cultural life through theatre (Klich, 2019), advertising (De Kerpel *et al*., 2024; Pilny *et al*., 2023), music (Accornero, 2022; Warrenburg *et al*., 2021), literature (Lester, 2022) and film (Bower, 2022).

1.3. Methodological Approaches

ASMR has been approached from different methodological perspectives leading to potential confusion. For example, research often treats ASMR as a *trait*, comparing those who experience its tingling sensation (ASMR responders) with those who do not. These studies focus on psychological, cognitive/emotional, and neurobiological differences between those with and without trait-ASMR (see Lohaus *et al*., 2023a; Mahady *et al*., 2023 for reviews). A challenge is defining criteria to separate ASMR responders from nonresponders (Hostler *et al*., 2019) with some studies using a binary response option to the question 'do you experience ASMR?' after describing the experience or showing ASMR stimuli (e.g., McErlean and Banissy, 2018) and other combining this question with the ASMR-15 scale (Roberts *et al*., 2019), which measures ASMR propensity across four dimensions (altered consciousness, tingling, affect, and relaxation). Other methods include checklists on the presence and intensity of the tingle response and additional questions about ASMR, providing more detailed information on responders (Fredborg *et al*., 2017; Poerio *et al*., 2023). An important advancement in this area is the ASMR-Experiences Questionnaire (AEQ), a validated instrument for classifying ASMR responders based on their reactions to ASMR stimuli (Swart *et al*., 2022b).

There are other areas where there is no clear methodological consensus, especially regarding ASMR trigger selection. Studies vary, using popular YouTube videos (e.g., Koumura *et al*., 2021), pre-tested videos (Villena-Gonzalez *et al*., 2023), or allowing participants to select based on sensation intensity (Poerio *et al*., 2018; Swart *et al*., 2022a). The challenge lies in the variability of what evokes tingling sensations, influenced by stimulus, context, and individual state. Some recent research on common ASMR triggers provides clues for common elements that may guide the selection of stimuli (Poerio *et al*., 2023) and there are also efforts to create an ASMR trigger library (Liu and Zhou, 2019). Additionally, defining control conditions, and considering expectation and suggestion effects are crucial methodological issues (Hostler *et al*., 2019). The Tingle Reporting Task (TRT) is one possible solution which uses a suggestibility control condition in which participants monitor changes in hand temperature — a body sensation they are led to believe might occur, as informed by the researcher before the experiment (Villena-Gonzalez *et al*., 2023). However, a global consensus is still needed to address this issue.

1.4. The Need for a Research Agenda

ASMR research faces challenges due to the diversity of its theoretical frameworks and the variety of methodological approaches used. This diversity, while enriching, has led to disconnected understandings and a lack of consensus on

key aspects of ASMR research (Lohaus *et al*., 2023a). A minimum threshold of shared understanding and language amongst researchers regarding key concepts, observations, and aims is crucial to progress knowledge on any topic, including ASMR. One way to increase consensus around the future direction of ASMR research is to use well-established empirical methods for generating consensus. Here, we used a modified Delphi technique involving two rounds of feedback as a method of generating a research agenda for ASMR to identify what could and should be done in this research area as an emerging field. The Delphi technique is a widely used and accepted method for gaining convergence of opinion from solicited experts/stakeholders within a certain topic area (Yousuf, 2007). It is a group communication process that collates and synthesises opinion on a topic from a diverse range of perspectives for the purpose of goal-setting and policy investigation. The Delphi method has been used to generate collaboratively-derived research agendas and priority lists in areas including science policy research (Sutherland *et al*., 2012), ecology (Ockendon *et al*., 2018), microbial biology (Antwis *et al*., 2017), and psychiatry/neuropsychology (Swedo *et al*., 2022).

As the Delphi technique prioritises collaboration and group cohesion over individual judgements, it is well suited to addressing the challenges of the diverse and fragmented ASMR field. In implementing this method, we engaged ASMR researchers from various disciplines and other stakeholders in a collaborative process to formulate a clear and coherent ASMR research agenda. In doing so, we hope to provide a common reference point to guide both new and existing researchers on current priorities across disciplines where their skills, knowledge and expertise can continue to contribute to this field and expand our collective basis of knowledge.

1.5. A Collaborative Research Agenda and Ethos

A key element of our research agenda is the input and endorsement from the broader ASMR community of content creators and experiencers. Scientific research may consider ASMR to be a distinct physiological experience; however, even from this perspective ASMR is recognised as a social phenomenon and is therefore changeable and adaptable according to the norms and beliefs of those participating in it (Grothe-Hammer, 2024). Practically, this means that ASMR content creators and experiencers have an instrumental role to play, not only in researching ASMR (as participants and cocreators), but also in defining, shaping, and expanding the boundaries of the phenomenon. Examples of this might include the creation of new ASMR triggers, modes of triggering and experiencing ASMR, and the creation and cultivation of ASMR cultures and the associated affective, psychological, and physiological responses. This feeds into both humanities work about the meaning of ASMR; scientific work about its origins, phenomenology, and underlying mechanisms; and cultural

work about its role in modern society. To achieve a research agenda that is collaborative, both ASMR creators and those who respond to ASMR-specific content and are part of online (and offline) ASMR communities must feel that the research agenda also reflects their values and interests, and that they are respected when contributing to research on ASMR as participants or coproducers.

1.6. The Present Study

In sum, the aim of the present study was to create a collaborative research agenda for ASMR using a modified Delphi technique to gather suggestions for important research topics from researchers interested in ASMR and adjacent fields (e.g., misophonia, synaesthesia), ASMR content creators, and ASMR community members. These ideas were coded into areas before being voted on in an initial round of feedback. They were then synthesised into a research agenda before a second round of feedback was gathered from participants. The three phases of the study, and the results of each, are described in chronological order below.

2. Method and Results

2.1. Phase 1: Eliciting Suggestions for the Research Agenda

2.1.1. Participants

To gather a diverse, yet relevant, stakeholder group, potential participants were identified *via* both targeted recruitment and nontargeted recruitment. For targeted recruitment, we first contacted researchers who had previously published scholarly research on ASMR. We also identified several scholars in fields relevant to ASMR including researchers who had published on synaesthesia, misophonia, intimacy, music-induced chills, sensory experiences, speech and language, technology and media, emotions, or mental health. To engage with the wider ASMR community, we invited existing contacts as well as those in the media whom we (the core team[1]) had collaborated with. For nontargeted recruitment, we advertised participation on social media including Twitter (now known as X), and ASMR-related Facebook groups, with an advert asking: 'Do you want to help define the future of ASMR research?' We used snowball sampling to invite those that we knew to suggest further contacts who could be interested in participating.

In total, 98 people from 22 different countries participated in Phase 1. Fifty-nine participants classified themselves as academic researchers, 23 as ASMR creators, 14 as 'audience/community member/experiencer', and the remainder

[1] See author contribution statement.

(2) as 'other'. Academics' fields varied from social, natural and health sciences to computer science, engineering, linguistics, performance and media-related studies. Within this subgroup, there was a noticeable presence of psychologists and neuroscientists with 16 participants reporting to specialise in these disciplines. The sample were mostly white [82% − 18 out of the 98 contributors had a Global Majority (nonwhite) ethnicity] with a mean age of 35 (SD = 8.96). There were 52 female, 39 male and four nonbinary participants, with three who preferred not to disclose their gender.

2.1.2. Procedure

The research received ethical approval by the Health, Psychology and Social Care Research Ethics and Governance Committee of the Manchester Metropolitan University. Participants were invited to take part in an online survey to provide written suggestions for priority ASMR research areas. They were asked to provide a minimum of three research areas with the following instructions:

> *In the section below, please write the research questions for the field of ASMR that you would like to see answered over the next 10 years. The research questions should be as specific as possible rather than just generic statements/questions. An example of a specific question might be*: "*Do people with ASMR display higher levels of social and emotional traits* (*such as empathy*) *compared to people without ASMR*?" *A generic question might simply say* "*Why do some people experience ASMR and other people do not*?" *Please provide any evidence for why you think the research question is important* (*rationale/evidence*). *The questions can span any aspect of ASMR that you like* (*e.g., its development, practical applications, connection to culture, underlying mechanisms*). *We are interested in collecting a diverse range of questions from people with different backgrounds and perspectives*.

2.1.3. Data Analysis and Results

A total of 451 suggestions for ASMR research priorities were generated from the 98 participants in Phase 1. The responses were then analysed to identify common themes following guidelines for thematic analysis (Braun and Clarke, 2022). Responses were first categorised and synthesised, removing duplicate suggestions and identifying similar thematic research priorities through note taking in Excel. During this process, the set of 451 questions were reduced to 50 broad subthemes. Examples were: "Questions relating to improving ASMR measurement or experimental methodology"; "Questions about the relationship between ASMR and other sensory phenomena, e.g., frisson"; and "Questions about the public perception and possible stigma related to viewing ASMR". This was done inductively, using a data-driven approach rather than

an *a priori* theoretical position. A full list of subthemes can be accessed in the online supplementary materials hosted on the Open Science Framework (OSF) (https://osf.io/4p3qh/). The 50 subthemes were then organised into 13 broader superordinate themes, ensuring the themes were distinct from one another and clearly defined the scope and boundaries of the research topics. The final list of 13 superordinate themes were written up into an agenda and became priority areas for research. They are presented in Table 1, along with descriptions and examples of potential research projects.

Table 1.
The 13 priority areas for ASMR research

Area	Title	Description	Example research project
1	Definition, conceptual clarification, and measurement of ASMR	Research aimed at clarifying the definition and concept of ASMR, including its similarities and differences to other experiences, and how it can be accurately measured as a trait and state.	Developing agreed upon terminology for the ASMR field including definitions of ASMR (state, trait) and ASMR triggers that are shared amongst researchers and consistently applied.
2	Origins and development of ASMR	Research aimed at understanding how, when, and why ASMR develops including its genetic, evolutionary, and social basis as well as whether it can be 'learnt'.	Examining whether there is a genetic predisposition to ASMR and whether it is a family-shared trait.
3	Neurophysiology of ASMR	Research aimed at understanding the neurological and physiological correlates/mechanisms of the ASMR trait and state.	Examining the patterns of neural activation/activity and structural/functional connectivity during experiences of ASMR (e.g., encompassing a variety of neural measures, fMRI, EEG, MEG, oscillatory brain mechanism and neural networks) and how patterns vary according to specific trigger types or the 'strength/intensity' of ASMR.
4	Understanding ASMR triggers	Research aimed at understanding the stimuli that typically induce ASMR, including aspects of ASMR genres, and idiosyncrasies/personal taste.	Establishing the common features (acoustic, vocal, visual, social) of ASMR triggers.

Table 1.
(Continued)

Area	Title	Description	Example research project
5	Factors affecting the likelihood of experiencing/eliciting ASMR	Research aimed at understanding the various conditions/factors that make ASMR more likely to occur and/or occur with greater intensity. This could refer to ASMR elicited by online content, in 'real-life' and ASMR in the absence of triggers.	Understanding whether features of the setting or circumstances in which ASMR content is consumed affect the experience (e.g., lighting, full screen mode, headphones, temperature of the room, distractions present or not, body posture, time of day).
6	ASMR and individual/cultural differences	Research aimed at understanding how the experience/incidence of ASMR might vary between people with different traits and across cultures.	Exploring how and why ASMR might be a negative experience for some people and/or cultures.
7	ASMR and the senses	Research exploring how ASMR is related to sensory processing, especially in relation to sound sensitivity/intolerance, but also more generally encompassing exteroception (broadly defined as sensory processing of cues such as sights/sounds originating externally) and interoception (broadly defined as sensory processing of cues coming from within the body).	Exploring the relationship between ASMR and sound intolerance including misophonia (negative reactions to specific, often human-made sounds such as chewing, breathing) and hyperacusis (noise sensitivity – everyday sounds experienced as intrusively loud).
8	ASMR and social intimacy	Research aimed at understanding the often socially intimate nature of ASMR-eliciting circumstances (e.g., service provision, care, kindness).	The relevance/importance of social intimacy (kindness, close personal attention) in eliciting ASMR (the idea that ASMR content is very personal on the one hand but also addressed to a great amount of people on the other).
9	Positive and negative consequences of ASMR in the general population	Research aimed at understanding whether and how ASMR may benefit and/or negatively affect the general population (including those that do not experience ASMR) both in the long and short term.	The role of ASMR in promoting well-being, reducing negative feelings, reducing loneliness, use as a social surrogate.

Table 1.
(Continued)

Area	Title	Description	Example research project
10	Therapeutic applications of ASMR in clinical populations/contexts	Research aimed at understanding whether and how ASMR may benefit clinical or 'special' populations/contexts.	The possible benefits of ASMR for common mood disorders (e.g., anxiety and depression) or other psychological conditions such as PTSD, phobias, alexithymia, eating disorders.
11	Effects of long-term ASMR use	Research aimed at understanding how and why repeated exposure to ASMR content can result in 'immunity', i.e., inability to experience ASMR sensations (termed 'ASMR immunity') and/or dependency/addiction.	Defining and measuring ASMR immunity (e.g., what is the threshold, and when is it more likely to occur?).
12	ASMR platforms and technology	Research aimed at understanding the role of online platforms, advertising, and emerging technologies in ASMR now, and in the future.	Using technological advancements to enrich the ASMR experience (e.g., virtual reality, augmented reality, metaverse).
13	ASMR community, culture, and practice	Research aimed at understanding the ASMR community and culture including its past, present, and future, and ASMR as a creative art form and type of media.	Describe the practice of ASMR content creators (e.g., their 'performance', creation of content, evolution over time, and the idea of ASMR as a profession) and the possible future of the field of ASMRtists.

2.2. Phase 2. First Round Voting

To explore areas of both alignment and divergence from our diverse set of contributors in terms of their priorities for future ASMR research, participants were invited to vote on the priority of each of the 13 areas.

2.2.1. Participants

All contributors to Phase 1 were contacted to participate in Phase 2. In total, 71 participants from Phase 1 took part but two participants provided only partial responses leaving a final sample for Phase 2 of 69 (70% of the initial sample). This included 52 participants who identified as ASMR researchers (88%), and 17 participants who identified as nonresearchers (e.g., ASMRtists, community members; 44% of initial sample).

2.2.2. Procedure

Participants were first asked to read the collated research priority document before voting. Each participant was then presented with a subset of nine of the

13 areas, and asked to choose their most and least important areas from the subset. The exact instructions given to the participants were:

> *You will now be shown a subset of the 13 different research priority areas from the list that you just reviewed. In each set, you will see nine of the 13 areas from the document. For each set, your task is to select which one you think is the highest priority and which one you think is the lowest priority.*

This was repeated 13 times, based on a balanced incomplete block design (BIBD) determined using the *bwsTools* R package (White, 2020). For each set, participants selected the highest priority and the lowest priority of the areas listed, meaning they always selected two priority areas in each iteration (*Of the following research topic areas below, which is the highest priority to you, and which is the lowest priority to you*?). This procedure was implemented after reviewing valid BIBDs based on 13 items and then selecting the option that had the greatest canonical efficiency factor. The BIBD that met this criterion was that of Plan 11.23, specifying the presentation of nine items out of the full set of 13 items over 13 blocks (Cochran and Cox, 1957, table 11.3). In other words, presenting nine items was the highest number containing the most options that would allow for the least number of repetitions of presentations of sets.

2.2.3. Data Analysis and Results

A best/worst scaling analysis was used to produce a quantifiable way of assessing the respondents' rankings of the priority areas in aggregate and to allow for the use of *bwsTools* in R in the analytical process. Calculation of the aggregate response ratings was performed to determine the rankings of all 13 items in Phase 2 across the sample. Normalised difference scores (Ndiff) were used as the metric to rank the items given high correlation with various multinomial logistic regression (MNL) coefficients (Marley *et al*., 2016). In other words, an analysis based on Ndiff would allow for a streamlined analysis comparable to a logistic regression. Ndiff was then manually calculated for all items from the complete responses. This was accomplished by first compiling the number of times each item was selected as the best item and worst item across all subset presentations, and then dividing each value by the total number of presentations across all subset presentations. This information is shown in Table 2. The Ndiff values were subsequently verified by importing the compiled counts into *bwsTools*, executing the ae_mnl command, and comparing the output Ndiff values against the manually calculated values on an item-by-item basis. The calculations were performed in this manner to reduce the possibility that the Ndiff results would be influenced by technical factors and to also serve as an additional check that *bwsTools* was functioning correctly.

Table 2.
Overall best/worst count, total item presentation and normalised difference score

Item	Best	Worst	Total	NDiff[a]
Definition, conceptual clarification, and measurement of ASMR	251	0	621	0.404
Neurophysiology of ASMR	141	17	621	0.200
Origins and development of ASMR	115	9	621	0.171
Understanding ASMR triggers	76	7	621	0.111
Factors affecting the likelihood of experiencing/eliciting ASMR	47	10	621	0.060
ASMR and the senses	64	30	621	0.055
Therapeutic applications of ASMR in clinical or 'special' populations/contexts	78	63	621	0.024
ASMR and individual/cultural differences	39	30	621	0.014
Positive and negative consequences of ASMR in the general population	30	44	621	−0.023
ASMR and social intimacy	33	69	621	−0.058
Effects of long-term ASMR use	23	90	621	−0.108
ASMR community, culture, and practice	0	233	621	−0.375
ASMR platforms and technology	0	295	621	−0.475

Note: $n = 69$. Items presented in descending order by Normalised Difference Score (NDiff).
[a] Ndiff = (Best – Worst) / Total. Ndiff scores range from −1.00 to 1.00. Scores closer to 1.00 suggest that the item will be more likely to be chosen as 'best' (i.e., highest priority) when presented, whereas scores closer to −1.00 suggest that the item will be more likely to be chosen as 'worst" (lowest priority) when presented.

The top-ranked overall item was "Definition, conceptual clarification, and measurement of ASMR". The lowest ranked overall item was "ASMR platform and technology".

2.2.4. Subgroup Analyses

Given the collaborative nature of the project involving participants with different connections to ASMR, we were interested in examining the convergence in rankings from different groups. Two subgroup analyses were performed, with the full set of 69 complete responses divided into researcher ($N = 52$) and nonresearcher ($N = 17$) groups (based upon self-reported profession data provided as part of the Phase 1 questionnaire). The Ndiff scores for the researcher and nonresearcher groups were sorted in descending order, and the subgroup results were then compared against the overall results.

For the researcher subgroup, the top-ranked and bottom ranked items were identical to the overall rankings (Table 3). For the nonresearcher subgroup, the top-ranked item was "Origins and development of ASMR". The lowest ranked item was again "ASMR platforms and technology" (Table 4).

Table 3.
Researcher subgroup best/worst count, total item presentation and normalised difference score

Item	*Best*	*Worst*	*Total*	*Ndiff* [a]
Definition, conceptual clarification, and measurement of ASMR	226	0	468	0.483
Neurophysiology of ASMR	117	14	468	0.220
Origins and development of ASMR	81	7	468	0.158
Understanding ASMR triggers	48	5	468	0.092
Factors affecting the likelihood of experiencing/eliciting ASMR	28	5	468	0.049
ASMR and the senses	35	14	468	0.044
Therapeutic applications of ASMR in clinical or 'special' populations/contexts	55	36	468	0.041
ASMR and individual/cultural differences	23	17	468	0.013
Positive and negative consequences of ASMR in the general population	22	22	468	0.000
ASMR and social intimacy	31	61	468	−0.064
Effects of long-term ASMR use	9	63	468	−0.115
ASMR community, culture, and practice	0	204	468	−0.436
ASMR platforms and technology	0	228	468	−0.487

Note: $n = 52$. Items presented in descending order by Ndiff score.

[a] Ndiff = (Best − Worst) / Total. Ndiff scores range from −1.00 to 1.00. Scores closer to 1.00 suggest that the item will be more likely to be chosen as 'best' (i.e. highest priority) when presented, whereas scores closer to −1.00 suggest that the item will be more likely to be chosen as 'worst' (lowest priority) when presented.

2.2.5. Normalised Difference Rankings

The final item rankings were then determined by the calculated normalised difference scores in descending order. The full ranking table is shown in Table 5.

The top five ranked items were the same across the three analyses, although the rank order was not the same across subgroup rankings. The bottom two ranked items were also the same across the three analyses and four items had a consistent rank across all analyses: "Factors affecting the likelihood of experiencing/eliciting ASMR", "ASMR and the senses", "ASMR community, culture, and practice" and "ASMR platforms and technology".

2.3. Phase 3. Second Round Feedback Meeting

Phase 3 was an online event to present findings from Phase 2 to the contributors and collect further feedback. As the meeting was online and attendance fluctuated, an exact number of attendees is not available. However, at least 26 participants were present for the majority of the meeting, including both researchers and nonresearchers. Contributors were invited to feedback both

Table 4.
Non-researcher subgroup best/worst count, total item presentation and normalised difference score

Item	*Best*	*Worst*	*Total*	*Ndiff*[a]
Origins and development of ASMR	34	2	153	0.209
Understanding ASMR triggers	28	2	153	0.170
Definition, conceptual clarification, and measurement of ASMR	25	0	153	0.163
Neurophysiology of ASMR	24	3	153	0.137
Factors affecting the likelihood of experiencing/eliciting ASMR	19	5	153	0.092
ASMR and the senses	29	16	153	0.085
ASMR and individual/cultural differences	16	13	153	0.020
Therapeutic applications of ASMR in clinical or 'special' populations/contexts	23	27	153	−0.026
ASMR and social intimacy	2	8	153	−0.039
Effects of long-term ASMR use	14	27	153	−0.085
Positive and negative consequences of ASMR in the general population	8	22	153	−0.092
ASMR community, culture, and practice	0	29	153	−0.190
ASMR platforms and technology	0	67	153	−0.438

Note: $n = 17$. Items presented in descending order by Ndiff score.

[a] Ndiff = (Best − Worst) / Total. Ndiff scores range from −1.00 to 1.00. Scores closer to 1.00 suggest that the item will be more likely to be chosen as 'best' (highest priority) when presented, whereas scores closer to −1.00 suggest that the item will be more likely to be chosen as 'worst' (lowest priority) when presented.

orally and *via* an anonymous public text response website (Padlet). Three main areas of feedback were sought:

(1) *Suitability of the Agenda*. Contributors were asked about the comprehensiveness of the agenda and its clarity. Feedback was mainly positive and contributors were happy with the breadth and clarity of the 13 priority areas described. One area of feedback concerned whether the current agenda included the study of ASMR as an art form and/or cultural phenomenon. We therefore chose to update the description of Area 13 (ASMR community, culture, and practice) to emphasise the intersection of these concepts and their relationship to arts and humanities inquiry.

(2) *Values for ASMR Research*. Contributors reflected on the values they held with regard to researching ASMR, why they wanted to see ASMR research conducted, and their thought process behind their own Phase 2 voting patterns. This provided further context to the agenda and captured the

Table 5.
Normalised difference score-based final item rankings

Item	*Overall Ranking*	*Researcher Ranking*	*Non-researcher ranking*
Definition, conceptual clarification, and measurement of ASMR	1	1	3
Neurophysiology of ASMR	2	2	4
Origins and development of ASMR	3	3	1
Understanding ASMR triggers	4	4	2
Factors affecting the likelihood of experiencing/eliciting ASMR	5	5	5
ASMR and the senses	6	6	6
Therapeutic applications of ASMR in clinical or 'special' populations/contexts	7	7	8
ASMR and individual/cultural differences	8	8	7
Positive and negative consequences of ASMR in the general population	9	9	11
ASMR and social intimacy	10	10	9
Effects of long-term ASMR use	11	11	10
ASMR community, culture, and practice	12	12	12
ASMR platforms and technology	13	13	13

Table 6.
Values associated with ASMR research

Theme	Description
Granting ASMR legitimacy through scientific research	Contributors felt that a current lack of understanding about ASMR meant that it was not considered a socially legitimate phenomenon outside of online ASMR communities, and by researching ASMR (particularly physiological aspects), this would improve.
Developing capacity and momentum in ASMR research through clarifying essential concepts	Contributors felt that it was crucial for the success of the field for key concepts regarding the definition and measurement of ASMR to be developed early to allow a cohesive field to develop and for ASMR research to progress.
Examining evidenced-based applied benefits of ASMR	Contributors felt that anecdotal evidence of the benefits of ASMR could not be translated into legitimate clinical practice without robust research on the effects and side effects of ASMR interventions.

diversity of perspectives on priorities in ASMR research. Feedback was summarised into three themes shown in Table 6.

(3) *Moving Forward with ASMR Research*. Contributors suggested ideas on the best ways to generate momentum and move forward with ASMR research. Contributors emphasised the importance of collaborating across disciplines, particularly between the sciences and humanities. They also discussed the use of shared ASMR research materials, the need to collaborate with ASMRtists, and connect researchers working on similar research questions to avoid duplication of effort. We elaborate on these ideas in Section 3 *Discussion* below.

3. Discussion

The aim of this study was to create a collaborative research agenda for ASMR using a modified Delphi technique to gather suggestions for important research topics from researchers interested in ASMR and adjacent fields (e.g., misophonia, synaesthesia), ASMR content creators, and ASMR community members. The resulting agenda — outlining 13 priority research areas — provides a much-needed definitive roadmap for ASMR research, which we hope will guide both novice and experienced researchers and situate future research within a broader framework and context. Academic research is a collaborative endeavour, and knowledge generation is cumulative, achieved either by the convergence of evidence around a 'correct' theory, as in the natural sciences, or in a divergence of novel generative approaches as in the Arts (Gaver, 2012). In both cases, any individual researcher's output represents only a small contribution to expanding the existing collective knowledge on a topic. Providing a framework for researchers to situate their work in the larger field will facilitate connections between different knowledge outputs, ultimately guiding the trajectory of ASMR research.

The 13 priority research areas represent topics that cut across disciplinary boundaries which is important for increasing cohesion in the field. Although substantial progress has been made in understanding ASMR from different disciplines independently, this likely creates a siloed and disconnected research field. Specialisation is, of course, necessary and desirable to fully understand ASMR and develop the competing theories and complementary lines of inquiry necessary for knowledge to progress. However, it also brings the risk that different lines of research enquiry become disconnected and unrelatable. In this scenario, scholars develop their own unrelated languages of inquiry which may be incomprehensible to one another and lead to the unnecessary duplication of effort, time, and resources. A research agenda with common thematic reference points — such as those generated in the present study — enables researchers to coordinate efforts to generate a complementary knowledge and understanding of ASMR. This may include cross-pollinating ideas as well as following open research practices to share and re-use data,

plans, materials and other research outputs to minimise research waste and duplication (Hostler, 2022).

As an example, future research on 'ASMR and social intimacy' (Area 8) would benefit not only from the work of social psychologists studying psychological intimacy (Trenholm-Jensen *et al*., 2022), but also from humanities researchers interested in interpreting how the medium of ASMR content creates a sense of intimacy compared to other cultural modes (Smith and Snider, 2019). This would facilitate an understanding of ASMR not just from a scientific perspective, but also from a wider lens — considering its cultural, social, philosophical, and technological characteristics. Although ASMR is a deeply personal phenomenon, it does not exist within a vacuum, and so the humanities' exploration of it as a social and cultural phenomenon will be crucial to bring meaning and context to any scientific ASMR research (Andersen, 2015; Grothe-Hammer, 2024). For instance, research into topics such as the 'Neurophysiology of ASMR' (Area 3) would be enhanced by qualitative research into how these findings are understood within nonscientific populations such as the ASMR community.

3.1. Co-Produced Knowledge Generation and Collaboration

Our research agenda was cocreated with members of the ASMR community alongside researchers from various disciplines, reflecting the priorities and interests of a diverse range of stakeholders in ASMR research. In Phase 1, where initial research questions were generated, 40% of participants classed themselves as 'nonresearchers'. In Phase 2, where participants ranked the importance of the 13 thematic areas, 25% of participants were nonresearchers.

In Phase 2, we asked participants to vote on which topics they thought were high or low priority. This was not intended to produce a metric of importance or indicate which areas are more deserving of greater funding or resources, rather it allowed us to observe areas of commonality and divergence amongst the participants in terms of their priorities. Whilst researchers ranked 'Definition, conceptual clarification, and measurement of ASMR' and 'Neurophysiology of ASMR' as their first and second priority areas, nonresearchers had 'Origins and development of ASMR' and 'Understanding ASMR triggers' as their top two, respectively. These differences illustrate that different ASMR stakeholders have different interests and priorities: whereas researchers were interested in clarifying key terminology and measurement first to allow for more valid and reliable studies, the priorities of nonresearchers reflected the considerations of their practical priorities, including how to experience and trigger ASMR more easily or reliably when watching or creating videos.

This latter case provides an excellent example of where collaboration between researchers and nonresearchers has potential for increasing knowledge of ASMR. ASMR content creators often have access to fascinating data

on the popularity and viewing statistics of their videos, with datasets on a scale that would be impossible for researchers to replicate (e.g., videos with millions of views). Such data would be invaluable to direct or triangulate findings from laboratory-controlled studies into different ASMR triggers. However, such collaboration requires trust and mutual understanding between researchers and the ASMR community. Trustworthy relationships are the foundation for community members (including content creators and viewers) to be positively involved in ASMR research in a variety of roles, not only as research participants who contribute data but as collaborators involved in the conception, design, and analysis stages of a research project (Cornish *et al*., 2023). The voting data from our study can be a tool to help both researchers and non-researchers understand each other's priorities for ASMR research, improving dialogue between different parties, and the cocreated research agenda serving as a common language when discussing potential collaborations. This paper is the culmination of a cooperative endeavour between different ASMR stakeholders which we hope will serve as an example to both current and future ASMR researchers as a way that they can meaningfully work together with the larger community to improve the understanding and application of ASMR.

3.2. Reflexivity and Values

The coproduction of a research agenda with members of communities affected by research can be a valuable opportunity for reflexivity (Gudowsky, 2021) on the values and beliefs that individuals hold about research and the topic of interest. This can help to contextualise research within the 'bigger picture' of local, cultural, and social contexts, and promote mutual learning and collaboration. We strove to emphasise this in our study by asking participants to reflect on the values they held with respect to ASMR research in Phase 3. The three themes that emerged are elaborated on below.

First, participants felt that the current deficit in scientific understanding of ASMR contributed to a lack of social 'legitimacy' of the phenomenon, especially in the eyes of the public outside of online ASMR communities. Participants believed that academic research would help provide such legitimacy, influencing public perceptions of ASMR, as well as its potential practical applications. Making this explicit in our research agenda is an important reminder to researchers that academic research and scholarly publications are linked to public perceptions of trust and authority (Krause *et al*., 2019), making it important for researchers to consider the implications of their work and its interpretation in a wider setting. This is particularly vital for neuroscientific ASMR research, which has an especially strong influence on legitimising (or de-legitimising) psychological phenomena (Gruber, 2017). It also applies to research linking ASMR with sexual attraction (e.g., Waldron, 2016), which

may unintentionally support pervasive and incorrect stereotypes about the nature of ASMR as a sexual phenomenon.

Second, participants highlighted how research could assist in the delivery of ASMR as a nonpharmacological and easily accessible therapeutic tool. Although there is anecdotal evidence that ASMR may benefit mental health and wellbeing (as discussed in Barratt and Davis, 2015) with growing empirical support (e.g., Carlaw *et al*., 2022; Eid *et al*., 2022), it is not yet sufficient to guide medical professionals. Rigorous studies (e.g., randomised controlled trials) and design-oriented projects would likely be a necessary first step in developing (and legitimising) ASMR-based interventions for mental health. Researchers should be aware of how their work may facilitate or impede the widespread or targeted use of ASMR as a potential positive force in society on individuals. However, they should also heed warnings from mindfulness meditation research (Farias and Wikholm, 2016), which provides a cautionary tale for how research on turning a cultural practice into a mental health intervention can be misled, generate a field of contradictory evidence within a narrow biomedical paradigm, and lead to widespread negative perceptions and mockery of the practice (Purser, 2019).

Third, participants felt strongly that key concepts regarding the definition and measurement of ASMR needed early development to foster and enable progress. Clear operationalisation is a vital step in the research process to be able to validly measure a phenomenon (Flake and Fried, 2020). If a group of researchers cannot agree on a shared definition and characteristics of a construct, then progress cannot be made in collecting comparable quantifiable data. Although clear operationalisation is certainly crucial for robust ASMR research, including the knowledge and expertise of existing ASMR communities in this process will be paramount to avoid an unhelpful 'constructed dichotomy of knowledge production' on epistemic grounds (Bell and Lewis, 2023). Such dichotomies underpin divisions between 'expert' and 'community' knowledge and reinforce an elitist perspective on knowledge generation, which stands in contrast to the inclusive ethos we believe should be central to a productive ASMR research programme. In other words, when constructing definitions and measures of ASMR, researchers should respect and acknowledge (where appropriate) the existing knowledge and language of the ASMR community rather than being perceived as 'co-opting' community knowledge, or patronising ASMRtists or experiencers by implying that their definitions or experiences may be wrong or invalid. Researchers have disciplinary knowledge and expertise crucial to understanding ASMR, but we should strive for a culture of 'epistemic equity' in ASMR research between researchers and the community, underpinned by values of reflexivity, humility, and recognition (Bell and Lewis, 2023; Cornish *et al*., 2023).

3.3. Limitations

There are several limitations that should be acknowledged. First, although we had a large sample of participants which brings stability to the findings (Jorm, 2015), researchers were overrepresented in both phases of the methodology, especially during the ranking phase (60% in Phase 1, 75% in Phase 2). In particular, researchers from the disciplines of psychology and neuroscience were overrepresented (making up ∼28% of the researcher sample), which is perhaps unsurprising given the focus on ASMR research in these areas. Therefore, despite striving to capture the views of participants from different academic fields, occupations and careers, the agenda may be more biassed in favour of the ideas, theories, and priorities of researchers from psychology and neuroscience compared to other researchers or members of the ASMR community. This limitation is offset to a certain extent by results of Phase 2 voting, which revealed that, although there were some differences between the priorities of researchers and nonresearchers, they were mostly similar. It will be important for future research to consult and involve the ASMR community as well as other academic disciplines in more depth on particular research issues (e.g., definitions of ASMR) to understand and acknowledge input from these groups. Relatedly, the majority of contributors were from the Global North meaning that non-WEIRD (Western, Educated, Industrialised, Rich, Democratic) views were underrepresented. Second, given the rapid growth in ASMR research, the agenda may not be comprehensive for all emerging lines of inquiry into the phenomenon, particularly those that intersect with technological or societal developments (e.g., Artificial Intelligence). However, the agenda is intended to be used as a flexible guide to inform researchers and the ASMR community of key topics and springboards for research to coalesce around, rather than a rigid prescription for what sort of research ought to be conducted.

3.4. Conclusion

ASMR means many things to many people: a pastime, a job, a therapeutic tool, a window through which to investigate culture and facets of human consciousness, and a topic of study in its own right. This diversity is reflected in the wide and growing range of ASMR research which we trust will continue to flourish. We hope that the research agenda created here serves as an anchor for these future endeavours and becomes a common reference point for researchers and nonresearchers alike to align their interests, language, and expertise. We anticipate that it may also be used to develop collaborations, both fostering and accelerating progress in this fascinating and exciting field.

Author Contributions

In Delphi study methodologies, it is common to offer participants the opportunity to co-author manuscripts as a means to recruit panellists and to ensure that results are interpreted and reported accurately and transparently (Khodyakov *et al*., 2023). Throughout the writing of this manuscript, to reduce risk of bias and any potential conflict of interest, the core research team and co-authors followed rigorous ethical standards and transparency, including making available all the study materials and results on the OSF. Authors 1–4 are the 'core team' and involved in the project conceptualisation, design, data collection, data analysis, and writing the original draft of the manuscript. Authors 1 and 2 have joint first authorship. Author 5 contributed to the data analysis and writing up of the original draft. Author 6 provided further support with writing up of the original draft. Authors 7–51 were participants in the Delphi study, as well as contributing to reviewing and editing the manuscript.

References

Accornero, G. (2022). What does ASMR Sound Like? Composing the proxemic intimate zone in contemporary music, *Contemp. Music Rev.* **41**, 337–357. DOI:10.1080/07494467.2022.2087377.

Ahuja, N. K. (2013). "It feels good to be measured" clinical role-play, Walker Percy, and the tingles, *Perspect. Biol. Med.* **56**, 442–451. DOI:10.1353/pbm.2013.0022.

Andersen, J. (2015). Now you've got the shiveries: affect, intimacy, and the ASMR Whisper Community, *Telev. New Media* **16**, 683–700. DOI:10.1177/1527476414556184.

Antwis, R. E., Griffiths, S. M., Harrison, X. A., Aranega-Bou, P., Arce, A., Bettridge, A. S., Brailsford, F. L., De Menezes, A., Devaynes, A., Forbes, K. M., Fry, E. L., Goodhead, I., Haskell, E., Heys, C., James, C., Johnston, S. R., Lewis, G. R., Lewis, Z., Macey, M. C., McCarthy, A., McDonald, J. E., Mejia-Florez, N. L., O'Brien, D., Orland, C., Pautasso, M., Reid, W. D. K., Robinson, H. A., Wilson, K. and Sutherland, W. J. (2017). Fifty important research questions in microbial ecology, *FEMS Microbiol. Ecol.* **93**, fix044. DOI:10.1093/femsec/fix044.

Barratt, E. L. and Davis, N. J. (2015). Autonomous Sensory Meridian Response (ASMR): a flow-like mental state, *PeerJ* **3**, e851. DOI:10.7717/peerj.851.

Bell, M. and Lewis, N. Jr (2023). Universities claim to value community-engaged scholarship: so why do they discourage it?, *Public Underst. Sci.* **32**, 304–321. DOI:10.1177/09636625221118779.

Bower, J. R. (2022). The sound of a door: reflections on tactility of sound design for *Feeling Thing*, a dance film by Candoco dance company and Jo Bannon, *Perform. Res.* **27**, 27–35. DOI:10.1080/13528165.2022.2117396.

Braun, V. and Clarke, V. (2022). *Thematic analysis: A practical guide*. SAGE, London, UK.

Carlaw, K. R., Ng, D. T. F., Kim, D. and Phillips, S. (2022). Does triggering an autonomous sensory meridian response reduce pre-operative anxiety? A randomized placebo controlled trial, *Anesth. Clin. Res.* 1–7. DOI:10.31487/j.ACR.2022.01.02.

Cochran, W. G. and Cox, G. M. (1957). *Experimental Designs*, 2nd edn. John Wiley & Sons, New York, NY, USA.

Cornish, F., Breton, N., Moreno-Tabarez, U., Delgado, J., Rua, M., de-Graft Aikins, A. and Hodgetts, D. (2023). Participatory action research, *Nat. Rev. Methods Primers* **3**, 34. DOI:10.1038/s43586-023-00214-1.

De Kerpel, L., Van Kerckhove, A. and Tessitore, T. (2024). Can you feel the advertisement tonight? The effect of ASMR cues in video advertising on purchase intention, *Int. J. Advert.* **43**, 716–745. DOI:10.1080/02650487.2023.2262328.

del Campo, M. A. and Kehle, T. J. (2016). Autonomous sensory meridian response (ASMR) and frisson: mindfully induced sensory phenomena that promote happiness, *Int. J. School Educ. Psychol.* **4**, 99–105. DOI:10.1080/21683603.2016.1130582.

Eid, C. M., Hamilton, C. and Greer, J. M. H. (2022). Untangling the tingle: investigating the association between the Autonomous Sensory Meridian Response (ASMR), neuroticism, and trait & state anxiety, *PLoS ONE* **17**, e0262668. DOI:10.1371/JOURNAL.PONE.0262668.

Farias, M. and Wikholm, C. (2016). Has the science of mindfulness lost its mind?, *BJPsych Bull.* **40**, 329–332. DOI:10.1192/pb.bp.116.053686.

Flake, J. K. and Fried, E. I. (2020). Measurement schmeasurement: questionable measurement practices and how to avoid them, *Adv. Methods Pract. Psychol. Sci.* **3**, 456–465. DOI:10.1177/2515245920952393.

Fredborg, B., Clark, J. and Smith, S. (2017). An examination of personality traits associated with Autonomous Sensory Meridian Response (ASMR), *Front. Psychol.* **8**, 247. DOI:10.3389/fpsyg.2017.00247.

Fredborg, B., Clark, J. and Smith, S. (2018). Mindfulness and autonomous sensory meridian response (ASMR), *PeerJ* **6**, e5414. DOI:10.7717/peerj.5414.

Fredborg, B., Champagne-Jorgensen, K., Desroches, A. S. and Smith, S. D. (2021). An electroencephalographic examination of the autonomous sensory meridian response (ASMR), *Consc. Cogn.* **87**, 103053. DOI:10.1016/j.concog.2020.103053.

Gallagher, R. (2016). Eliciting euphoria online: the aesthetics of "ASMR" video culture, *Film Criticism* **40**, D1–D15. DOI:10.3998/fc.13761232.0040.202.

Gallagher, R. (2019). 'ASMR' autobiographies and the (life-)writing of digital subjectivity, *Convergence* **25**, 260–277. DOI:10.1177/1354856518818072.

Gaver, W. (2012). What should we expect from research through design?, in: *Proc. SIGCHI Conf. Hum. Factors Comput. Syst.*, pp. 937–946. DOI:10.1145/2207676.2208538.

Gillmeister, H., Succi, A., Romei, V. and Poerio, G. L. (2022). Touching you, touching me: Higher incidence of mirror-touch synaesthesia and positive (but not negative) reactions to social touch in Autonomous Sensory Meridian Response, *Consc. Cogn.* **103**, 103380. DOI:10.1016/j.concog.2022.103380.

Glim, S., Braun, L., Hayd, S., Kuenz, A., Rosak, F. and Vom Bruch, J. (2022). Body scan meditation enhances the autonomous sensory meridian response to auditory stimuli, *Perception* **51**, 435–437. DOI:10.1177/03010066221098104.

Grothe-Hammer, M. (2024). Tingles and society: the emotional experience of ASMR as a social phenomenon, *Sociol. Inq.* DOI:10.1111/soin.12618.

Gruber, D. R. (2017). Three forms of neurorealism: explaining the persistence of the "uncritically real" in popular neuroscience news, *Written Commun.* **34**, 189–223. DOI:10.1177/0741088317699899.

Gudowsky, N. (2021). Limits and benefits of participatory agenda setting for research and innovation, *Eur. J. Futures Res.* **9**, 8. DOI:10.1186/s40309-021-00177-0.

Hardwick, J. (2021). *Top YouTube Searches* (as of April 2020). *Ahrefsblog*. Available at: https://ahrefs.com/blog/top-youtube-searches/.

Hostler, T. J. (2022). The importance of Rigorous Methods in a Growing Research Field: Five Practices for ASMR researchers, *Meta-Psychology* **6**, MP.2020.2626. DOI:10.15626/MP.2020.2626.

Hostler, T. J., Poerio, G. L. and Blakey, E. (2019). *Still* more than a feeling: commentary on Cash *et al*., "Expectancy effects in the Autonomous Sensory Meridian Response" and recommendations for measurement in future ASMR research, *Multisens. Res.* **32**, 521–531. DOI:10.1163/22134808-20191366.

Jorm, A. F. (2015). Using the Delphi expert consensus method in mental health research, *Aust. N. Z. J. Psychiatry* **49**, 887–897. DOI:10.1177/0004867415600891.

Khodyakov, D., Grant, S., Kroger, J., Gadwah-Meaden, C., Motala, A. and Larkin, J. (2023). Disciplinary trends in the use of the Delphi method: a bibliometric analysis, *PLoS ONE* **18**, e0289009. DOI:10.1371/journal.pone.0289009.

Kilborn, K., Smith, S. D. and Clark, J. M. (2022). The role of anomalous perception in Autonomous Sensory Meridian Response, *Psychol. Consc. (Wash. D. C.)*. DOI:10.1037/cns0000322.

Klausen, H. B. (2019). 'Safe and sound', *SoundEffects* **8**, 87°103.

Klausen, H. B. (2021). The ambiguity of technology in ASMR experiences: four types of intimacies and struggles in the user comments on YouTube, *Nordicom Rev.* **42**, 124–136. DOI:10.2478/nor-2021-0045.

Klefeker, J., Striegl, L. and Devendorf, L. (2020). What HCI can learn from ASMR: becoming enchanted with the mundane, in: *CHI'20: Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems*, pp. 1–12. DOI:10.1145/3313831.3376741.

Klich, R. (2019). Visceral dramaturgies: curating sensation in immersive art, *Body Space Technol.* **18**, 175–197. DOI:10.16995/bst.319.

Koumura, T., Nakatani, M., Liao, H.-I. and Kondo, H. M. (2021). Dark, loud, and compact sounds induce frisson, *Q. J. Exp. Psychol.* **74**, 1140–1152. DOI:10.1177/1747021820977174.

Kovacevich, A. and Huron, D. (2019). Two studies of Autonomous Sensory Meridian Response (ASMR): the relationship between ASMR and music-induced frisson, *Empir. Musicol. Rev.* **13**, 39–63. DOI:10.18061/emr.v13i1-2.6012.

Krause, N. M., Brossard, D., Scheufele, D. A., Xenos, M. A. and Franke, K. (2019). Trends—Americans' trust in science and scientists, *Public Opin. Q.* **83**, 817–836. DOI:10.1093/poq/nfz041.

Lester, A. J. (2022). *The Sound of It*. Bench Press, London, UK.

Lewkowich, D. (2022). ASMR literacies: toward a posthuman structure of feeling, *Knowl. Cult.* **10**, 123–144.

Liu, M. and Zhou, Q. (2019). A preliminary compilation of a digital video library on triggering Autonomous Sensory Meridian Response (ASMR): a trial among 807 Chinese college students, *Front. Psychol.* **10**, 2274. DOI:10.3389/fpsyg.2019.02274.

Lochte, B. C., Guillory, S. A., Richard, C. A. H. and Kelley, W. M. (2018). An fMRI investigation of the neural correlates underlying the autonomous sensory meridian response (ASMR), *Bioimpacts* **8**, 295–304. DOI:10.15171/bi.2018.32.

Lohaus, T., Schreckenberg, S. C., Bellingrath, S. and Thoma, P. (2023a). Autonomous sensory meridian response (ASMR): A PRISMA-guided systematic review, *Psychol. Consc*. (*Wash. D. C*.). DOI:10.1037/cns0000368.

Lohaus, T., Yüksekdag, S., Bellingrath, S. and Thoma, P. (2023b). The effects of Autonomous Sensory Meridian Response (ASMR) videos versus walking tour videos on ASMR experience, positive affect and state relaxation, *PLoS ONE* **18**, e0277990. DOI:10.1371/journal.pone.0277990.

Mahady, A., Takac, M. and De Foe, A. (2023). What is autonomous sensory meridian response (ASMR)? A narrative review and comparative analysis of related phenomena, *Consc. Cogn.* **109**, 103477. DOI:10.1016/j.concog.2023.103477.

Marley, A. A. J., Islam, T. and Hawkins, G. E. (2016). A formal and empirical comparison of two score measures for best–worst scaling, *J. Choice Model.* **21**, 15–24. DOI:10.1016/j.jocm.2016.03.002.

McErlean, A. B. J. and Banissy, M. J. (2018). Increased misophonia in self-reported Autonomous Sensory Meridian Response, *PeerJ* **6**, e5351. DOI:10.7717/peerj.5351.

McErlean, A. B. J. and Osborne-Ford, E. J. (2020). Increased absorption in autonomous sensory meridian response, *PeerJ* **8**, e8588. DOI:10.7717/peerj.8588.

McGeoch, P. D. and Rouw, R. (2020). How everyday sounds can trigger strong emotions: ASMR, misophonia and the feeling of wellbeing, *BioEssays* **42**, e2000099. DOI:10.1002/bies.202000099.

Mednicoff, S. D., Barashy, S., Gonzales, D., Benning, S. D., Snyder, J. S. and Hannon, E. E. (2022). Auditory affective processing, musicality, and the development of misophonic reactions, *Front. Neurosci.* **16**, 924806. DOI:10.3389/fnins.2022.924806.

Morales, R., Ramírez-Benavides, D. and Villena-Gonzalez, M. (2021). Autonomous Sensory Meridian Response self-reporters showed higher scores for cognitive reappraisal as an emotion regulation strategy, *PeerJ* **9**, e11474. DOI:10.7717/PEERJ.11474.

Niven, E. C. and Scott, S. K. (2021). Careful whispers: when sounds feel like a touch, *Trends Cogn. Sci.* **25**, 645–647. DOI:10.1016/j.tics.2021.05.006.

Ockendon, N., Thomas, D. H. L., Cortina, J., Adams, W. M., Aykroyd, T., Barov, B., Boitani, L., Bonn, A., Branquinho, C., Brombacher, M., Burrell, C., Carver, S., Crick, H. Q. P., Duguy, B., Everett, S., Fokkens, B., Fuller, R. J., Gibbons, D. W., Gokhelashvili, R., Griffin, C. and Sutherland, W. J. (2018). One hundred priority questions for landscape restoration in Europe, *Biol. Conserv.* **221**, 198–208. DOI:10.1016/j.biocon.2018.03.002.

Peng, D., Person, T., Skierś, K., Cui, R., Armstrong, M., Minamizawa, K. and Pai, Y. S. (2023). asmVR: enhancing ASMR tingles with multimodal triggers based on virtual reality, in: *SIGGRAPH Asia 2023 XR*, pp. 1–2. DOI:10.1145/3610549.3614597.

Pilny, H. L., Papen, M.-C. and Niemand, T. (2023). Transfer of autonomous sensory meridian response (ASMR) to relationship marketing: potential effects on perceived customer intimacy, *J Relationship Market.* **22**, 29–61. DOI:10.1080/15332667.2022.2132105.

Poerio, G. L., Blakey, E., Hostler, T. J. and Veltri, T. (2018). More than a feeling: autonomous sensory meridian response (ASMR) is characterized by reliable changes in affect and physiology, *PLoS ONE* **13**, e0196645. DOI:10.1371/journal.pone.0196645.

Poerio, G. L., Ueda, M. and Kondo, H. M. (2022a). Similar but different: high prevalence of synesthesia in autonomous sensory meridian response (ASMR), *Front. Psychol.* **13**, 990565. DOI:10.3389/fpsyg.2022.990565.

Poerio, G. L., Mank, S. and Hostler, T. J. (2022b). The awesome as well as the awful: Heightened sensory sensitivity predicts the presence and intensity of Autonomous Sensory Meridian Response (ASMR), *J. Res. Pers.* **97**, 104183. DOI:10.1016/j.jrp.2021.104183.

Poerio, G. L., Succi, A., Swart, T., Romei, V. and Gillmeister, H. (2023). From touch to tingles: assessing ASMR triggers and their consistency over time with the ASMR Trigger Checklist (ATC), *Consc. Cogn.* **115**, 103584. DOI:10.1016/j.concog.2023.103584.

Portas Ruiz, E. (2022). YouTube, the attention economy and digital audience interest in sponsored ASMR videos, *Anáhuac J.* **22**, 12–41. DOI:10.36105/theanahuacjour.2022v22n2.01.

Purser, R. E. (2019). *McMindfulness: How Mindfulness Became the New Capitalist Spirituality*. Repeater Books, New York, NY, USA.

Richard, C. (2016). *Interview with Jennifer Allen, the woman who coined the term, 'Autonomous Sensory Meridian Response'* (ASMR). Available at https://asmruniversity.com/2016/05/17/jennifer-allen-interview-coined-asmr/.

Roberts, N., Beath, A. and Boag, S. (2019). Autonomous sensory meridian response: scale development and personality correlates, *Psychol. Consc. Theory Res. Pract.* **6**, 22–39. DOI:10.1037/cns0000168.

Roberts, N., Beath, A. and Boag, S. (2020). A mixed-methods examination of autonomous sensory meridian response: comparison to frisson, *Consc. Cogn.* **86**, 103046. DOI:10.1016/j.concog.2020.103046.

Rouw, R. and Erfanian, M. (2018). A large-scale study of misophonia, *J. Clin. Psychol.* **74**, 453–479. DOI:10.1002/JCLP.22500.

Sakurai, N., Ohno, K., Kasai, S., Nagasaka, K., Onishi, H. and Kodama, N. (2021). Induction of relaxation by autonomous sensory meridian response, *Front. Behav. Neurosci*. **15**. DOI:10.3389/FNBEH.2021.761621.

Schoeller, F., Jain, A., Pizzagalli, D. A. and Reggente, N. (2024). The neurobiology of aesthetic chills: how bodily sensations shape emotional experiences, *Cogn. Affect. Behav. Neurosci.* **24**, 617–630. DOI:10.3758/s13415-024-01168-x.

Smejka, T. and Wiggs, L. (2022). The effects of Autonomous Sensory Meridian Response (ASMR) videos on arousal and mood in adults with and without depression and insomnia, *J. Affect. Disord.* **301**, 60–67. DOI:10.1016/j.jad.2021.12.015.

Smith, N. and Snider, A. M. (2019). ASMR, affect and digitally-mediated intimacy, *Emot. Space Soc.* **30**, 41–48. DOI:10.1016/j.emospa.2018.11.002.

Smith, S. D., Kolesar, T. A., Fredborg, B. K. and Kornelsen, J. (2022). Tingles down the spinal cord: a spinal functional magnetic resonance imaging investigation of the autonomous sensory meridian response, *Perception* **51**, 514–517. DOI:10.1177/03010066221098964.

Starr, R. L., Wang, T. and Go, C. (2020). Sexuality vs. sensuality: the multimodal construction of affective stance in Chinese ASMR performances, *J. Sociolinguist.* **24**, 492–513. DOI:10.1111/josl.12410.

Sutherland, W. J., Bellingan, L., Bellingham, J. R., Blackstock, J. J., Bloomfield, R. M., Bravo, M., Cadman, V. M., Cleevely, D. D., Clements, A., Cohen, A. S., Cope, D. R., Daemmrich, A. A., Devecchi, C., Anadon, L. D., Denegri, S., Doubleday, R., Dusic, N. R., Evans, R. J., Feng, W. Y., Godfray, H. C. J., Harris, P., Hartley, S. E., Hester, A. J., Holmes, J., Hughes, A., Hulme, M., Irwin, C., Jennings, R. C., Kass, G. S., Littlejohns, P., Marteau, T. M., McKee, G., Millstone, E. P., Nuttall, W. J., Owens, S., Parker, M. M., Pearson, S., Petts, J., Ploszek, R., Pullin, A. S., Reid, G., Richards, K. S., Robinson, J. G., Shaxson, L., Sierra, L., Smith, B. G., Spiegelhalter, D. J., Stilgoe, J., Stirling, A., Tyler, C. P., Winickoff, D. E. and Zimmern, R. L. (2012). A collaboratively-derived science-policy research agenda, *PLoS ONE* **7**, e31824. DOI:10.1371/journal.pone.0031824.

Swart, T. R., Banissy, M. J., Hein, T. P., Bruña, R., Pereda, E. and Bhattacharya, J. (2022a). ASMR amplifies low frequency and reduces high frequency oscillations, *Cortex* **149**, 85–100. DOI:10.1016/j.cortex.2022.01.004.

Swart, T. R., Bowling, N. C. and Banissy, M. J. (2022b). ASMR-Experience Questionnaire (AEQ): a data-driven step towards accurately classifying ASMR responders, *Br. J. Psychol.* **113**, 68–83. DOI:10.1111/bjop.12516.

Swedo, S. E., Baguley, D. M., Denys, D., Dixon, L. J., Erfanian, M., Fioretti, A., Jastreboff, P. J., Kumar, S., Rosenthal, M. Z., Rouw, R., Schiller, D., Simner, J., Storch, E. A., Taylor, S., Vander Werff, K. R., Altimus, C. M. and Raver, S. M. (2022). Consensus definition of misophonia: a Delphi study, *Front. Neurosci.* **16**, 841816. DOI:10.3389/fnins.2022.841816.

Trenholm-Jensen, E. A., Burns, L., Trenholm, J. E. and Hand, C. J. (2022). Beyond tingles: an exploratory qualitative study of the Autonomous Sensory Meridian Response (ASMR), *PLoS ONE* **17**, e0277962. DOI:10.1371/journal.pone.0277962.

Valtakari, N. V., Hooge, I. T. C., Benjamins, J. S. and Keizer, A. (2019). An eye-tracking approach to Autonomous sensory meridian response (ASMR): the physiology and nature of tingles in relation to the pupil, *PLoS ONE* **14**, e0226692. DOI:10.1371/journal.pone.0226692.

Vardhan, V. V., Venkatesh, U. and Yadav, S. (2020). Signal processing based autonomous sensory meridian response to treat insomnia, in: *Proceedings of the 2020 International Conference on Electronics and Sustainable Communication Systems (ICESC), Coimbatore, India*, pp. 1173–1176. DOI:10.1109/ICESC48915.2020.9155950.

Villena-Gonzalez, M., Rojas-Thomas, F., Morales-Torres, R. and López, V. (2023). Autonomous sensory meridian response is associated with a larger heartbeat-evoked potential amplitude without differences in interoceptive awareness, *Psychophysiology* **60**, e14277. DOI:10.1111/psyp.14277.

Waldron, E. L. (2016). 'This FEELS SO REAL!' Sense and sexuality in ASMR videos, *First Monday* **22**. DOI:10.5210/fm.v22i1.7282.

Wang, Q. (2023). Digital intimacy: a multimodal discourse analysis on ASMR videos, *Open Access Library J.* **10**, 1–9. DOI:10.4236/oalib.1110538.

Warrenburg, L., Centa, N., Li, X., Park, H., Sari, D. and Xie, F. (2021). Sonic intimacy in the music of Billie Eilish and recordings that induce ASMR, in: *Proceedings Future Directions of Music Cognition*, Ohio State University, Virtual, pp. 139–144. DOI:10.18061/FDMC.2021.0026.

White, M. (2020). *bwsTools: Tools for Case 1 Best-Worst Scaling* (*MaxDiff*) *Designs* (1.2) [Computer software]. Available at https://github.com/markhwhiteii/bwsTools.

Yousuf, M. I. (2007). Using experts' opinions through Delphi technique, *Practical Assessment Res. Eval.* **12**, 4. DOI:10.7275/rrph-t210.

Zhou, J. (2023). Research on the relieving effect of ASMR chewing sounds on anxiety in food video, *Int. J. Educ. Humanit.* **8**, 89–91. DOI:10.54097/ijeh.v8i3.8391.