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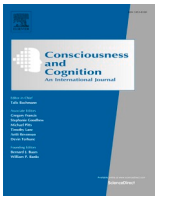

From touch to tingles: Assessing ASMR triggers and their consistency over time with the ASMR Trigger Checklist (ATC)

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ABSTRACT

Autonomous Sensory Meridian Response (ASMR) is a term describing a complex sensory-perceptual phenomena characterised by relaxing and pleasurable scalp tingling sensations. A central defining feature of ASMR is that the sensation is elicited by a core set of stimuli or so-called "triggers". The idea that ASMR is triggered by specific external stimuli is frequently invoked in conceptual definitions of ASMR and implicit in its operationalisation as a trait and state; however, it is rarely explicitly measured. In this paper, we present the 37-item ASMR Trigger Checklist (ATC), a new tool to assist researchers in ASMR-responder identification and to capture individual differences in the number and intensity of ASMR triggers across auditory (vocal, non-vocal), visual, and tactile/interpersonal stimulus domains. The ATC is related to existing measures of trait-ASMR that tap into the sensations and phenomenological aspects of the experience (ASMR-15 and AEQ) and provides a complementary assessment for researchers interested in common ASMR elicitors. Importantly, the ATC addresses concerns regarding the over-reliance of audio-visual ASMR stimuli in existing measures and conceptualisations of ASMR by emphasising tactile and interpersonal stimuli. Physical touch to the body was both the most endorsed (98%) and intense (average 5/6) ASMR trigger. 24 of the 37 ATC items were endorsed by 75% of the sample and might therefore be considered prototypical ASMR triggers. The ATC has appropriate convergent validity through its association with other individual differences known to be related to ASMR (e.g., absorption, openness to experience, aesthetic experiences). Re-administration of the ATC after 5 months showed high consistency in reports of ASMR triggers with 84% of endorsements remaining the same over time. We hope that the ATC will prove a useful tool for researchers in participant selection and recruitment as well as for measuring individual differences within the ASMR population.

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1. Introduction

Autonomous Sensory Meridian Response (ASMR) is a term coined in 2010 to describe a specific head-tingling relaxing sensation that many people have experienced since childhood (Barratt & Davis, 2015; Poerio et al., 2018). The ASMR response is thought to be elicited or induced by a set of core ASMR triggers such as whispering, soft speaking, tapping, and delicate hand movements (Barratt & Davis, 2015; Barratt et al., 2017). ASMR sensations and ASMR triggers do not have a simple one-to-one mapping (e.g., not all whispering sounds in all contexts will elicit ASMR in someone who is capable of experiencing it). Instead, ASMR depends on various features of the context in which triggers occur, including the features of the triggers themselves (e.g., gentle, repetitive, non-threatening) and the social situation (e.g., during interpersonal interactions with a kind or caring person). Recent estimates suggest that around 1 in 5 people experience ASMR, a tentative prevalence rate of 20% (Poerio et al., 2022).

As a relatively new research area, with the first empirical article documenting ASMR published in 2015 (Barratt & Davis, 2015), a key challenge is the ability to characterise both the ASMR trait (e.g., what differentiates those who experience ASMR from those that do not?) and the ASMR state (e.g., what are the effects of experiencing ASMR on affect and cognition?). To achieve this, it is essential to recruit participants who are genuinely capable of experiencing ASMR, and if so, to have some way of capturing individual differences in the intensity of their ASMR response. Researchers can then compare ASMR-responders to non-responders and/or examine how individual differences in ASMR intensity relate to other phenomena of interest (e.g., Valtakari et al., 2019; McErlean & Banissy, 2017; Morales et al., 2021; Poerio et al., 2022; Wang, Yang, Sun, & Su, 2020).

Several features are typically included in the definition of ASMR and have been deemed critical for the identification and measurement of ASMR as a trait and/or state. First, the sensation is described as head/scalp tingling (usually the site of origin for the ASMR experience but it can spread throughout the body) (e.g., Barratt & Davis, 2015). Second, ASMR is a relaxing and pleasurable experience, distinct from other complex aesthetic emotions such as frisson (e.g., Kovacevich & Huron, 2018). Third, ASMR is elicited by a set of core triggers such as whispering, tapping, and close personal attention (e.g., Barratt et al., 2017). The first (location/dynamics) and the second (sensory and affective outcomes) defining features have been used in new measurement tools to identify genuine cases of trait ASMR (ASMR Experience Questionnaire AEQ; Swart et al., 2022) and individual differences in the propensity to experience ASMR (ASMR-15; Roberts et al., 2020). The measurement of ASMR *triggers* however, and their consistency over time, has been less well researched but is often implicit in these existing measures. For example, the AEQ relies on responses to a pre-selected set of ASMR videos taken from YouTube that encompass what are thought to be common ASMR triggers. Similarly, the ASMR-15 asks participants to rate their responses to "certain sounds, such as whispering, crinkling, tapping" (Roberts et al., 2020).

Are there really a core set of triggers that reliably induce ASMR both between and within people? If so, what are they? And how do they relate to existing measures of ASMR? The current research aims to provide answers to these questions whilst simultaneously providing a new tool (the ASMR Trigger Checklist; ATC) for researchers to measure individual differences in the ASMR response.

1.1. What are the most endorsed and strongest ASMR triggers?

In the first paper published on ASMR, Barratt and Davis (2015) asked participants (N = 245) whether their ASMR was elicited by five triggers, four of which were endorsed by over 50% of the sample: whispering (75%), personal attention (69%), crisp sounds (64%) and slow movements (53%), watching repetitive tasks was the least commonly endorsed (34%). Poerio et al. (2018, Study 1) found comparable results in a larger investigation (N = 813) which listed 13 triggers, finding that soft-speaking/whispering and close personal attention were the most commonly endorsed (>65%) as well as actual tactile stimulation in the form of hair play/brushing (73%). Least commonly endorsed triggers were mouth and eating sounds (<30%). Although these early investigations demonstrated similarities in the kinds of stimuli that trigger ASMR across people, the triggers provided for endorsement were curated by researchers (why those triggers?) and participants were only asked about the presence/absence of each trigger rather than the intensity of the ASMR sensations elicited by each trigger.

Fredborg et al. (2017) were the first to systematically develop an ASMR checklist to determine which types of stimuli typically elicit the most intense ASMR experiences. The ASMR checklist contained 16 triggers, based on interviews with ASMR-experiencers and internet forums, and asked participants to rate the intensity of ASMR elicited by each trigger. Two of the 16 triggers were subsequently excluded ("watching others refill fountain pens" and "watching others sweep") because more than 100 of their 284 ASMR participants did not know whether this was an ASMR trigger for them. Of the remaining 14 triggers, whispering, haircut simulations, tapping sounds, scratching sounds, and watching someone touch another person's hair were both the most endorsed and intense triggers. Principal Components Analysis suggested a possible 5 factor structure encompassing: watching, touching, repetitive sounds, simulations, and mouth sounds. The ASMR checklist has been an excellent first step at assessing individual differences in ASMR responses and has proved valuable for examining how ASMR trigger intensity relates to other individual differences such as personality, and sensory sensitivity (Fredborg et al., 2017; Poerio et al., 2022).

One of the difficulties in developing a list of ASMR triggers is that, although there appear to be commonalities in situations and stimuli that trigger ASMR, individual preference can be idiosyncratic and context specific (e.g., not all whispering voices in all contexts will trigger ASMR). A comprehensive measure of ASMR triggers must therefore seek to be broad enough to capture commonly endorsed triggers but not in such a way that is too specific to a particular context (e.g., the specific action of watching someone refill a fountain pen as in Fredborg et al's checklist). Another challenge is that ASMR inducing situations are often multisensory and involve the layering of different triggers. Although this may be important for understanding the ASMR response (e.g., that ASMR may be strongest in situations that involve combinations of different trigger types) researchers may want to parse the triggers to understand component parts of the ASMR response. For example, we have found that ASMR content that contains vocal auditory triggers rather

than non-vocal auditory ones is more conducive to the ASMR response (Poerio et al., 2018, Study 1). Here we used Fredborg and colleagues ASMR checklist as a starting point which we then expanded to provide a more comprehensive measurement of different types of triggers grouping triggers into four categories encompassing: visual, vocal auditory, non-vocal auditory, and tactile/interpersonal triggers, which we then tested and refined with ASMR-responders.

1.2. Emphasising the importance of touch in ASMR

One driving force behind our development of a new ASMR trigger checklist was to draw attention to touch as an important ASMR trigger, something which has so far been largely neglected in ASMR measurement tools. Most, if not all, articles on ASMR begin with a definition of ASMR that describes the sensations as being elicited by audio-visual triggers. We have become concerned that describing ASMR *as predominantly* elicited by audio and visual stimuli underestimates the importance of interpersonal and tactile triggers. By continuing to describe and measure ASMR as something elicited primarily via audio and visual modalities, the idea that ASMR is an audio-visual phenomenon may become a canonised fact rather than one derived from empirical exploration.

We suspect that the idea of ASMR as primarily audio-visual rather than tactile likely reflects the way that many ASMR-responders now experience ASMR as digitally mediated (and perhaps to a lesser extent, the methods that researchers use to elicit it). Given the proliferation of online ASMR content on platforms such as YouTube, people who have experienced ASMR since childhood (and before the term was officially coined) are now able to experience it 'on demand' rather than waiting for such experiences to occur in daily life. Whilst the popularity of ASMR content online has undoubtedly piqued research interest, online content is not the only way to experience ASMR. ASMR is a much broader emotional experience often elicited in real world social settings and does not simply represent a popular internet phenomenon requiring scientific explanation. Early experiences of ASMR described by participants often involve interpersonal scenarios and tactile input (e.g., hair being played with, stroking of the back, a school lice check or doctor's appointment). Intentional ASMR videos attempt to recreate and simulate real-world tactile and interpersonal scenarios creating the anticipation or simulation of being touched (e.g., watching others' being massaged or having make-up applied, using binaural microphones to simulate haircuts). In this sense, content created intentionally to induce ASMR can be thought of as a simulation of ASMR as it would occur in naturalistic contexts ("in real life"). However, because ASMR content is so popular on platforms such as YouTube, we believe that this has led to the erroneous assumption that ASMR is elicited predominately by auditory and visual modalities, leading to the underrepresentation of touch as a trigger and the important role of interpersonal interaction in eliciting ASMR.

1.3. Current research: Aims and rationale

The overarching aim of this research was to create a new measurement tool providing a comprehensive assessment of ASMR triggers and their intensity. Specifically, this new tool would capture visual and auditory triggers but also, give a more balanced assessment of tactile and interpersonal triggers in ASMR elicitation. By creating and administering this tool we also provide updated empirical data on which ASMR triggers are the most endorsed and intense. To this end, we first created a new ASMR trigger checklist which we then tested and refined within the ASMR community.

After refining our checklist, which eventually comprised 37 triggers – the ASMR Trigger Checklist (ATC) – we administered it to ASMR-responders to determine the most endorsed and strongest ASMR triggers. To help validate our new measure, we then contacted participants who had completed the ATC around 5 months later to: (1) examine the consistency in ASMR triggers over time, (2) determine how an assessment of triggers compared to other established methods of measuring ASMR (the AEQ and ASMR-15), and (3) examine whether trigger responses showed associations with individual difference measures that have been consistently associated with trait-ASMR, specifically, greater openness to experience (Fredborg et al., 2018, McErlean & Banissy, 2017; Poerio et al., 2018), greater predisposition to aesthetic experiences, such as frisson (Fredborg, Clark, & Smith, 2018, Poerio et al., 2022, Roberts et al. 2020), greater trait absorption (Roberts et al., 2019; McErlean & Osbourne-Ford, 2020), and aspects of mindfulness (Fredborg, Clark, & Smith, 2018, Poerio et al., 2022).

2. Study 1. Development and refinement of the ASMR trigger checklist (ATC)

2.1. Method

2.1.1. Development of the ASMR trigger checklist

We devised an initial checklist comprising 31 ASMR triggers across four categories: Vocal Auditory, non-Vocal Auditory, Visual and Tactile/interpersonal. Six items were taken from Fredborg et al.'s (2017) 14 item checklist indicated with an * below. As per the original checklist, for each trigger, a respondent selected '0′ if the item was not a trigger or 'unknown', and if an item was a trigger, it was rated its intensity from 1 to 6 (most intense). Note that many of the tactile/interpersonal triggers likely include auditory and visual triggers and so unlike the other categories are inherently more multi-sensory and/or socio-emotional in nature.

Vocal Auditory triggers were 10 auditory stimuli produced by the human vocal tract:

1. *Whispering
2. Soft-speaking
3. Inaudible or unintelligible speaking
4. Breathing

5. Mouth sounds, e.g., lip-smacking, humming
6. Eating sounds, e.g., *chewing
7. Accents
8. Timbre/Pitch of voice
9. Certain letter sounds such as S, K, T
10. Reading, e.g., books or journals

Non-Vocal Auditory triggers were 6 auditory stimuli:

1. *Tapping sounds
2. Crisp, crunchy and crinkling sounds
3. *Scratching sounds e.g., writing
4. Brushing sounds
5. Page turning sounds
6. Sticky fingers sounds

Visual triggers were 8 predominantly visual stimuli:

1. Repetitive actions, e.g., towel folding or colouring
2. Delicate hand movements
3. Having a light flashed near your face
4. Soap cutting or cutting other solids
5. Slime or other moving liquids
6. Watching someone concentrate on a task
7. Watching someone complete a task with expertise
8. Watching someone being touched, e.g., massage or hair brushing

Tactile and Interpersonal triggers were 10 touch mediated or close up social interaction:

1. Close personal attention towards you
2. Close-up movements directed at you
3. Someone providing care for you
4. Light touch on your face, e.g., *make-up application
5. Physical touch on your body, e.g., *hair play, massage
6. Blowing into your ear
7. Eye contact with you

2.2. Participants and procedure

We administered our initial 31-item checklist to to people who self-reported experiencing ASMR by advertising on Reddit and Facebook ASMR community groups. Ninety self-reported ASMR-responders (M_{age} = 32.61, SD = 9.34; Range: 18–64; 66% female) completed the checklist and provided feedback. At the end of each category, participants could suggest other triggers that they thought were missed in that category using an open text response box. At the end of the survey, participants were asked two yes vs. no questions: (1) "Do our categories – vocal, auditory, visual, tactile/interpersonal – make sense?" and (2) "Have we covered the main triggers in each category?". Participants were then provided with the opportunity to provide additional feedback via open text responses boxes in response to the following questions: "Any comments about categories?" "Any comments about the triggers?" "Anything to add or remove?" "Were the triggers easy to understand or should they have been described differently?" and "Any other thoughts?".

Table 1
Frequency and intensity and scale reliabilities for overall checklist and subcategories.

	Count		Intensity		Reliability
	M	SD	M	SD	Cronbach's alpha
All Triggers (N = 31)	25.24	5.37	3.83	0.59	0.88
Vocal Auditory (n = 10)	7.44	2.13	3.72	0.77	0.76
Non-Vocal Auditory (n = 7)	5.68	1.54	3.60	1.00	0.72
Visual (n = 8)	6.11	2.02	3.36	0.97	0.78
Tactile/interpersonal (n = 7)	6.01	1.43	4.57	0.97	0.83

Note. Cronbach's alpha was calculated based on the ATC intensity scores rather than count/frequency.

3. Results

Table 1 displays the means, standard deviations for the frequency of endorsed triggers and their rated intensity as well as scale reliabilities. Results are displayed for the checklist overall as well as for each of its four subcategories. The mean frequency of ASMR triggers overall was 25.24 (SD = 5.37) out of the total 31. Overall, the intensity mean for all triggers was 3.83 ($SD = 0.59$). Participants rated Tactile/Interpersonal triggers as the most intense ($M = 4.57$, $SD = 0.97$), while Visual triggers ($M = 3.36$, $SD = 0.97$) were scored as least intense. The overall scale and subscales showed good internal reliability consistency (all > 0.70). In addition, all respondents (100%) answered that the categories used made sense to them and nearly three-quarters (74%) agreed that we had covered the main triggers within each category.

3.1. Refining the ASMR trigger checklist

Participants' suggestions for new triggers and examples of existing triggers to the checklist were compiled and reviewed by the authors. If a trigger was suggested twice or more or could better explain the meaning of an existing trigger, then it was included in the revised checklist (see Supplementary Tables S1 & 2). In total, we included an additional eight new triggers and 20 examples.

3.1.1. Vocal auditory ASMR triggers

No new triggers were added in this category, but additional examples were included for the following triggers:

1. Soft speaking. Additional examples were: slow, soft rhythmic speaking, calm speaking, pauses, counting.
2. Timbre/Pitch of voice. Additional examples were: "*female voices*" and "*children voices*".
3. Certain letter sounds. Additional examples were: the letter "*R*", and "*trigger words (letter sounds that could come up in trigger words)*".
4. Accents. An additional example was: "*foreign accents"*.
5. Mouth sounds. Additional example was "*teeth noises*".
6. Breathing. Additional examples were: "*delicate breath"* and *"inhaling"*.
7. Eating sounds. An additional example was: "*swallowing"*.

3.1.2. Non-vocal auditory ASMR triggers

Six new triggers were added:

1. Rubbing sounds.
2. Buzzing sounds, vibrations, humming.
3. Blowing sounds / white noise, such as hair dryers, vacuums.
4. Liquid sounds, e.g. water, lotion, foam, spray bottles
5. Solid sounds, e.g. wood on wood, glass on glass, metal on metal such as scissors cutting.
6. Nature sounds, e.g. rain, flowing river, wind blowing, fire crackling, leaves rustling.

In this category we included additional examples for the following triggers:

1. Tapping sounds. Additional examples were "nails tapping gently on hard surfaces", "tapping on objects", "keyboard typing".
2. Scratching sounds. One example was added: "writing with a fountain pen".
3. Crisp, crunchy and crinkling sounds. New examples were: "metallic foil" and "crinkly clothing".

3.1.3. Visual ASMR triggers

Only one new trigger with examples was added: "*Oddly satisfying triggers,* e.g., *cutting soap or other solids, kinetic sand, slime or other moving liquids*".

Additional examples were also included for the following existing triggers:

1. Delicate hand movements. Additional examples were: "*hand strokes*", "*tracing of objects*".
2. Watching someone other than yourself being touched. Additional example was: "*cheek touch*".
3. Watching someone complete a task with expertise. Additional examples were: "*playing a musical instrument or creating works of art such as calligraphy, painting, or sculpture"*
4. Watching someone concentrate on a task. Additional examples were: "*cooking", "someone applying their make-up*".

3.1.4. Tactile/Interpersonal ASMR triggers

In this category one new trigger with examples was added: "*Altruistic acts towards you,* e.g. *kind words, lending or borrowing things from others, apologies, kind acts*".

Additional examples were also included for the following existing triggers:

1. Physical touch on your body. We specified that this could be **"***both intentional and unintentional*" in brackets and added "*someone brushing against you*" as an example of unintentional touch.

2. Close personal attention towards you. Additional examples were: "*service encounters like getting checked into a hotel; attending appointments such as the hairdressers, ear cleaning; being measured; doing surveys*".
3. Someone providing care for you. Additional example was: "*looking after you when you're unwell, giving you positive affirmations*".
4. Blowing. Additional example was: "*into your hair*".
5. Eye contact. An example was added: "*with you, or someone looking very closely at an aspect of you*".

Additional suggestions not included in the revised checklist. 4.5% of participants suggested "Roleplay" as a new category. Roleplays are specific multisensory scenarios intentionally created for ASMR videos (e.g., a doctor's visit, hairdresser appointment) in which a multitude of triggers can be encountered. Although we appreciate that roleplays represent a common genre of ASMR videos (presumably intended to recreate and intensify scenarios that would elicit ASMR in the real world) we felt that the term was too specific to ASMR online communities and may not be understood by individuals with trait-ASMR who do not engage with online content. We also considered that many of the component parts of roleplay videos were already represented in individual triggers (e.g., close personal attention, auditory vocal and non-vocal triggers). In a similar vein, 5.4% of respondents noted that ASMR is typically enhanced by the *combination* of different triggers, suggesting awareness of the multisensory nature of ASMR elicitation. 6.3% suggested adding music/relaxing music as a separate trigger. Although music might trigger ASMR we decided not to include it because we thought it might lead some people to conflate ASMR sensations with emotional piloerection or "frisson" typically induced in response to music, which is thought to be different to ASMR (Kovacevich & Huron, 2018).

3.2. Other modifications to the ASMR trigger checklist

Instructions. We altered the instructions of the checklist to make clear that we were only asking about positive emotional reactions to each of the triggers listed (whilst also acknowledging their potential to cause negative emotional reactions). This change was made because: (1) several participants noted that certain triggers (e.g., eating sounds) could elicit negative emotional reactions and (2) there is a known co-occurrence between ASMR and misophonia in which certain sounds (that are also sometimes ASMR triggers such as breathing, eating) trigger negative emotional reactions such as anger and irritation (McErlean & Banissy, 2017; Barratt et al., 2017; Rouw & Erfanian, 2018). The instructional modifications were thus as follows: "Below you will see a list of possible ASMR triggers. Please read each one and evaluate whether or not it would trigger your ASMR. If it is an ASMR trigger for you then please rate how intense your ASMR experience would be (on average) when encountering those stimuli. Some triggers could elicit negative emotions under some circumstances. We only want you to consider the ones that have the potential to elicit positive feelings for you.".

Order of categories. For the next iteration of ATC, items and categories were ordered based on hierarchical prevalence of coding categories (from most to least common). The average ASMR intensity score was higher for Tactile/Interpersonal triggers ($M = 4.57$), so we moved it to the top of the Checklist, followed by Vocal Auditory triggers, non-Vocal Auditory triggers, and Visual triggers.

4. Study 1 discussion

By first building on Fredborg et al.'s (2017) existing ASMR checklist, and then consulting with a relatively large sample of ASMR-responders, we developed a new tool to measure commonly experienced ASMR triggers. The ATC asks about 37 ASMR triggers with expanded examples of said triggers, across four broad trigger categories: Vocal Auditory, non-Vocal Auditory, Visual and Tactile/interpersonal. We should note that the primary intention of separating the ASMR triggers in this way is not to reflect a clear delineation of ASMR triggers in different sensory modalities but rather: (1) to ensure that different modalities are fully represented (especially tactile and interpersonal triggers) and (2) to chunk triggers into categories to help participants reflect on the different stimuli and contexts that typically trigger their ASMR. Of course, some trigger types may indeed cluster together more than others, and we suspect that auditory (vocal and non-vocal) triggers may be more distinct categories than visual and tactile/interpersonal ones. As noted by our participants, we should also point out that ASMR eliciting contexts are often multisensory making it difficult to tease out the component sensory elements of ASMR-inducing contexts. For example, although 'delicate hand movements' is presented in the 'visual' trigger category of the ATC, it is inherently interpersonal. Similarly, triggers in the 'tactile/interpersonal' category of the ATC are also likely to engage auditory and visual modalities (e.g., close personal attention). Nevertheless, having the categories represented in this way made sense to all respondents in the current study when asked.

5. Study 2 examining the consistency of ASMR triggers over time and the validity of the ATC

The refined 37-item ATC was administered to ASMR-responders as part of a larger study on ASMR (described in Gillmeister et al., 2022). Participants who had completed the ATC in this study were then contacted approximately 5 months later to complete the checklist for a second time, allowing us to examine the consistency of ASMR triggers over time. In this survey they also completed three other measures of ASMR – the ASMR Experiences Questionnaire (AEQ; Swart et al., 2022), the ASMR-15 (Roberts et al., 2020) and the Flow-to-ASMR scale (Barratt & Davis, 2015), allowing us to determine how the ATC compared to these other more well established measures of trait-ASMR. Participants also completed several other questionnaires allowing us to examine the convergent validity of the ATC. Based on previous research we predicted that ATC scores would be significantly positively correlated with: (1) openness to experience (Fredborg et al., 2018, McErlean & Banissy, 2017; Poerio et al., 2018), (2) trait absorption (Roberts et al., 2019; McErlean & Osbourne-Ford, 2020), (3) aesthetic experiences (Fredborg et al., 2018, Poerio et al., 2022, Roberts et al., 2020), and (4) the 'observing' facet of mindfulness (but not the other four) (Fredborg et al., 2018, Poerio et al., 2022). We also examined how the ATC

related to a measure of social desirability.

6. Method

6.1. Participants

310 participants completed the ATC at T1 of which 14 were excluded for failing two or more of the seven attention checks in the broader study (Gillmeister et al., 2022). Participants were recruited from a range of sources including social media, a UK University staff and student mailing list as well as a participant pool software system (SONA). The final sample of 295 participants at T1 had an average age of 30.37 years ($SD = 10.60$, range: 18–69). The majority were female (71%, 3% non-binary, 1% other) and white (85%). 145 of these participants completed the T2 measures (none failed more than two of our attention checks) with a mean age of 31.52 ($SD = 11.06$, range: 18–69). The majority were again female (75%, 1% non-binary) and white (90%). The average time elapsed between T1 and T2 completion was 5.62 months ($SD = 0.60$, range: 4–7 months). Ethical approval for the study was provided by the University ethics committee.

6.2. ASMR measures

ASMR triggers. The refined version of the ASMR Trigger Checklist (ATC) asked participants to read a list of 37 triggers (with examples) and evaluate whether each is an ASMR trigger for them, and if so, to rate its average intensity from 1 to 6. The revised version of the ATC is provided with instructions for use and scoring in Appendix 1. Two scores were computed from the ATC: (1) Trigger count/frequency: which is a value out of 37 ("0"(*not a trigger*) and "7"(*unknown*), were not counted) and reflects the number of endorsed ASMR triggers; (2) Trigger Intensity: which is the average intensity across all 37 triggers ("7" was recoded as "0" intensity). Higher scores represent more intense ASMR experiences across all triggers (T1$\alpha = 0.89$; T2$\alpha = 0.90$).

ASMR propensity. The ASMR-15 (Roberts et al., 2019) measured propensity to experience ASMR, including 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*) (e.g., "When I experience ASMR… the sensation feels 'tingly'"). Four subscales captured the following facets of the ASMR experience: (1) Altered Consciousness (4-items, $\alpha = 0.88$), (2) Sensation (5-items, $\alpha = 0.70$), (3) Relaxation (3-items, $\alpha = 0.78$) and (4) Affect (3-items $\alpha = 0.66$). 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 propensity ($\alpha = 0.85$).

Flow to ASMR. The 8-item modified Short Flow State Scale (FSS; Jackson & Marsh, 1996; Jackson & Eklund, 2002) was used to assess experiences of flow during ASMR as in previous research (Barratt & Davis, 2015; Roberts et al., 2019). Participants rated each item (e.g., "When I experience ASMR… it is no effort to keep my mind on what is happening") from 1(*not my experience at all*) to 5 (*completely representative of my experience*). Items were averaged to provide an overall score where higher scores indicated greater flow-like experience during ASMR ($\alpha = 0.68$).

ASMR Experiences Questionnaire. The ASMR Experiences Questionnaire (AEQ; Swart et al., 2022) was administered to provide a classification of ASMR-responder status. Participants watched five ASMR videos portraying a range of audio-visual ASMR triggers. Three videos included auditory vocal sounds (whispering/soft-speaking) and two videos included auditory non-vocal sounds. One video was a traditional 'role play' scenario which is a simulation of a haircut. Following each video, participants rated how pleasant and calm they found the video (on scales from −5 to + 5), whether they experienced ASMR tingling and if so, to rate the location and intensity of the sensations felt. Based on these responses participants were grouped according to an unsupervised k-means clustering algorithm (Zhang et al., 1996) in five possible groupings. ASMR-Strong, ASMR-Weak, Control+ (participants who do not experience tactile tingling sensations, but do experience a calming effect), Control- (participants who do not experience tactile tingling sensations, and find the videos unpleasant), and False-Positives (participants who report tactile sensations which are unpleasant and upsetting).

6.3. Individual difference measures

Openness to experience (Big Five Inventory, BFI; John, & Srivastava, 1999*).* Participants rated 9-items (e.g., "I see myself as someone who… is curious about many different things") from 1(*disagree strongly*) to 5(*agree strongly*). Negatively worded items were reverse-coded and items were averaged to provide an overall score where higher scores indicated greater trait openness to experience ($\alpha = 0.81$).

Trait absorption (Multidimensional Personality Questionnaire, MPQ; Patrick, Curtin, & Tellegen, 2002*).* Participants rated 12-items (e.g., "Sometimes I am so immersed in nature or in art that I feel as if my whole state of consciousness has somehow been temporarily changed") as true (coded 1) or false (coded 0). Items were summed to provide an overall score (out of 12) where higher scores indicated greater trait absorption ($\alpha = 0.74$).

Aesthetic experiences (Aesthetic Experiences Scale, AES; Silvia & Nusbaum, 2011*).* Participants rated how often they experience 10 aesthetic feelings (e.g., "feel absorbed and immersed", "feel like crying", "feel touched", "feel a sense of awe and wonder") when encountering arts in daily life from 1(*never/rarely*) to 7(*nearly always*). Items were averaged to create an overall score where higher scores indicate a greater tendency to experience aesthetic feelings in daily life ($\alpha = 0.87$).

Mindfulness (Five Facets of Mindfulness Questionnaire, FFMQ; Baer et al., 2008). Participants rated 15-items 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 ($\alpha = 0.52$), Describing ($\alpha = 0.86$), Acting with Awareness ($\alpha = 0.76$), Non-Judging ($\alpha = 0.80$), and Non-Reactivity to inner experience ($\alpha = 0.72$). 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 = 0.70).

Social desirability (Marlow-Crowne Social Desirability Scale; Reynolds, 1982*).* Participants rated 13-items (e.g., "I sometimes feel resentful when I don't get my own way") as true or false. Socially desirable responses were coded as 1 and were summed to provide an overall score (out of 13) where higher scores indicate more socially desirable responding (α = 0.65).

7. Results

7.1. What are the most endorsed and intense ASMR triggers?

Table 2 shows the percentage of respondents at T1 (N = 296) who endorsed each stimulus as an ASMR trigger for them as well as the average intensity of that trigger. Physical touch to the body was both the most endorsed trigger (98%) and had the highest intensity (*M* = 5.06/6) with the least variation (*SD* = 1.32). Soft-speaking, whispering, brushing sounds, delicate hand movements, and touch to the face were all endorsed by over 90% of respondents, here vocal sounds (soft-speaking and whispering) were reported as the most intense. Over 80% of respondents endorsed tapping, close personal attention, being cared for, nature, page turning, scratching, rubbing, letter sounds and close-up movements as triggers. The least commonly endorsed triggers were having a light flashed in one's face (45%), eating sounds (46%) and blowing (55%), which may be more context specific than other triggers. We also note that 24 of the 37 triggers were endorsed by 75% of the sample and might therefore be considered typical or common triggers present in most people who report ASMR.

7.2. Is there consistency between and within ASMR-responders in ASMR triggers?

Between T1 and T2, trigger count and average intensity were significantly positively correlated: (1) ATC trigger count: *rs*(145) =

Table 2
ASMR triggers and intensity (T1) N = 296.

Trigger	Type	%YES	M	SD
Physical touch on your body	T/INT	98	5.03	1.32
Soft-speaking	VOC	94	4.09	1.74
Brushing sounds	AUD	93	3.52	1.82
Delicate hand movements	VIS	92	3.75	1.86
Whispering	VOC	92	4.07	1.88
Light touch on your face	T/INT	90	3.87	1.97
Tapping sounds	AUD	89	3.75	2.01
Close personal attention towards you	T/INT	87	3.56	2.08
Nature sounds	AUD	85	3.07	1.97
Page turning sounds	AUD	85	3.10	1.95
Scratching sounds	AUD	83	3.03	1.99
Someone providing care for you	T/INT	83	2.85	1.94
Rubbing sounds	AUD	82	2.82	1.99
Certain letter sounds	VOC	80	3.07	2.09
Close-up movements directed at you	T/INT	80	3.09	2.08
Liquid sounds	AUD	79	2.81	2.00
Crisp, crunchy and crinkling sounds	AUD	79	2.85	2.08
Accents	VOC	78	2.91	2.13
Watching someone being touched	VIS	77	2.88	2.19
Breathing	VOC	77	2.41	1.85
Watching someone complete a task with expertise	VIS	77	2.63	2.05
'Oddly satisfying' triggers	VIS	77	2.59	2.05
Timbre / pitch of voice	VOC	76	2.79	2.05
Watching someone concentrate on a task	VIS	75	2.46	2.02
Blowing into your ear	T/INT	74	2.69	2.18
Solid sounds	AUD	73	2.39	1.94
Repetitive actions	VIS	73	2.24	1.89
Reading out loud	VOC	70	2.01	1.85
Inaudible-Unintelligible speaking	VOC	69	2.24	2.09
Mouth sounds	VOC	66	2.35	2.17
Buzzing sounds	AUD	65	1.80	1.83
Eye contact with you	T/INT	65	1.94	1.94
Sticky fingers sounds	AUD	63	1.73	1.83
Altruistic acts	T/INT	61	1.78	1.86
Blowing sounds/white noise	AUD	55	1.52	1.83
Eating sounds	VOC	46	1.35	1.88
Having a light flashed near your face	VIS	45	1.37	1.94

Note. Mean values represent average intensity of each trigger from 0 to 6. VOC = Vocal Auditory, AUD = non-Vocal Auditory, T/INT = Tactile/interpersonal, VIS = Visual.

0.72, p <.001, (2) ATC trigger intensity $rs(145) = 0.71$, p <.001, suggesting a high correspondence in endorsement and intensity of triggers over time. In terms of the most and least commonly endorsed and most intense ASMR triggers, results for the T2 sample overall were similar to those obtained at T1. Physical touch and close personal attention were the most endorsed (97%) and again touch was the most intense trigger on average (4.94/6). The least commonly endorsed triggers were the same as at T1 (eating, light flash, blowing). For interested readers, Supplementary Table 3 shows the percentage of respondents at T2 (N = 145) who endorsed each stimulus as an ASMR trigger for them as well as average intensity of that trigger.

As an additional examination of consistency over time in ASMR triggers, we calculated within-participants whether their endorsement of each trigger (yes vs. no) stayed the same between T1 and T2 or changed. Change in trigger endorsement could go either way: i.e., an ATC item was reported as a trigger at T1 but not at T2 and an ATC item was reported as a trigger at T2 but not at T1. Considering all the triggers, 84% of endorsements were consistent over time, that is, they were consistently either endorsed or not as a trigger by participants. Only 16% of responses changed – 9% were triggers at T2 but not T1 (T2 > T1) and 7% were triggers at T1 but not T2 (T1 > T2). There was a 75% or above consistency rate for 34/37 triggers. For interested readers Supplementary Table 4 shows the endorsement frequencies for each trigger with columns for consistency and changes over time.

7.3. Comparison of the ATC with existing ASMR measures

7.3.1. ASMR-15 and Flow to ASMR scale

Correlational analyses examined how the two metrics of the ATC (trigger count and trigger intensity) compared to the ASMR-15 (including subscales) and the Flow to ASMR scale. ATC trigger intensity was significantly positively correlated with the ASMR-15 ($r(145) = 0.42$, p <.001, all ASMR-15 subscales (Altered Consciousness, $r(145) = 0.28$, p <.001; Sensation, $r(145) = 0.30$, p <.001; Relaxation, $r(145) = 0.40$, p <.001; Affect, $r(145) = 0.30$, p <.001) and the flow to ASMR scale ($r(145) = 0.36$, p <.001), suggesting a high degree of convergence amongst these measures (i.e., those with higher ATC intensity scores also scored higher on all other measures of ASMR).

ATC trigger count was significantly positively correlated with the ASMR-15 ($r(145) = 0.20$, p =.016), suggesting that participants reporting a greater number of triggers also scored higher on the ASMR-15 overall score. Examination of the subscales of the ASMR-15 suggest that the relationship between the two scales was largely driven by the positive association between ATC trigger count and the sensation subscale of the ASMR-15 ($r(145) = 0.20$, p <.016, all other correlations for the subscales p >.05), which is indicative of somatosensory sensations accompanying the ASMR response. ATC trigger count was also significantly positively correlated with the flow to ASMR scale ($r(145) = 0.23$, p =.007).

7.3.2. ASMR experiences Questionnaire (AEQ)

Of the 145 participants at T2, 134 completed the AEQ, assessing responses to ASMR videos. The 5-cluster solution produced by the AEQ suggested that 46% were strong ASMR responders, 29% were weak ASMR responders, 13% were positive controls, 4.5% were negative controls and 7.5% were false positives. Given such small numbers of AEQ classified non-ASMR participants (positive controls, negative controls, false positives), we created a new AEQ defined 'non-responder' group (N = 33; 25%) to compare with strong (N = 62; 46%) and weak (N = 39; 29%) ASMR responders on ATC scores. Two one-way ANOVAs were conducted to compare average levels of ATC intensity and count scores between the groups. The main effect of group was significant for trigger intensity, $F(2, 131) = 5.77$, p =.004, $\eta_p^2 = 0.08$. Pairwise comparisons (Bonferroni corrected) showed that, compared to the non-responder group, mean trigger intensity was significantly higher in the strong ASMR group ($M_{diff} = 0.61$, $SE = 0.18$, p =.003, 95%CI[0.17, 1.05]). There were no significant differences in trigger intensity between the strong and weak ASMR-responders or between the weak ASMR-responders and the non-responders. There was not a significant main effect of trigger count between the groups, $F(2, 131) = 0.78$, p =.454, $\eta_p^2 = 0.01$. We also collapsed strong and weak responders into a single group to compare with the non-responder group, comparing trigger count and intensity scores with two Welch Tests. Compared to non-responders, ASMR responders reported significantly more intense ASMR triggers overall ($M_{diff} = 0.5$, *Welch's* $F(1, 51.66) = 8.05$, p =.006, $d = 0.59$) but not a significantly greater number of triggers ($M_{diff} = 1.46$, *Welch's* $F(1, 47.72) = 1.12$, p =.294, $d = 0.23$). Rates of trigger endorsement across the three groups were very similar and

Table 3
Pearsons Correlations between ATC count and intensity scores and individual difference variables (N = 145).

	ASMR Trigger Checklist			
	Count		Intensity	
	r	*p*	*r*	*p*
Openness to Experience	0.12	0.166	0.21	0.016
Trait Absorption	0.24	0.007	0.34	<0.001
Aesthetic Experiences	0.31	<0.001	0.37	<0.001
Mindfulness Facets	0.08	0.388	0.14	0.098
Observing	0.16	0.070	0.31	<0.001
Describing	0.01	0.911	0.07	0.421
Acting with Awareness	−0.03	0.752	−0.06	0.516
Non-Judging	−0.08	0.379	0.01	0.874
Non-reactivity	0.11	0.190	0.07	0.395
Social Desirability	0.10	0.270	0.03	0.706

comparable to the full sample. For interested readers we also display the frequencies of each trigger type for each group separately in Supplementary Table 5.

7.4. Associations between ATC count and intensity with individual difference measures

Table 3 displays the results of correlational analyses examining how the two metrics of the ATC (trigger count and trigger intensity) related to individual differences measures previously associated with ASMR (openness to experience, trait absorption, aesthetic experiences, observing facet of mindfulness; Fredborg et al., 2018, McErlean & Banissy, 2017; McErlean & Osbourne-Ford, 2020; Poerio et al., 2018, Roberts et al., 2019, Roberts et al., 2020 and a measure of socially desirable responding. Reassuringly, social desirability was not significantly associated with either measure of the ATC (see last row of Table 3).

ATC Intensity was significantly positively correlated with openness to experience, trait absorption, aesthetic experiences, and the observing (but not any other) facet of mindfulness (see Table 3 column 'Intensity'). Associations for ATC Trigger count were less consistent. Trigger count was significantly positively associated with trait absorption and aesthetic experiences but not with openness to experience or the observing facet of mindfulness (see Table 3 column 'Count'). These results suggest that (1) higher levels of ASMR trigger intensity are associated with higher levels of: openness to experience, trait absorption, aesthetic experiences, and the observing facet of mindfulness and (2) endorsing more ASMR triggers (trigger count) is associated with higher levels of: trait absorption and aesthetic experiences.

8. Discussion

A central defining feature of ASMR is that the sensation is elicited by a core set of stimuli or so called "triggers" such as whispering, soft speaking, tapping, and delicate hand movements (Barratt & Davis, 2015; Barratt et al., 2017). The elicitation of ASMR depends not only on the trigger types and modalities, but also on the features of those triggers (e.g., gentle, repetitive, non-threatening) and the social contexts in which they arise (e.g., during interpersonal interactions with a caring person). The idea that ASMR is elicited by a set of core "trigger" stimuli is frequently invoked in conceptual definitions of ASMR and often implicit in its operationalisation as both a trait and state (e.g., research participants are often shown ASMR videos that contain ostensibly prototypical ASMR triggers). Although new measures have been developed to determine ASMR-responder status and individual differences in ASMR sensations, the conceptualisation and measurement of ASMR triggers *themselves* is less well-researched. Here we address this issue with an in-depth empirical investigation of ASMR-triggers. We provide an expanded ASMR-trigger checklist (ATC) as a new tool for use in future research, examine the consistency of ASMR triggers over time, and provide initial evidence for the validity of our new measure.

8.1. The ASMR trigger checklist

Our central aim was to develop a new tool to capture individual differences in the number and intensity of ASMR triggers. Importantly, we sought to capture ASMR triggers that were not unduly biased by perceptions of ASMR as an 'online' audio-visual phenomenon, something we believe has led researchers to underestimate the importance of tactile and interpersonal triggers in ASMR elicitation. Our measure was intended to reflect both real-world and online triggers and to be broad enough to capture commonly endorsed triggers but not in such a way that makes them overly context-specific (e.g., watching someone fill a fountain pen). Relatedly, we provided an equivalent number of ASMR triggers across different 'modalities' for participants to consider when thinking about the stimuli that might commonly elicit ASMR.

We initially developed a 31-item ASMR trigger checklist comprising four broad trigger categories: Vocal Auditory, non-Vocal Auditory, Visual and Tactile/interpersonal. The measure was tested with a sample of ASMR-responders, which led to further refinement of the checklist including: 1) additional triggers and expanded examples of trigger types, 2) clearer instructions to explain the focus on eliciting pleasant sensations (rather than misophonic-type reactions), and 3) a reordering of the checklist presentation (from most to least common). The final ATC (Appendix 1) comprised 37 triggers where participants simultaneously rate each trigger (Yes vs. No vs. Unknown) and its intensity (from 1 to 6).

The revised ATC was administered to a large sample of ASMR-responders providing updated descriptive data on the most endorsed and strongest ASMR triggers. Physical touch to the body was both the most endorsed (98%) and intense (average 5/6) ASMR trigger. This finding is important and novel because other measures of ASMR do not ask specifically about physical touch as a trigger (except for asking about hair play/brushing; Fredborg et al., 2017; Poerio et al., 2018). The overwhelming endorsement of touch for eliciting ASMR raises the possibility that consistently experiencing strong ASMR sensations from physical touch should be considered a necessary condition for trait ASMR. Given the increasing popularity of ASMR content online, knowing whether participants report ASMR sensations to actual touch (i.e., in real life) could help to identify genuine cases of ASMR from those that have engaged with and enjoy digitally-mediated ASMR content. The centrality of touch for eliciting ASMR also fits well with theoretical suggestions that ASMR represents an exaggerated cross-modal correspondence to hedonic touch (Poerio et al., 2022), and empirical research showing that ASMR-responders report greater enjoyment of positive social touch (Gillmeister et al., 2022) and tend to seek out tactile experiences more in daily life (Poerio, Osman, Todd, Kaur, & Cardini, 2023).

Soft-speaking, whispering, brushing sounds, delicate hand movements, and touch to the face were endorsed by over 90% of ASMR-responders. Over 80% endorsed tapping, close personal attention, being cared for, nature, page turning, scratching, rubbing, letter sounds and close-up movements as triggers. This is consistent with previous investigations on the endorsement of ASMR triggers (e.g., whispering, personal attention, tapping/scratching sounds being amongst the most common in Barratt & Davis, 2015, Poerio et al.,

2018, Study 1; Fredborg et al., 2017; Cash et al., 2018; Ditchburn & Bedwell, 2019; McErlean & Osbourne-Ford, 2020; Smith et al., 2020). These data also add to existing research by highlighting additional common triggers not captured in previous measures such as touch to the face, being cared for, and specific letter sounds. With regards to trigger intensity, aside from physical touch, speech sounds (soft-speaking and whispering) were reported as most intense (average 4/6). The importance of vocal auditory triggers for inducing ASMR fits well with previous research showing that vocal compared to non-vocal ASMR content elicits a stronger ASMR response (Poerio et al., 2018, Study 1) as well as with research examining the speech characteristics associated with ASMR content online (Starr, Wang, & Go, 2020).

We note that 24 of the 37 triggers were endorsed by 75% of the sample and might therefore be considered typical or common triggers present in most people who report ASMR. This may be suggestive of a potential cut-off point that could be used to help verify trait-ASMR: for example, it could be stipulated that an ASMR respondent must report physical touch as an ASMR trigger and at least 20 of the 37 checklist items to be deemed a genuine ASMR-responder. Although this would need to be directly tested in future research, it nevertheless suggests a potential self-report method of distinguishing genuine ASMR-responders from false positives that goes above and beyond asking participants to self-disclose ASMR status. Of course, whether certain triggers (like touch) or endorsing a certain number of triggers are necessary conditions for being considered genuine ASMR-responders are open questions. It is possible for example, that a person may be a genuine ASMR-responder but never experience ASMR to touch and only experience it in response to a small number of specific triggers. Although we suspect, based on the current data, that these cases might be rare, using stringent criteria may sometimes inadvertently exclude genuine cases so this approach should be considered with caution.[1]

The least commonly endorsed triggers were having a light flashed in one's face (45%), eating sounds (46%), and blowing sounds (55%). Eating sounds as a low endorsement trigger fits well with previous findings (e.g., Fredborg et al., 2017; Poerio et al., 2018, Study 1) and may be particularly uncommon as an ASMR trigger given its links to misophonia, which often co-occurs with ASMR (McErlean & Banissy, 2017; Barratt et al., 2017; Rouw & Erfanian, 2018). However, we should note that other traditionally misophonic trigger sounds such as breathing and other mouth sounds were reported by 70% and 60% respectively in our sample as triggering a pleasant emotional response. This is perhaps suggestive of a more complex picture in which similar acoustic properties might elicit opposing emotional responses within the same individual depending on social and other contextual factors (e.g., who is making the sound and in what context).

8.2. *Consistency of ASMR triggers over time*

To our knowledge Study 2 represents the first examination of the stability or consistency of endorsed ASMR triggers over time. ASMR-responders were highly consistent in both their reports of ASMR triggers and their intensity when asked about them over 5 months later. When re-tested, physical touch and close personal attention were most endorsed (97%) and again touch was the most intense trigger (average 5/6). The least commonly endorsed triggers were also consistent and the same as at T1 (eating, light flash, blowing). Overall, respondents were consistent in their reporting of ASMR triggers over the 5 month period, with 84% of endorsements remaining the same over time (i.e., consistently either endorsed or not as a trigger by participants).

Only a small proportion of trigger endorsements changed over time (16%) such that some participants reported triggers initially but not 5 months later or vice versa. Although this represents a small proportion of inconsistency over time, it may reflect a combination of: 1) increased awareness/exposure to ASMR triggers over time (e.g., participants became more aware of their triggers after being asked about them, or they discovered new triggers) and 2) habituation or "ASMR immunity" to certain triggers over time (e.g., due to over-exposure). Our measure did not ask participants to reflect on their ASMR triggers over a specific time period (e.g., two-weeks) although it is possible that participants may have interpreted the ATC as asking about whether a trigger would currently trigger their ASMR. In future iterations it may be prudent to allow participants to note whether something was a trigger in the past but is now extinct or to rate the duration of time that a trigger has elicited ASMR. In general, we consider the ATC as a trait-type measure intended to capture relatively stable endorsement of ASMR triggers, but also one that may be susceptible to fluctuations over time within an individual (e.g., depending on their exposure to triggers). However, we suspect that strong triggers like touch and speech may be more stable and consistent over time compared to others. Irrespective of the small changes over time seen here, the overwhelmingly consistent reports of ASMR triggers over a relatively long time period (months rather than weeks), is reassuring and suggestive of their relative stability.

Like in synaesthesia research, consistency tests have been suggested as tests of genuineness for trait-ASMR verification (Hostler et al., 2018). Although the ATC demonstrates ASMR trigger consistency over time it is not a consistency test in the strictest sense since it does not actually expose participants to the same stimuli at different points in time and assess the consistency of any resulting ASMR response (as is the case in synesthetic consistency testing; Asher et al., 2006). Consistency tests as a method of classifying trait-ASMR (e.g., exposure to ASMR triggers and the ASMR response measured over time) are worthy of future investigation, but they may be too strict and lead to the exclusion of many genuine ASMR-responders. Although ASMR and synaesthesia do share similarities and co-occur, they depart in important ways with implications for their measurement and identification. Unlike in synaesthesia 1) ASMR elicitors are not typically unimodal or even necessarily sensory in nature and 2) the ASMR response is not completely involuntary or automatic (Poerio et al., 2022).

As noted by our participants in Study 1, ASMR sensations often occur and intensify when multiple sensory modalities are triggered and integrated (e.g., tactile, visual, and auditory triggers). ASMR is also often elicited by emotional rather than purely sensory triggers

[1] We thank an anonymous reviewer for raising this point.

(e.g., those reflecting interpersonal intimacy which are commonly endorsed). And although the experience of ASMR may be felt as involuntary and automatic by responders, it does also appear to be affected by context (e.g., social environment, emotional state of the individual) suggesting it may not be a fully automatic or uncontrollable response. These features would make it difficult to isolate a single trigger that will automatically and, in every circumstance, elicit an ASMR response in the same individual with the same intensity of feeling, in the ways that a synaesthesia type consistency test would require.

8.3. Validation of the ATC

To help validate the ATC we examined how it related to other existing measures of trait-ASMR as well as other individual difference traits previously associated with ASMR. ATC intensity was significantly positively associated with all subscales of the ASMR-15 which taps into the phenomenological experiences of ASMR (e.g., sense of altered consciousness, tingling sensations, relaxation) and the Flow to ASMR scale. The fact that people who report more intense ASMR triggers also report ASMR as a more immersive, relaxing, and altered state of consciousness provides good initial support for the correspondence between ASMR trigger intensity and other aspects of the ASMR experience not explicitly captured by an assessment of triggers.

Although the ATC trigger count score (number of endorsed triggers) was positively correlated with the ASMR-15 overall, this appeared to be driven by a strong association with the 'sensation' subscale which taps into the canonical tingling sensations of ASMR. As an index of ASMR, the ATC trigger count score may be especially sensitive for identifying people who have strong somatosensory sensations accompanying their ASMR. Whether or not tingling is a necessary condition for trait or state ASMR is an open question but tingling sensations may represent a peak in ASMR responding driven by an accumulation of different triggers and their integration. Future research would benefit from exploring this possibility by identifying constellations of ASMR triggers that, when combined, elicit tingling responses as opposed to simple relaxation or immersion. Indeed, it will also be important for future research to clearly delineate what, if anything, about ASMR trigger features or the contexts in which they occur, differentiates an ASMR trigger from stimuli that are relaxing for most people (e.g., nature sounds). Similarly, it will be interesting for future research to explore the extent to which non-ASMR responders experience tingling sensations (head orientated or otherwise) in response to common ASMR triggers, especially touch. This may help us to understand whether ASMR experiences lie on a continuum (weak to strong) or should be best described as categorical (you either experience ASMR or you do not). The ATC, with some modifications (e.g., not assuming previous experience with ASMR), could be administered in a more generalised sample to explore these possibilities as has been done for the ASMR-15 (Roberts et al., 2020).

Administering the AEQ in our sample suggested that 75% were ASMR-responders with the remainder a combination of positive/negative controls and false positives. Whilst it is reassuring that three quarters of our sample who self-reported ASMR were verified ASMR-responders by the AEQ, we are hesitant to conclude that the remaining 25% were all non-responders, although it is likely that some were. We say this because the AEQ clusters participants based on the consistency of their self-reported responses (affective and somatosensory) to a selection of ASMR videos. It is therefore a trait measure of ASMR based on state measures to specific audio-visual ASMR content. The five videos used in the AEQ may not consistently elicit state-ASMR even in genuine cases of trait-ASMR. Additionally, because the AEQ can only provide an assessment of whether individuals respond to audio-visual (and to some extent interpersonal) stimuli, it does not include an assessment of what we now know is the strongest and most endorsed ASMR trigger – physical touch. Examining the differences between AEQ classified ASMR-responders and 'non-responders' on the ATC, we found that non-responders had significantly lower intensity scores but not fewer endorsed triggers overall. It may be that AEQ 'non-responders' are those that tend to report less responsivity to ASMR triggers in general and that the selection of AEQ videos used may not have been sufficient to tip them into experiencing a characteristic ASMR response required to be statistically classified as an ASMR-responder. This is not to say that the AEQ is not a useful tool; indeed it undoubtedly provides a less subjective and better assessment of trait-ASMR than self-report alone. However, we suspect it would be wise to use a combination of methods over and above state-ASMR responses to determine trait-ASMR. In this way, the ATC might be useful to complement the AEQ, by for example, providing additional conditions for trait-ASMR status (e.g., endorsement of physical touch and a cut-off point for triggers). Regardless, it is important to note that all participants in our studies were classified as ASMR-responders from their own self-report, following a detailed description of ASMR. We did not exclude participants from analyses who were identified from the AEQ screening method as 'non-responders' due to the limitations of the AEQ described above. The use of self-reported ASMR-status in our study is a clear limitation of the work and updated results for trigger endorsement rates after using more stringent criteria (e.g., lab-based assessment of ASMR responses) is recommended.

As well as associations between the ATC and existing trait-ASMR measures, we also provide evidence for its convergent validity by examining associations with other individual difference measures known to be associated with trait-ASMR. ATC Intensity was significantly positively correlated with openness to experience, trait absorption, aesthetic experiences, and the observing (but not any other) facet of mindfulness. This is consistent with previous literature linking ASMR with these individual differences (Fredborg et al., 2018; McErlean and Banissy, 2017; Poerio et al., 2018; Fredborg, Clark, & Smith, 2018; Poerio et al., 2022; Roberts et al. 2020; McErlean & Osbourne-Ford, 2020) and provides support for ATC intensity scores as an individual difference measure for ASMR. ATC trigger count scores were positively associated with trait absorption and aesthetic experiences but not with openness to experience or the observing facet of mindfulness as expected. The different pattern of results for ATC intensity compared to count scores suggests perhaps that the former might be a better indicator of the strength, intensity, or propensity to experience ASMR compared to trigger count. Indeed, the intensity score is one that reflects a combination of the number of endorsed triggers and their intensity (given that 0s are included in the calculation) and may therefore be viewed as a more comprehensive indicator of individual differences in ASMR triggers.

9. Conclusion

We have provided a new tool for use in ASMR research, the ASMR Trigger Checklist (ATC), which is a comprehensive measure for assessing individual differences in trait-ASMR. The ATC is related to existing measures of trait-ASMR that tap into the sensations and phenomenological aspects of the experience (ASMR-15 and AEQ) and provides a complementary assessment in terms of the common elicitors of the experience. Importantly, by emphasising both tactile and interpersonal stimuli, the ATC addresses concerns regarding the over-reliance of audio-visual ASMR stimuli in existing measures and conceptualisations of ASMR. The measure shows good initial convergent validity and test–retest reliability, which also provides the first empirical evidence for consistency of ASMR triggers over time.

We hope that the tool, which is freely available for other researchers to use (see Appendix 1), will be helpful for addressing important questions in this growing field. With further testing the ATC could be used as an additional method for identification of ASMR-responders (e.g., ensuring touch is endorsed as a trigger and using trigger cut-offs to remove potential non-responders) rather than using only self-identification or state-based measures. It could also be used as an assessment of individual differences in the strength or intensity of ASMR, something especially useful for participant selection in state-based ASMR research which requires ASMR elicitation under laboratory conditions. Although we have categorised triggers into 'modalities' for ease of completion (and these show some internal consistency as subscales) we do not recommend using the ATC to examine different categories of triggers since this would likely oversimplify how ASMR is elicited. Indeed, how different sensory modalities of ASMR triggers are integrated to produce pleasant somatosensation especially within social intimate contexts is perhaps one of the most intriguing aspects underlying the complexity of ASMR as an emotional response.

CRediT authorship contribution statement

Giulia L. Poerio: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Project administration, Resources, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing. **Angelica Succi:** Conceptualization, Formal analysis, Investigation, Methodology, Validation, Visualization, Writing – review & editing. **Tom Swart:** Formal analysis, Methodology, Resources. **Vincenzo Romei:** Supervision, Validation, Writing – review & editing. **Helge Gillmeister:** Conceptualization, Investigation, Methodology, Project administration, Resources, Supervision, Validation, Writing – review & editing.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data shared via osf: https://osf.io/h94nt/

Appendix A. Supplementary material

Supplementary data to this article can be found online at https://doi.org/10.1016/j.concog.2023.103584.

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