Autonomous Sensory Meridian Response (ASMR): A flow-like mental state

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Autonomous Sensory Meridian Response (ASMR) is a previously unstudied sensory phenomenon, in which individuals experience a tingling, static-like sensation across the scalp, back of the neck and at times further areas in response to specific triggering audio and visual stimuli. This sensation is widely reported to be accompanied by feelings of relaxation and wellbeing. The current study identifies several common triggers used to achieve ASMR, including whispering, personal attention, crisp sounds and slow movements. Data obtained also illustrates temporary improvements in symptoms of depression and chronic pain in those who engage in ASMR. A high prevalence of synaesthesia (5.9%) within the sample suggests a possible link between ASMR and synaesthesia, similar to that of misophonia. Links between number of effective triggers and heightened flow state suggest that flow may be necessary to achieve sensations associated with ASMR.

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Introduction

16 In recent years, there has been growing interest in a previously unknown sensory phenomenon, named
17 Autonomous Sensory Meridian Response (ASMR) by those capable of experiencing it. Those who
18 describe ASMR claim it to be an anomalous sensory experience which has thus far escaped the eye of
19 scientific research. There is a suggestion that ASMR may be of use for providing temporary relief to
20 individuals with depression, stress and chronic pain. As ASMR has received some media attention in
21 recent months, many have taken to public forums to explain their ability to induce ASMR to ease
22 symptoms of these conditions in cases where other routes of treatment may have been lacking or
23 ineffective (Taylor, 2013; TheWaterwhispers, 2013), while others use ASMR exclusively as a
24 relaxation tool (Marsden, 2012). To date there has been no rigorous scientific exploration of ASMR,
25 nor of the conditions which trigger or end the ASMR state.

26 Media designed specifically to produce ASMR has amassed a community of thousands of members.
27 Capable individuals utilise a variety of visual and audio stimulation – most typically through video
28 sharing – to achieve a tingling, static-like sensation widely reported to spread across the skull and
29 down the back of the neck (Taylor, 2014). The advent of online video communities has facilitated a
30 gathering of those who experience ASMR, and as a result hundreds of videos have been produced,
31 viewed and shared with the goal of inducing this sensation, which is said to be paired with a feeling of
32 intense relaxation. A dedicated ASMR subgroup on Reddit (http://www.reddit.com/r/asmr/) boasts
33 86,000 subscribers from around the world, and some of the most popular ASMR content creators on
34 video sharing site Youtube (http://youtube.com/), for example GentleWhispering have upwards of
35 300,000 subscribers. Table 1 lists a number of these popular sources on Youtube. These figures show
36 that the culture surrounding ASMR is in no way insignificant. Several reputable international media
37 outlets have reported on the attention this phenomenon is receiving, and the lack of scientific
38 explanation. (Marsden, 2012; Tomchak, 2014).

39 Though stimuli used to induce ASMR are widely varied, and devotees report that individual
40 differences play a pivotal role in the effectiveness of each video, distinct themes appear to be present in
41 ASMR media. Exploration of the most viewed ASMR media on Youtube uncovers what may be
42 discrete categories of common triggers. For example, many of these videos depict role play situations,
43 in which the viewer is placed in a position of 'close proximity' to another person in order to be cared
44 for in some manner. Often this involves grooming (e.g. MassageASMR; Fairy Char ASMR), or being

45   given some type of medical examination (e.g. WhisperTalkStudios). The tone of these types of ASMR

46   media is usually one of having close attention paid to you, the viewer, with videos shot in a point of

47   view manner. Other videos include acts which require a similar amount of focus, but directed towards

48   objects, rather than the viewer (e.g. Ephemeral Rift).

49   ASMR videos also typically appear to include an emphasis on the use of sound to trigger the static

50   sensation of ASMR, which include the subjects of these videos cycling through a variety of household

51   items which make various noises when tapped upon or used (e.g. MassageASMR). On the surface, this

52   trigger resulting in sensation seems quite similar to the experience of synaesthesia, a phenomenon in

53   which specific external stimuli cause an internal experience in a second, unstimulated modality

54   (Banissy, Jonas & Cohen-Kadosh, 2014). . The reported automatic, consistent response to audio-visual

55   stimuli which is felt in tactile sensory modalities alongside a feeling of calm does appear to resemble

56   synaesthesia in these aspects, though the tactile concurrents (secondary sensations in the unstimulated

57   modality; Cytowic, 2002) found in ASMR appear to be more tangible than those experienced in

58   synaesthesia (ie. tingling on the skin). Even with this being the case, the positive emotional response of

59   calm said to be triggered by ASMR media consumption could potentially be considered a form of

60   sound-emotion synaesthesia.

61   Reports of ASMR experiences also appear to share some features with the state of "flow", which is the

62   state of intense focus and diminished awareness of the passage of time that is often associated with

63   optimal performance in several activities, including sport (Csiskemenhalyi, 1991; Swann et al., 2014).

64   Anecdotal reports of ASMR describe states of focus, of greater "presence" and of relaxation which are

65   consistent with the non-active aspects of flow.

66   The aim of the current study was to describe the sensations associated with ASMR, explore the ways in

67   which it is typically induced in capable individuals, and to provide further thoughts on where this

68   sensation may fit into current knowledge on atypical perceptual experiences. This research also aims to

69   explore the extent to which engagement with ASMR may ease symptoms of depression and chronic

70   pain. As ASMR has yet to be defined within scientific literature, this study will utilise survey data and

71   qualitative descriptive contributions from participants to explore the characteristics of ASMR, and to

72   provide a basis for later experimental investigation.

Materials and Methods

Participants

The sample of the present study was comprised of 245 men, 222 women and 8 individuals of non-binary gender (N=475). These participants presented themselves as volunteers via online advertisement on specialised ASMR interest groups on Facebook and Reddit. The age of the sample ranged from 18 to 54 years (mean = 24.6 years, st. dev. = 7 years). Volunteers were located worldwide, with particular participation from the United States of America and Western Europe. All individuals in the sample self-reported to have experienced ASMR and regularly consume ASMR media.

Method

An online questionnaire (www.qualtrics.com, Version 36,892) was conducted in order to gather information on the prevalence of particular features of ASMR, when and why individuals engage in ASMR, and the relation of ASMR to other known phenomenon. Ethical approval was granted by the Department of Psychology of Swansea University, and continuation from the initial screen of this questionnaire, which contained a brief summary of the research topic and all necessary ethical information, served as informed consent. The structure of this questionnaire is described below, and a version of the text of the questionnaire is included as supplementary material:

Section 1 - Demographics

Demographic information, including whether or not individuals suffered from any chronic illness or took medications, was gathered at the beginning of the survey. In addition, the Beck Depression Inventory (BDI-II; Beck et al., 1996) and Beck Anxiety Inventory (BAI; Beck et al., 1988) were included to give insight on the daily mood of participants. As several online sources indicate the existence of a subset of ASMR media users who engage in ASMR to manage symptoms of depression, stress, or pain, this data would be used to explore efficacy of ASMR in easing symptoms of these conditions. Participants were asked to verify that they identified as able to experience ASMR and the tingling sensations commonly associated with ASMR. No leading elaboration was given with regard to this sensation, as all participants had been recruited via ASMR social network groups, and would therefore be aware of how this aspect of the phenomenon is typically described. This was an attempt to limit imposing researcher assumptions about ASMR. In this section, participants were also given a definition of synaesthesia, alongside some examples of synaesthetic associations. Participants

102   were asked to report if they suspected they may experience any type of synaesthesia. Those who

103   responded in a positive or unsure manner were asked to specify which type of synaesthesia they

104   thought they may have, and were followed up approximately four weeks later via e-mail to be assessed

105   for consistency.

106   *Section 2 – Viewing Habits*

107   This section included questions pertaining to how often participants engaged in ASMR media

108   sessions, how many videos they consumed in a single session, and at what time of day they typically

109   viewed ASMR media. Questions regarding the optimal conditions to experience ASMR were also

110   included.

111   *Section 3 – Triggers*

112   Participants were asked to report whether or not they experienced any of the triggers in a list of

113   9 given stimuli: Crisp sounds, whispering, personal attention, vacuum noise, aeroplane noise, laughing,

114   smiling, watching repetitive tasks, and slow movements. Of these suggestions, five possible triggers

115   were inspired by the typical content of ASMR videos (eg. Close personal attention, crisp sounds) and

116   four were unlikely triggers (vacuum noise, aeroplane noise, laughing, smiling). These unlikely triggers

117   are commonly present in ASMR videos, but are not commonly identified in titles or online discussions,

118   so were considered to be unlikely to produce tingles in many participants. This section included a

119   comment box in which participants could specify what, if anything, abolished the tingling sensations.

120   Preference of receiving auditory triggers in one ear over another was also probed.

121   *Section 4 – Location*

122   In order to more clearly define the location and time course of the tingling sensation associated

123   with ASMR, participants were asked to report where on their body they typically felt tingles originate,

124   and whether or not the sensation always originated in that area. Participants were also asked whether or

125   not the tingling evolved or spread with intensity, and if so, which other body areas the tingling

126   sensation spread to.

127   *Section 5 – 'Why do you watch ASMR videos?'*

128   This section presented several likert style statements to be rated from 'strongly agree' to

129   'strongly disagree' in terms of how well each represented individuals' experiences of ASMR and

130 ASMR media. These included statements concerning mood and arousal control, such as 'I watch

131 ASMR videos to relieve negative mood', '… to deal with anxiety', and '… to relieve stress'. Further,

132 more generalised statements, such as 'I know what triggers my ASMR', 'I watch ASMR videos for

133 sexual stimulation', and 'ASMR videos help me focus' were included to obtain a rounded view of why

134 participants choose to engage with ASMR media.

135 *Section 6 - Flow State Scale*

136 Since the reported ASMR experience shares some features with that of the 'flow' state

137 (Csiskeminhalyi, 1991), we used a reduced version of the Flow State Scale (Jackson & Marsh, 1996) to

138 quantify this experience. We selected only the eight questions relating to the passive experience of

139 flow. Participants scored their agreement with statements such as "Things seem to happen

140 automatically" on a 5-point scale. These scores were initially subjected to factor analysis to confirm

141 that only a single factor had been captured in the reduced questionnaire. Combined scores, composed

142 of the sum of the scores of the components, were then submitted to Pearson's Correlation to investigate

143 links between flow state and trigger thresholds.

144 *Section 7 - Effect on mood and chronic pain*

145 Using an interactive sliding scale ranging from 0 to 100, participants were asked to rate their

146 experience of mood during a typical day, directly before, during, one hour after and 3 hours after a

147 successful ASMR media viewing session. These ratings were given at the same time, i.e. not during the

148 ASMR state. 0 on this scale represented 'terrible, the worst I've ever felt', whereas 100 represented

149 'euphoric, the best I've ever felt'. Participants who earlier indicated that they suffered from chronic

150 pain were also asked to complete a version of this task with the intensity of their pain symptoms in

151 mind.

152 Data analysis

153 Where possible, analyses were conducted on the entire sample (N=475). However, due to certain

154 sections being inapplicable to some participants, some sections included data from a subset of the

155 entire sample. In these cases, N is reported alongside the results. All analyses were carried out in SPSS

156 and Microsoft Excel. A copy of the data from this experiment are included as supplementary data.

157 **Results**

158 *Why engage in ASMR?*

159 Through Likert style questions, participants largely sought out ASMR as an opportunity for relaxation,

160 with 98% of individuals agreeing, or agreeing strongly with this statement. In a similar vein, 82%

161 agreed that they used ASMR to help them sleep, and 70% used ASMR to deal with stress. A small

162 number of individuals (5%) reported using ASMR media for sexual stimulation, with the vast majority

163 of participants (84%) disagreeing with this notion.

164 Many participants described additional details of seeking the effects of ASMR where other

165 interventions, medical or otherwise, had been unable to assist. This is perhaps best illustrated by a

166 correspondence from one participant whose anxiety and stress was causing significant issues in his

167 daily functioning. After noticing during a hairdressing appointment that he felt at ease, he sought out

168 ways to replicate this feeling daily in order to manage his symptoms, and in the process discovered

169 ASMR media. In his own words:

170 "*I was totally amazed, I can only describe what I started feeling as an extremely relaxed trance like*

171 *state, that I didn't want to end, a little like how I have read perfect meditation should be but I never*

172 *ever achieved.*"

173 *Common triggers*

174 Analysis of responses found four prominent categories of triggers, each experienced by over 50% of

175 participants. These triggers are whispering (75%), personal attention (69%), crisp sounds (64%) and

176 slow movements (53%). 34% of participants also reported that their ASMR was triggered by watching

177 repetitive tasks. Triggers less commonly associated with ASMR media (smiling, vacuum cleaner noise,

178 aeroplane noise, and laughing) were included for comparison. Each of these non-triggers were in each

179 case reported to be effective by less than 3% of participants. These values are illustrated in Table 2.

180 Some individuals reported only being triggered by new viewing material, in which they are unable to

181 predict which trigger will be presented next.

182 The most common time for engagement with ASMR media was reported to be before going to sleep at

183 night, with 81% of participants reporting this as their preferred time. 4% of participants engaged in

184 ASMR upon waking, 2% participated during the morning to midday. 30% of participants also reported

185 viewing ASMR media in their spare time, regardless of the time of day.

186   When asked if participants preferred any specific environmental conditions for viewing, 52%

187   responded 'yes'. Submitted comments suggested that of these, individuals near universally preferred

188   quiet, relaxed conditions in order to achieve ASMR from online media. Many also specified preference

189   for binaural headphones, so as to experience depth of sound.

190   Most participants reported having their first experience of ASMR at age five (65 individuals), with the

191   vast majority (241 individuals) reporting the first experience of ASMR between five and ten years of

192   age. There were also several instances of ASMR being first experienced further into adulthood – 41

193   individuals reported their first ASMR experience as happening after age 18.

194
195   *Experience of ASMR*

196   Participants widely reported sensations similar to that found in general reporting of ASMR; a tingling

197   sensation which originated typically towards the back of the scalp and progressed down the line of the

198   spine and, in some cases, out towards the shoulders. Many participants also felt that their lower back,

199   arms and legs experienced the sensation, though the amount of area the tingles covered seemed to be

200   determined by the extent to which individuals had been triggered.

201   63% of participants reported the tingling sensation associated with ASMR to originate consistently in

202   one part of their body, while 27% said this origin varied. Of those that reported a consistent origin, the

203   static tingling sensation was reported to typically originate on the back of the head (41%) and

204   shoulders (29%). When intense, this sensation is able to extend down the line of the spine (50%), arms

205   (25%) and legs (21%), though this does not occur in every session, and every individual does not

206   experience the same route. An illustration of the most common path of these sensations is provided in

207   Figure 1.

208
209   *Medications which affect ASMR*

210   Of the sample who reported taking medication, only three participants responded positively when

211   asked if they had noted effects of any of their medications on ASMR. One participant noted that their

212   antidepressant stifled sensations of ASMR, which later returned once they stopped taking the

213   medication, though they did not specify which. Another noted that sleeping pills dulled their ASMR

214   experience. A third reported that Clonazepam decreased the sensations associated with ASMR. Six

215 participants responded that their medication had no effect on ASMR. 103 other participants who use

216 medication were unsure as to the effect of their medication on their experience of ASMR.

Effect on mood

218 80% of participants responded positively when asked if ASMR has an effect of their mood, while 14%

219 were unsure and 6% felt that ASMR did not alter their mood. When submitted to a mixed ANOVA

220 with factors for time (before, during, immediately following and 3 hours after ASMR) and for

221 depression status (high, medium or low as defined by the BDI), we found a significant main effect of

222 time on mood [$F(3.06, 1143.0)$, $p < 0.0005$]. Pairwise comparisons revealed significant differences

223 between all timeframes ($p < 0.0005$ in all cases). Participants reportedly felt best while they are

224 engaging with ASMR media, with reports on the 0 to 100 scale of positive mood averaging at 78 for

225 this time period. The effect on mood steadily decreased over the course of several hours. Means for all

226 time frames are reported in Figure 2. This effect is moderated by severity of depression, with people at

227 higher risk of depression showing a more rapid decline in mood score over time [$F(10,2360)=20.217$, p

228 < 0.0005] however, there was also a correlation between BDI scores and the difference in mood score

229 between baseline and immediately after an ASMR experience, suggesting that people with higher

230 depression scores had the greatest benefit from engaging in ASMR [$r=0.439$, $p<0.0005$].

231 50% of participants said their mood improved even in sessions when no tingling sensation was

232 produced, while 30% said that achieving this sensation was vital to mood improvement.

233 69% of those who scored moderate to severe on the BDI reported using ASMR to ease their symptoms

234 of depression (N=70). Those scoring as depressed reported a mean improvement in mood of 38.75

235 (STD = 18.85), in comparison to a mean improvement of 21.33 (STD = 13.58) in non-depressed

236 participants.

Effect on chronic pain

238 38 individuals with chronic pain reported that ASMR improved their symptoms. 13 were unsure of

239 ASMR's impact on their symptoms. 40 did not believe that ASMR had an impact on their symptoms of

240 chronic pain. Analyses were carried out on the responses of individuals who responded positively and

241 unsurely to this section. Six individuals who originally reported issues with chronic pain were omitted

242 due to incomplete data. Data analysis was therefore carried out on 45 cases.

243   Self-report data for before, during, immediately after and 3 hours after ASMR were analysed using a

244   one way ANOVA, and were found to significantly differ [$F(3, 132) = 13.892$, $p < 0.0005$)]. Pairwise

245   comparisons revealed there to be a significant difference in chronic pain symptoms before and during

246   ASMR ($p < 0.0005$), a difference which was maintained three hours following ASMR ($p = 0.014$).

247   There was no significant difference between symptoms of chronic pain during and immediately after

248   ASMR ($p = 1.00$), nor was there a difference between during and 3 hours after ASMR ($p = 0.21$).

249   *Flow state*

250   50 cases did not have complete data for the flow state questionnaire, so were removed from analysis.

251   We were interested in whether people who experience the flow state more readily also experience the

252   ASMR state more readily. To examine this we took the sum of each participant's responses on the flow

253   state questionnaire and correlated this with the total number of ASMR triggers each person reported,

254   from the list of commonly-reported triggers (i.e. whispering, crisp sounds, personal attention, repetitive

255   actions, slow movements, smiling, water pouring). We used a non-parametric Spearman's test, as the

256   trigger data tended to fall into a small number of values. We found a highly significant relationship

257   between flow experience and number of triggers, with greater flow experience being associated with a

258   larger number of triggers [$rho = 0.936$, $p<0.01$]. This relationship is shown in Figure 3.

259   *Familial links*

260   When asked if they knew of any family members who experienced ASMR, 38 participants responded

261   positively, 59 responded negatively, and the remaining 378 were unsure or had not inquired. The

262   relations most often identified as experiencing ASMR were sisters (17 individuals), mothers (11),

263   brothers (7) and fathers (4). There were also reports of grandparents experiencing ASMR, though as

264   relational distance increased fewer individuals were reported to be known as able to experience ASMR.

265   It is likely that the perceived strangeness and stigma many individuals feel surrounds ASMR, has

266   prevented many from asking if other individuals within their family experience something similar. The

267   reports gathered through this research, however, do appear to indicate a familial aspect to the ability to

268   experience ASMR.

269   *Synaesthesia*

270   Synaesthesia appeared to be particularly prevalent within the sample. 35 participants reported

271   experiencing various subtypes synaesthesia and, after exploration of the consistency of concurrents

272   through a follow up interview, 29 of these cases were assessed to be genuine. This places the

273   prevalence of synaesthesia within the sample at 5.9%, compared the current estimate of prevalence in

274   the general population of 4.4% (Simner at al. 2006), however, our value fell slightly short of being

275   significantly higher than the general population (Z=1.594, p=0.0555). Participants reported several

276   subtypes, including grapheme-colour, grapheme-personality, time-space and pain-gustatory

277   synaesthesia.

278   Some comments submitted seem to resemble the inducer-concurrent relationship in synaesthesia. One

279   individual described the tingling sensation as changeable depending on the gender of the voice in the

280   ASMR video she was currently watching. She reported that a female voice would cause the tingles to

281   extend more strongly down one leg, whereas a male voice would increase the sensation in the other leg.

282   Several individuals responded similarly, specifying that '*different triggers hit different parts*'. However,

283   without more data it is difficult to ascertain whether similar experiences are common amongst ASMR

284   capable individuals.

Discussion

ASMR can be defined as a combination of positive feelings, relaxation and a distinct, static-like tingling sensation on the skin. This sensation typically originates on the scalp in response to a trigger, travelling down the spine, and can spread to the back, arms and legs as intensity increases. An increase in intensity can be achieved through experiencing further triggers.

Those who are able to can engage in ASMR through specialised media at any time, given that the environment in which they attempt to do so is quiet and calm. Many report being triggered by viewing others engaged in focused, precise tasks, by having close personal attention paid to them, or by any number of audio stimuli, such as whispering, tapping or other crisp sounds. Though the effectiveness of various triggers is subject to individual differences, most who experience ASMR can be induced by the above categories of stimuli, either through watching specially designed media, or by coming across triggers in daily life. In capable individuals, ASMR is used mainly to achieve relaxation and for stress relief purposes.

Uplifting mood and pain relief

The results of this study suggest that ASMR also provides temporary relief in mood for those suffering from depression, with many individuals consciously using it for this purpose. Individuals whose scores on the BDI suggested moderate to severe depression reported a significantly more uplifting effect of engaging in ASMR than those without depression. Those suffering from symptoms of chronic pain also benefitted from ASMR, seeing a significant reduction in their discomfort for several hours following an ASMR session.

Many reported that even in the absence of tingling sensations, they felt that their mood and symptoms of pain had been improved. It is possible that devoting specific time to engaging in ASMR, watching relaxed scenes play out and sitting quietly could be considered a form of mindfulness (Langer, 1989). Those who engage in ASMR take time to focus on positive emotions triggered by these stimuli, focusing exclusively on this the task at hand. This behaviour is very reminiscent of mindfulness practices, which have already been shown by several studies to have positive effect on both conditions (Kabat-Zinn, Lipworth & Burney, 1985; Segal, Williams & Teasdale, 2012). This categorisation of ASMR as an exercise in mindfulness meditation perhaps best explains the improvements in mood observed in both depressed and non-depressed participants in this study.

314 *Obtaining Flow State*

315 Individuals who scored highly on flow measures reported regularly experiencing a higher number of

316 triggers. This suggests that those who are able to more readily experience flow state during ASMR

317 media consumption are susceptible to more frequent ASMR experiences during their sessions.

318 Many ASMR videos show individuals in highly focused states (e.g. performing medical exams) or

319 engaged in repetitive tasks (e.g. folding towels). The behaviour of performers during these types of

320 videos often resembles that of someone in flow state – confidently and accurately executing precise

321 tasks. It may be that ASMR is brought about by obtaining a flow-like state, which is in part facilitated

322 by witnessing others in such a state. Similar transference of state from performers to audience have

323 been observed in studies probing the role of mirror neurons (Rizolatti, Sinigaglia & Anderson, 2008).

324 Higher levels of flow may in turn facilitate triggers to be obtained, as could be indicated by results of

325 this study.

326 *Links with synaesthesia*

327 The prevalence of synaesthesia of any type within the current study's sample was 5.9%, which is high

328 for the estimated prevalence of 4.4% in the general population (Simner & Hubbard, 2013). Although

329 the figure reported here did not exceed the estimated level to a statistically significant degree, we

330 would suggest there may be a relationship between the two phenomena. In emotional subtypes of

331 synaesthesia, individuals feel moved to various emotions by inducing stimuli which should, in theory,

332 have no emotional effect on them (e.g. tactile-emotion synaesthesia; Ramachandran & Brang, 2008).

333 This sounds strikingly similar to the experience of emotion in ASMR, where emotionally neutral

334 sounds such as tapping and paper tearing, or visual stimuli such as tasks requiring close concentration,

335 bring about a consistent relaxing, stress relieving, positive emotional response.

336 It is, however, also worth exploring whether or not the experience of ASMR ends with automatic

337 positive emotional reactions to neutral audio and visual stimuli. There may also be merit in exploring

338 automatic negative emotional reactions to external stimuli, and assessing any relation of such an

339 experience to ASMR. Within literature surrounding synaesthesia, a related phenomenon that fits this

340 description does exist, and is known as misophonia. Those who experience misophonia (literally

341 'hatred of sound') have automatic negative emotional reactions to particular sounds – the opposite of

342 what can be observed in reactions to specific audio stimuli in ASMR. For instance, sufferers report that

343   noises made by humans, such as 'loud breathing or nose sounds' of any volume can produce feelings

344   of disgust, anger, or hatred in a manner which cannot be explained by previously learned associations.

345   (Schröder, Vulink & Denys, 2013) Though this condition has not yet been included in the Diagnostic

346   and Statistical Manual (DSM), there has been movement for misophonia to be recognised as a

347   psychiatric disorder in future revisions, and links between this phenomenon and other perceptual

348   atypicalities such as synaesthesia have been found (Edlstein, Brang & Ramachandran, 2012).

349   There are distinct similarities between the experience of ASMR and Misophonia. In both phenomena,

350   triggering sounds originate from human movements and behaviours. Reactions to these stimuli

351   automatic in both cases, unexplained by previously learned associations, and have some consistency

352   (with the possible exception of some individuals becoming habituated to triggers from ASMR media

353   they have previously viewed). The present study suggests that ASMR, similarly to misophonia, may

354   have a relationship with synaesthesia. Indeed, both experiences seem to follow somewhat synaesthetic

355   patterns; particular inducers (external stimuli, such as whispering, close attention, etc.) produce

356   concurrents (internal perceptual/sensational experiences - in the case of ASMR, tingling and

357   relaxation) in a somewhat predictable manner. It may be the case that ASMR and misophonia are two

358   ends of the same spectrum of synaesthesia-like emotional responses. Whether this hypothetical

359   spectrum, or indeed ASMR alone, can be classified as a type of sound-emotion synaesthesia is however,

360   debateable.

361   The main issue with relating ASMR to synaesthesia is that, from the data collected here, there does

362   appear to be a difference between the two in terms of tangibility of concurrents. Whereas synaesthetic

363   concurrents are described as 'having a knowledge or sensation of a certain concurrent' (Simner &

364   Hubbard, 2013), the tingling sensation associated with ASMR is described in a very physical sense. If

365   we were to consider the concurrent of ASMR as a tingling sensation, as described by participants of the

366   current study, we could with near certainty say that ASMR is not a subtype of synaesthesia. However,

367   this neglects the presence of positive emotions which accompany the tingling sensation. It may be that

368   ASMR is the positive end of a spectrum of a sound/emotion synaesthesia, and that this tingling

369   sensation is a secondary phenomenon resulting from intensely positive feelings, rather than the primary

370   concurrent. The data collected seems to support this, as many participants reported feeling relaxation

371   and positive emotions even in the absence of a tingling sensation.

372   However, there is no mention in misophonia research of any negative counterpart to the tingling

373   sensation found in ASMR. If one were looking for a truly polar opposite sensation, it may be expected

374   to observe numbness in the skin or an irritating sensation present. It must be considered, however, that

375   perhaps the opposite of this tingling sensation is not irritation, but actually the general level of

376   sensation that might be expected in typical individuals. Rather than this aspect lying on a continuum

377   from irritation to typical sensation to pleasant tingling, it is a smaller continuum between typical

378   sensation and pleasant tingling, with many shades of grey between the two.

379   *Future directions for research*

380   Though the age of the sample in the present study suggests engaging in ASMR is primarily an

381   endeavour of young adults - this is likely to be reflective of limitations in the sampling method. Several

382   individuals above age 40 provided input via this questionnaire, and some participants spontaneously

383   reported being aware that one of their parents and/or their children also experienced what they believe

384   to be the same the sensation. This would suggest that the young age of the sample is more likely a

385   product of user demographic of Facebook and Reddit than an accurate representation of ASMR

386   capable individuals' ages. In the current study, synaesthesia was tested for consistency via e-mail

387   interview. As the subtypes reported by participants were so varied, some immeasurable by the standard

388   Test of Genuineness (TOG-R; Asher et al., 2006), interview was favoured over electronic tests of

389   consistency such as those found on synaesthete.org (Eaglemann et al., 2007). We suggest that future

390   studies into ASMR include rigorous controls for synaesthetic experience.

391   While ASMR appears to be a genuine, relatively prevalent perceptual experience, the exact nature of

392   the phenomenon is still unknown. There is the possibility that the tingles associated with ASMR result

393   from a minor seizure, brought on by appropriate stimuli. This has been hypothesised in the past

394   (Novella, 2012), but as of yet remains uninvestigated. In this vein, research utilising neuroimaging

395   methods such as fMRI may further our understanding brain regions involved in ASMR. fMRI

396   investigations in particular, however, have potential to prove problematic, as results of the current

397   study show that individuals overwhelmingly require specific, quiet and relaxed conditions to achieve

398   the desired sensation. An alternative avenue of research might be the use of so-called non-invasive

399   brain stimulation (Davis & van Koningsbruggen, 2013) to modulate brain activity during ASMR.

400   Techniques such as transcranial direct current or magnetic stimulation (tDCS, TMS) are known to

401   induce multisensory experiences, often as an unintended side-effect of stimulation (Davis, Gold,

402   Pascual-Leone, & Bracewell, 2013). Given the age demographic of ASMR consumers, we note that

403   brain stimulation techniques should be used sparingly in younger people (Davis, 2014).

404   Further exploration into ASMR's relationship with Misophonia may also yield interesting results.

405   Studies examining the co-occurrence of Misophonia and ASMR may shed more light on the possibility

406   that these two experiences are related, or potentially opposite poles of the same spectrum. Similarly,

407   the relationship with synaesthesia suggested by the results of this research should be taken further,

408   using more robust consistency measures to verify that the high instance of synaesthesia in ASMR

409   capable individuals. The suggestion that ASMR and Misophonia may be related was based primarily

410   on similarities in reaction to auditory stimuli. Though sounds play a pivotal role in ASMR, it would

411   also be advantageous to investigate the role of visual stimuli alone in triggering viewers, as such

412   stimuli involving precise movements and focused tasks appear to be effective while being near silent.

413   *Conclusions*

414   We have provided the first investigation into the phenomenon of autonomic sensory meridian response

415   (ASMR). ASMR can be induced, in those who are susceptible, by a fairly consistent set of triggers.

416   Given the reported benefits of ASMR in improving mood and pain symptoms, we suggest that ASMR

417   warrants further investigation as a potential therapeutic measure similar to that of meditation and

418   mindfulness.

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Popular ASMRtists

Table 1 - Popular ASMR-related channels on YouTube. Counts correct as of 10 December 2014

2   **Table 1 - Popular ASMR-related channels on YouTube. Counts correct as of 10 December 2014**

Name	Channel URL	Total Views
WhisperTalkStudios	https://www.youtube.com/user/WhisperTalkStudios	218,900
GentleWhispering	https://www.youtube.com/user/GentleWhispering	88,311,107
MassageASMR	https://www.youtube.com/user/MassageASMR	46,575,761
Fairy Char ASMR	https://www.youtube.com/user/feirychaRstaRs	9,008,828
Ephemeral Rift	https://www.youtube.com/user/EphemeralRift	27,053,163
ASMRRequests	https://www.youtube.com/user/ASMRrequests	648,590
TheUKASMR	https://www.youtube.com/user/TheUKASMR	7,734,238

Common Triggers

Table 2 - Percentage of participants that reported induction of tingling sensations from each trigger type.

2   **Table 1 - Percentage of participants that reported induction of tingling sensations from each trigger type**

Trigger type	Percentage of participants triggered
Whispering	75%
Personal attention	69%
Crisp sounds (metallic foil, tapping fingernails, etc.)	64%
Slow movements	53%
Repetitive movements	36%
Smiling	13%
Aeroplane noise	3%
Vacuum cleaner noise	2%
Laughing	2%

1

ASMR Map

Figure 1: An illustration of the route of ASMR's tingling sensation. Image shows rear view of the head and upper torso. Capable individuals typically experience the sensation as originating at the back of the head, spreading across the scalp and down the back of the neck. Half of participants reported that this sensation typically spreads to the shoulders and back with increasing intensity. Though this diagram represents the most common areas involved in the tingling sensation, there is a huge amount of individual variation in where tingles spread to with increased intensity, with legs and arms also commonly reported as hotspots in some individuals.

Origin of tingling
sensation.

Described as moving
downwards, following
the line of the spine.
Many also feel this
in the shoulders.

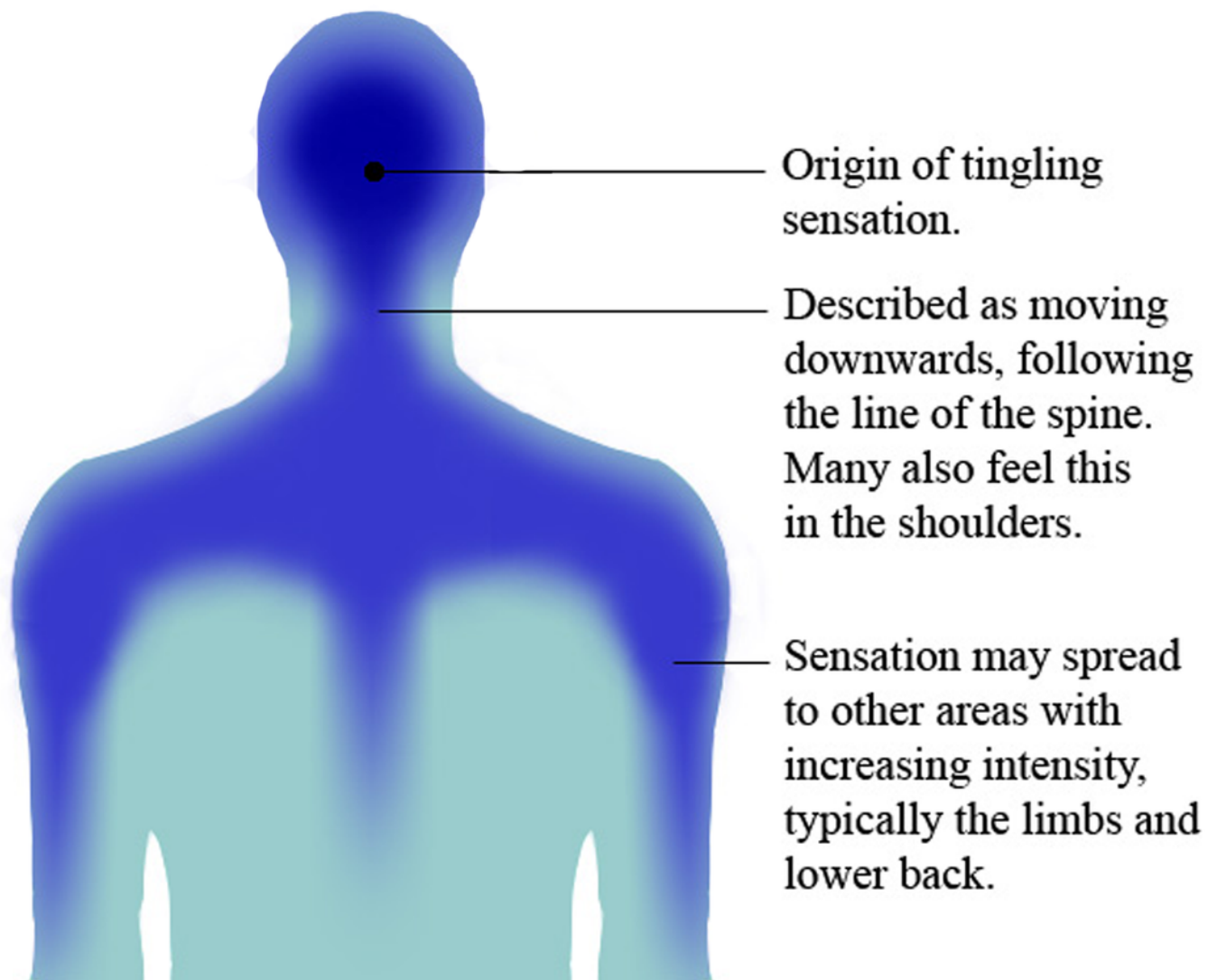
Sensation may spread
to other areas with
increasing intensity,
typically the limbs and
lower back.

BDI graph

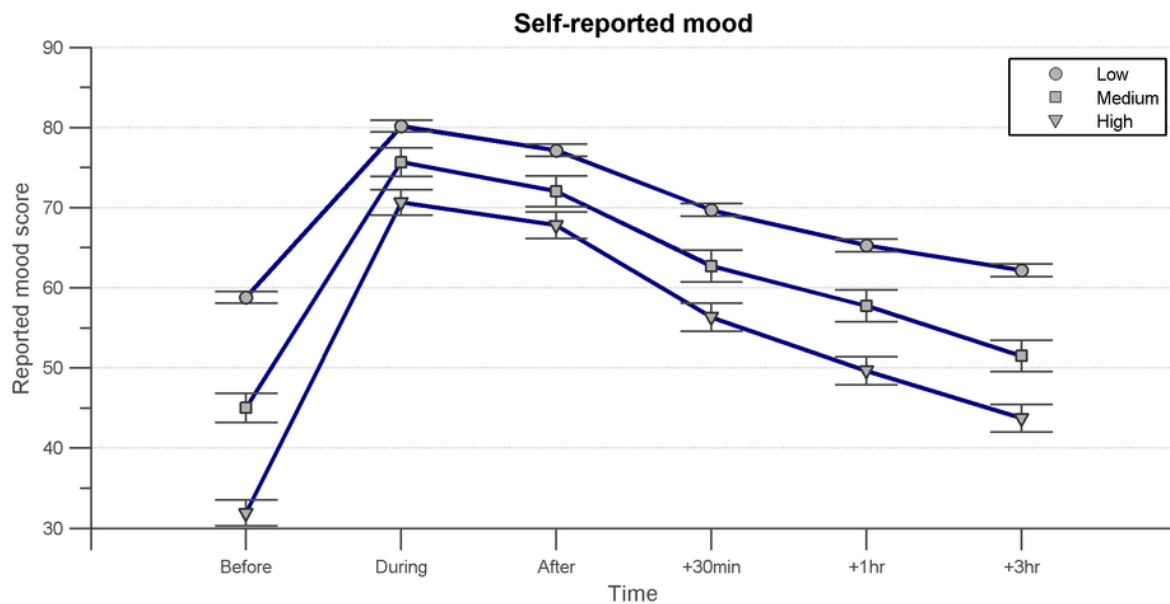
Figure 2: The time course of mood before, during, immediately following, and several hours after engaging in ASMR. Data shown is the mean mood score given to each time frame by all participants (N = 475), with participants grouped according to their Beck Depression Index. Mood scores could range from 0 to 100, 0 representing the worst the individual had ever felt, 100 representing the best they have ever felt. Error bars represent +/- 1 standard error.

Flow and Triggers figure

Figure 3 – Relationship between participants' susceptibility to the flow state (expressed as a sum of the scores on the modified Flow State Scale) and the number of triggers of the ASMR state.