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Do you remember? Similarities and differences between the earliest childhood memories for the five senses

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ABSTRACT

We perceive the world with our five senses. However, the role that these five senses play in early childhood memories has received relatively little attention. Against this background, participants ($N = 117$) were asked to write down their earliest childhood memories for the five senses and to answer additional questions regarding these memories. There was no significant difference between the five senses regarding the percentage of participants reporting a memory or between the valence and the subjective reliability of the reported memories. However, memories reported for sight were marginally longer, from a younger age, and estimated to be more important compared to memories reported for the other senses. A qualitative content analysis revealed that the vast majority of the reported memories fell into a limited number of categories. Interestingly, several categories played a role in more than one sense. Nevertheless, the reported memories also mirrored the characteristic properties that one is able to perceive with each sense. Overall, the findings support the notion that sight is the dominant sense. At the same time, they remind us that each sense provides us with unique information about ourselves and the world around us.

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As adults, we do not remember the moment of our birth. We do not remember muttering our first sounds and words or taking our first steps. More generally speaking, we typically do not have autobiographical memories for the first three to four years of our lives: a phenomenon that was first described in the literature in the late nineteenth century (Henri & Henri, 1895, 1896, 1898; Miles, 1895) and termed *infantile* or *childhood amnesia* (Freud, 1905/1953; for a review, see, e.g., Bauer, 2015). As research from the last years and decades has demonstrated, the time-line for childhood amnesia consists of a two-stage process (for an overview, see, e.g., Bauer, 2007; Pillemer & White, 1989): In addition to the lack of autobiographical memories for the first three to four years of our lives, adult autobiographical memory for the years following is still reduced and only reaches a more adult-like distribution at the end of the first decade of life (see also Bauer & Larkina, 2019).

Despite the existence of this general pattern, research from recent years has accumulated evidence for considerable intra- and inter-individual variability (for an overview of current issues and findings, see Wang & Gülgöz, 2019). For instance, it has been demonstrated that the reported age of early childhood memories depends on various contextual factors (e.g., Kingo et al., 2013; Wessel et al., 2019), that participants tend to report different earliest childhood memories when asked at two different points in time (Ece et al., 2019), and that dating errors may be more frequent than previously assumed (Wang et al., 2019). However, there is at least one potential source of variability that has received relatively little attention thus far: the role that our five senses – sight, hearing, touch, smell, and taste – play in early childhood memories.

Whenever we make memories or interact with our environment, these memories and interactions are mediated through our senses. For instance, remembering the day my younger brother was born may be driven by the experience of hearing him cry for the first time; it may be driven by seeing his face, holding him in my arms, smelling the unique scent of his head – or a combination of these sensory impressions. Against this background, the present study asked a simple but important and heretofore unresolved question: What are the similarities and differences between the earliest childhood memories for the five senses? In order to answer this question, participants were asked to write down the earliest memories that they can recall for each of the five senses

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and to answer some additional questions, which were designed to capture the valence, age, subjective importance and subjective reliability of these memories.

Broadly speaking, two different outcomes seem plausible. On the one hand, one could assume that sight is the dominant sense in the context of early childhood memories. First, we live in an inherently visual culture (Mirzoeff, 1999). In addition, sight dominates input from other senses (see, e.g., Hecht & Reiner, 2009; Hirst et al., 2018) and is the most important sense for most people (Hutmacher, 2019). Most importantly, contemporary theories of autobiographical memory argue that autobiographical memories are not only based on conceptual, but also on sensory-perceptual information – and on *visual* information in particular (e.g., Conway, 2001, 2005; Greenberg & Rubin, 2003; Knez et al., 2017; Rubin, 2005, 2006; Rubin & Umanath, 2015). For instance, Brewer (1988) has demonstrated that most autobiographical memories involve visual imagery. In line with this, subsequent studies have confirmed the strong link between visual imagery and autobiographical memory (e.g., Greenberg & Knowlton, 2014; Vannucci et al., 2016). Against this background, participants should be more likely to recall an earliest childhood memory involving sight than an earliest childhood memory involving one of the other senses, report more detailed memories for sight compared to the other senses, as well as memories from a younger age, which are perceived as more important, more reliable, and perhaps even more positive.

On the other hand, one could assume that early childhood memories for the five senses do not differ that much after all. Despite the apparent dominance of vision in our daily lives, studies have demonstrated that detailed and durable long-term memory representations are not only formed for visual (Brady et al., 2008), but also for haptic (Hutmacher & Kuhbandner, 2018), auditory (Hutmacher & Kuhbandner, 2020), and olfactory (Engen & Ross, 1973) input. While sight may play a key role in autobiographical memory, leading to visual perceptual details being more present in autobiographical memories compared to perceptual details from the other senses, this does not necessarily imply that sight is the dominant sense when comparing the existing earliest childhood memories for the five senses. Quite the contrary, there is reason to believe that the non-visual senses are of particular importance in the early years of life.

For instance, exploring the world through touch and experiencing physical contact are vital preconditions for the healthy development of the individual (for an overview, see Grunwald, 2017). In addition, studies that used retrieval cues in different modalities have provided evidence that smell plays a crucial role in early childhood memories (Chu & Downes, 2000; Miles & Berntsen, 2011; Willander & Larsson, 2006, 2007). For example, Willander et al. (2015) demonstrated that the distribution of autobiographical memories across the first three decades of life differs depending on the modality of the retrieval cue. As far as early childhood memories are concerned, participants provided more memories when an olfactory cue was used compared to the use of auditory, visual, and multimodal cues. Note, however, that the present study does not use retrieval cues in different modalities, but asks the participants to write down their earliest memories for the five senses in response to a verbal instruction. Nevertheless, the above-mentioned studies at least indicate that it is far from clear that sight dominates in the context of early childhood memories. Thus, instead of expecting participants to be more likely to recall an earliest childhood memory involving sight, and instead of expecting the memories reported for sight to be more detailed, from a younger age, as well as more important, more reliable, and more positive, one could also expect the similarities between the earliest childhood memories for the five senses to outweigh the differences.

Method

Participants

The minimum sample size ($N = 84$) was based on a power analysis (G*Power 3.1.9.7; Faul et al., 2007) to have sufficient power (.95, alpha = .05) in order to detect small-to-medium sized effects ($f = 0.15$) in a within-subjects design with one factor with five levels. The data were collected between the beginning of June and the middle of August 2020. Participants were recruited via social media. Participants enrolled in the psychology programme of the University of Regensburg (Germany) received course credit. In total, 124 participants completed the questionnaire on SoSci Survey (Leiner, 2019) using their personal electronic devices. Participants who did not report any memories at all ($n = 7$) were excluded from the analysis. In addition, two memories from one participant were excluded because the age provided for these memories (39 years) was improbable. The remaining data from this participant were included in the analysis. Thus, the final sample consisted of 117 participants (18-75 years, $M = 27.54$, $SD = 13.12$, 88 female, 29 male). The majority of the participants were (psychology) students ($n_{psychology} = 54$, $n_{other} = 28$), but the questionnaire was also completed by employed and retired individuals ($n_{employed} = 33$, $n_{retired} = 2$). All participants provided written informed consent. The study was conducted in accordance with the Helsinki Declaration and the University Research Ethics Standards. In Germany, these types of psychological studies do not require ethical approval of an Ethics Committee (see https://www.dfg.de/foerderung/faq/geistes_sozialwissenschaften/). All data exclusions, manipulations, and measures in the experiment are reported. Data can be downloaded at https://osf.io/z2pe6/.

Design and procedure

Participants were asked to write down the earliest memories that they can recall for the five senses (sight, hearing, touch, smell, taste) and to answer four additional questions regarding these memories. The order in which the participants were asked about their earliest memories for the five senses was counterbalanced across participants. In total, six dependent variables were measured for each memory (see below).

When being asked to write down the earliest memory that they could remember for a specific sense (e.g., sight), participants were instructed to describe their perceptions (e.g., what they have seen in the specific situation) as well as the thoughts and feelings that they experienced during the event. Participants were told to take their time and to think about their childhood in case they were unable to immediately recall a memory. Crucially, participants were allowed to skip a sense when they were convinced that they could not remember a specific situation or event that they would consider their earliest memory with respect to this specific sense. Thus, two dependent variables were measured: the *percentage of participants reporting a memory* for the five senses and the *length* (in words) of the descriptions provided by the participants for their earliest memories.

If participants provided a memory, they were asked to answer four additional questions regarding this memory. Participants were asked (1) to rate the *valence* of the reported event on a 7-point Likert scale ranging from "very negative" to "very positive", (2) to estimate how old they were when the recalled event took place (*age*), (3) to rate the *subjective importance* of the reported memories on a 7-point Likert scale ranging from "very unimportant" to "very important", and (4) to state how certain they are that the recalled memory is authentic and not based on an account that family members had told them (*subjective reliability*) on a 7-point Likert scale ranging from "very unsure" to "very sure". Participants were allowed not to provide an age estimate when they felt unable to do so. If participants did not provide a memory for a particular sense, they continued with the next sense. Participants repeated this pattern until they had been asked about their earliest memories for each of the five senses.

Results

Comparison of the memories reported for each sense

An ANOVA with the within-subjects factor *senses* (sight, hearing, touch, smell, taste) was run for each of the six dependent variables. Note that all participants ($N = 117$) were included in the ANOVA investigating whether the percentage of participants reporting a memory differed between the five senses. The remaining ANOVAs only included complete datasets (i.e., participants who had provided memories for all five senses; $N = 85$ for the dependent variables length, valence, subjective importance, and subjective reliability; $N = 82$ for age as dependent variable, as three more participants did not provide an age estimate for all memories). When the sphericity assumption was violated as indicated by Mauchly's Test of Sphericity, results were adjusted using the Greenhouse-Geisser correction. In the event that an ANOVA showed a significant main effect, the results were further analysed using post-hoc t-tests. To account for multiple testing, the *p*-values of the post-hoc t-tests were adjusted using the Bonferroni–Holm correction. A visualisation of the results for the six dependent variables can be found in Figure 1. The corresponding descriptive statistics can be found in the supplemental material.

Percentage of participants reporting a memory

The percentage of participants reporting a memory did not differ significantly between the five senses, $F(3.49, 400.74) = 1.65$, $p = .169$, $\eta^2 = .014$.

Length

The length of the memories marginally differed between the five senses, $F(3.44, 289.12) = 2.48$, $p = .053$, $\eta^2 = .029$. The results of the post-hoc t-tests are depicted in Table 1. Memories reported for sight ($M = 54.80$, $SD = 49.08$) were marginally longer than memories reported for smell ($M = 44.07$, $SD = 33.80$). All other comparisons were not significant, $ps \geq .126$.

Valence

The valence of the memories did not differ significantly between the five senses, $F(4, 336) = 0.96$, $p = .430$, $\eta^2 = .011$.

Age

The age reported for the memories differed significantly between the five senses, $F(4, 324) = 12.78$, $p < .001$, $\eta^2 = .136$. The results of the post-hoc t-tests are depicted in Table 2. Memories reported for sight ($M = 3.68$, $SD = 1.40$) were from a younger age than memories reported for hearing ($M = 4.34$, $SD = 1.88$), smell ($M = 4.76$, $SD = 1.58$), and taste ($M = 4.91$, $SD = 1.48$), as well as from a marginally younger age than memories reported for touch ($M = 4.17$, $SD = 1.61$). Memories reported for hearing ($M = 4.34$, $SD = 1.88$) were from a younger age than memories reported for taste ($M = 4.91$, $SD = 1.48$). Memories reported for touch ($M = 4.17$, $SD = 1.61$) were from a younger age than memories reported for smell ($M = 4.76$, $SD = 1.58$) and taste ($M = 4.91$, $SD = 1.48$). All other comparisons were not significant, $ps \geq .135$.

Subjective importance

The subjective importance of the memories differed significantly between the five senses, $F(4, 336) = 4.17$, p

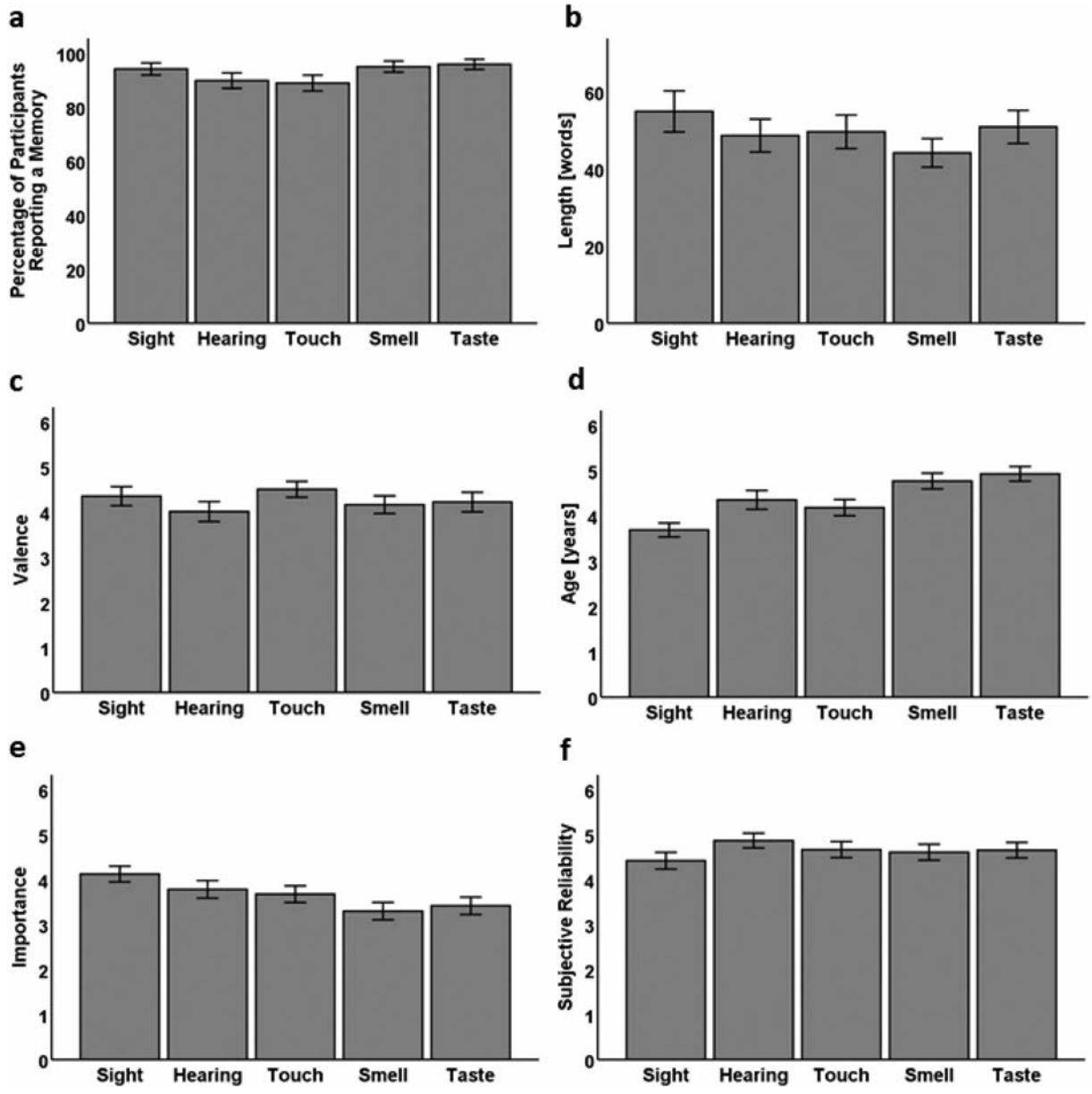

Figure 1. Results. (a) Percentage of participants reporting a memory for the five senses; (b) Average length in words of the descriptions provided by the participants for their earliest memories for the five senses; (c) Average valence of the earliest memories for the five senses (ranging from 0 = "very negative" to 6 = "very positive"); (d) Average age in years of the earliest memories for the five senses; (e) Average subjective importance of the earliest memories for the five senses (ranging from 0 = "very unimportant" to 6 = "very important"); (f) Average subjective reliability of the earliest memories for the five senses (ranging from 0 = "very unsure that the memory is authentic" to 6 = "very sure that the memory is authentic").

Note: Error bars represent the standard error of the mean.

= .003, $\eta^2 = .047$. The results of the post-hoc t-tests are depicted in Table 3. Memories reported for sight ($M = 4.12$, $SD = 1.61$) were estimated to be more important than memories reported for smell ($M = 3.30$, $SD = 1.79$) and taste ($M = 3.41$, $SD = 1.78$). All other comparisons were not significant, $ps \geq .256$.

Subjective reliability

The subjective reliability of the memories did not differ significantly between the five senses, $F(4, 336) = 1.16$, $p = .328$, $\eta^2 = .014$.

Memory content

In order to gain insights into the content of the reported memories, the descriptions provided by the participants were analysed using an inductive qualitative content analysis (see, e.g., Elo & Kyngäs, 2008). This analysis was performed with MAXQDA 2020 (VERBI Software, 2019). In a first step, each memory was coded with a brief label that captured the key object the memory was about. For instance, when participants stated that they remember caressing and cuddling their favourite stuffed animal, the description was coded with the label "stuffed animal";

Table 1. Differences regarding the length of the memories reported for each sense.

	t	*df*	*p*	*d*
Sight vs. hearing	1.49	84	.973	0.16
Sight vs. touch	1.31	84	.973	0.14
Sight vs. smell	2.83	84	.06*	0.31
Sight vs. taste	1.03	84	1	0.11
Hearing vs. touch	0.29	84	1	0.03
Hearing vs. smell	1.49	84	.973	0.16
Hearing vs. taste	0.73	84	1	0.08
Touch vs. smell	1.77	84	.648	0.19
Touch vs. taste	0.37	84	1	0.04
Smell vs. taste	2.52	84	.126	0.27

Note. *t* = t-value; *df* = degrees of freedom; *p* = Bonferroni-Holm adjusted *p*-value; *d* = Cohen's d; (marginally) significant results are marked with an asterisk.

Table 3. Differences regarding the subjective importance of the memories reported for each sense.

	t	*df*	*p*	*d*
Sight vs. hearing	1.50	84	.64	0.16
Sight vs. touch	2.05	84	.301	0.22
Sight vs. smell	3.83	84	<.001*	0.42
Sight vs. taste	3.29	84	.009*	0.36
Hearing vs. touch	0.44	84	1	0.05
Hearing vs. smell	2.18	84	.256	0.24
Hearing vs. taste	1.69	84	.57	0.18
Touch vs. smell	1.54	84	.64	0.17
Touch vs. taste	1.15	84	.759	0.12
Smell vs. taste	0.55	84	1	0.06

Note. *t* = t-value; *df* = degrees of freedom; *p* = Bonferroni-Holm adjusted *p*-value; *d* = Cohen's d; (marginally) significant results are marked with an asterisk.

when participants stated that they remembered smelling the perfume their grandmother was wearing when they were a child, the description was coded with the label "grandmother's perfume", and so on. In a second step, the labels were sorted into inductively created categories. This step was performed separately for each sense. Finally, the number of labels per category was counted. An overview of the results of the content analysis is provided in Table 4. To ensure that the inductive category system is understood in the same way across individuals, an independent rater coded the memories provided by the first 25 participants (~20% of the data). The inter-rater reliability (Brennan & Prediger, 1981) was almost perfect (Landis & Koch, 1977), $\kappa = .89$.

Memories of sight included memories for scenes involving humans (e.g., the faces of parents and siblings, playing with other children in the kindergarten, visiting the grandparents), places (e.g., the kitchen in the grandparents' house, a beach when being on vacation), objects (e.g., a football, traffic lights in front of the parents' house), events (e.g., a car accident, snow on Christmas), and toys (e.g., puppet, toy car).

Memories of hearing included memories for human voices (e.g., parents yelling at each other, crying of the baby brother), songs and music (e.g., a family member playing the piano or singing a song, singing in the kindergarten and at school), technical sounds (e.g., a car or a train passing by at night, the humming of an airplane, the ticking of a clock in the living room), media (e.g., listening to audio books while being in the car, listening to the news on the radio), toys (e.g., a singing stuffed animal, a toy car making specific sounds), animals (e.g., barking of a dog, birds singing in the garden), and nature (e.g., a thunderstorm, the sound of the rushing sea).

Memories of touch included memories for toys (e.g., a rocking horse, toy blocks), objects in the childhood

Table 2. Differences regarding the age of the memories reported for each sense.

	t	*df*	*p*	*d*
Sight vs. hearing	3.19	81	.014*	0.35
Sight vs. touch	2.42	81	.072*	0.27
Sight vs. smell	5.41	81	<. 001*	0.60
Sight vs. taste	7.83	81	< .001*	0.86
Hearing vs. touch	0.89	81	.748	0.10
Hearing vs. smell	2.04	81	.135	0.23
Hearing vs. taste	2.76	81	.035*	0.30
Touch vs. smell	3.04	81	.018*	0.34
Touch vs. taste	4.18	81	<. 001*	0.46
Smell vs. taste	0.81	81	.748	0.09

Note. *t* = t-value; *df* = degrees of freedom; *p* = Bonferroni-Holm adjusted *p*-value; *d* = Cohen's d; (marginally) significant results are marked with an asterisk.

Table 4. Content of the memories provided for each sense.

	Number of Memories
Sight	**110**
Scenes involving humans	47
Places	24
Objects	13
Events	12
Toys	8
Other	6
Hearing	**105**
Human voice	37
Songs and music	27
Technical sounds	9
Media	7
Toys	5
Animals	5
Nature	4
Other	11
Touch	**103**
Toys	16
Objects in the childhood home	15
Animals	15
Stuffed animals	15
Humans	9
Objects in nature	7
Playground	7
Other	19
Smell	**108**
Food	21
Person	18
House	17
Nature	16
Cosmetics and care products	7
Farm	6
Other	23
Taste	**112**
Food	95
Drinks	11
Medicine	3
Other	3

home (e.g., the fence of the garden, a carpet, a chair), animals (e.g., cat, dog, rabbit), various stuffed animals (e.g., teddy bear), humans (e.g., sitting on the grandmother's lap, touching the father's beard), objects in nature (e.g., snow, walking barefoot on grass), and playgrounds (e.g., sand in the sand box, climbing on a climbing frame).

Memories of smell included memories for food (e.g., cake, Christmas cookies, meat), persons (e.g., the mother's perfume, the smell of the siblings when they were babies), houses (e.g., the smell of the attic in the grandparents' house, the smell of the school or the kindergarten), nature (e.g., the smell after a thunderstorm, freshly mowed grass, the sand and the sea when being on vacation), cosmetics and care products (e.g., a specific shampoo, skin cream), and farms (e.g., the smell of dung).

Memories of taste included memories for food (e.g., ice cream, sweets, spaghetti, a specific soup, a specific sausage the grandparents used to buy), drinks (e.g., lemonade, tea, juice, cocoa), and medicine (e.g., cough syrup).

Discussion

The present study was designed to investigate similarities and differences between the earliest childhood memories for the five senses. In order to do so, participants were asked to write down the earliest memories that they could recall for each of the five senses and to answer some additional questions regarding their reported memories. Two different outcomes seemed plausible: (1) that sight is the dominant sense also in the context of earliest childhood memories or (2) that the earliest childhood memories for the five senses do not differ much, as each sense provides us with unique information about the world. The results confirm both possibilities to a certain degree.

First, there was no significant difference regarding the percentage of participants reporting a memory for the five different senses or between the valence and the subjective reliability of the reported memories. Overall, participants were very easily able to recall an earliest childhood memory for the five different senses, confirming the basic idea that the five senses provide us with different kinds of information about our environment, but that all these kinds of information are potentially important and memorable (see, e.g., Ernst & Bülthoff, 2004). Although the reported memories did not differ regarding their valence, it is important to note that they had a positive tone on average. In the existing literature, there is little consensus regarding the valence of memories from early childhood (for a recent overview, see, e.g., Lind et al., 2020): While a significant fraction of early childhood memories is clearly negative (e.g., Kihlstrom & Harackiewicz, 1982; Peterson et al., 2009), adults generally report more positive than negative memories from their childhood (Kihlstrom & Harackiewicz, 1982; see also Walker et al., 2003). This is particularly true when free recall is used (Peterson et al., 2005) as in the present study. Thus, the present finding is in line with previous research. As far as the subjective reliability is concerned, participants were confident that the recalled memories were authentic and not based on accounts that family members had told them. In this context, it would be an interesting topic for future research to investigate whether this impression is accurate or whether the earliest memories for the five senses are malleable and vary over time as earliest childhood memories do in general (see, e.g., Ece et al., 2019; Kingo et al., 2013).

Second, there was a significant difference regarding the age and the subjective importance, as well as a marginally significant difference regarding the length of the reported memories. Crucially, all of these differences were primarily driven by sight. As far as the age of the reported memories is concerned, memories reported for sight were estimated to be from a younger age than memories reported for all other senses, while memories for touch were estimated to be from a younger age than memories reported for smell and taste. In addition, memories reported for hearing were estimated to be from a younger age than memories reported for taste. While the age reported for earliest memories involving sight was on average a little below four years, the age reported for the other senses varied between about four and five years. Thus, the memories reported for all senses lie well within the range that is typically found when investigating earliest childhood memories (see, e.g., Bauer, 2007; Pillemer & White, 1989).

Memories reported for sight were more important to the participants than memories reported for smell and taste. In addition, the difference regarding the length of the reported memories was driven by the fact that the descriptions provided for visual memories were marginally longer than the descriptions provided for olfactory memories. As studies that used retrieval cues in different modalities have provided evidence that smell plays a crucial role in early childhood memories (Chu & Downes, 2000; Miles & Berntsen, 2011; Willander et al., 2015; Willander & Larsson, 2006, 2007), this finding may seem surprising. As already mentioned in the introduction, however, the present study did not use retrieval cues in different modalities, but asked the participants to write down their earliest memories for the five senses in response to a verbal instruction. Hence, the different results may be attributable to methodological differences. This aspect should be further investigated in future research.

How can the relative dominance of sight in the context of earliest childhood memories be explained? On the hand, one could argue that sight is *by nature* the dominant sensory modality. In the context of the present study, for instance, one could refer to the fact that sight and visual imagery are closely linked to autobiographical memory (e.g., Conway, 2001, 2005; Greenberg & Rubin, 2003; Rubin, 2005, 2006). On the other hand, one could also point out that there is considerable historical and cross-cultural variation regarding the hierarchy of the senses

(for a detailed discussion, see Hutmacher, 2019; see also Majid et al., 2018). In other words, the relative dominance of sight in the context of earliest childhood memories may at least be reinforced by cultural norms and the fact we live in an increasingly visual world. In this context, it is particularly interesting that relevant cross-cultural differences have been observed regarding other aspects of early childhood memory (see, e.g., Wang, 2006, 2014). Thus, the present study provides a valuable basis for extending the knowledge about the role of our five senses in early childhood memories in future, cross-cultural research. In particular, different cultural backgrounds could influence both the evaluation (e.g., with respect to importance) and the content of the earliest childhood memories for the five senses. In addition, it is important to note that most participants in the present study were young adults and females. A systematic investigation of potential effects of participant age and gender in future research is highly desirable.

The analysis of the content of the reported memories revealed two other interesting findings. First, there was considerable variability regarding the content of the memories both between and within the senses. As it appears, the content of the earliest childhood memories for the five senses depends on various contextual factors and the specific environment in which the individual grew up. In addition, the memories for the five senses mirror the characteristic properties that one is able to perceive with each sense. For example, many memories for sight involve the general characteristics of a specific environment, while memories for touch involve objects in the immediate vicinity (i.e., toys, stuffed animals, objects in the childhood home). Food and drinks play a prominent role in smell and taste, while songs and music are particularly important among memories for hearing.

Despite this variability, the vast majority of the reported memories fell into a limited number of categories, indicating that there are clear commonalities between the earliest memories for the five senses on a more abstract level. Even more importantly, there are several categories that play a role in more than one sense. Experiences with humans are prominent in all senses except taste; memories for specific places (such as the childhood home) are prominent in sight, touch, and smell; toys (including stuffed animals) are prominent in sight, hearing, and touch. As the combination of our sensory abilities grants us a rich and diverse access to the world, such an overlap across the different modalities is not surprising. Nevertheless, it provides a nice illustration of the broader claim that the perceptual content of memories from early childhood is not limited to sight.

Early memories are like "flashes in the dark" (Draaisma, 2012): They comprise those few aspects of our early years of life that we can still remember as adults. By helping to understand the role of our five senses in early childhood memories, the present study contributes to the broader goal of unravelling the enigmas of memory – and in particular of those precious "flashes in the dark" that we still remember as adults. In short, the findings of the present study support the notion that sight is the dominant sense. At the same time, they remind us that each sense provides us with unique information about ourselves and the world around us.

Disclosure statement

No potential conflict of interest was reported by the author(s).

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