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A systematic review of the sensory processing experiences of people with attention-deficit/hyperactivity disorder (ADHD): Characterising sensory profiles and exploring their relationship with participation barriers in daily living

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ABSTRACT

Background: Optimal participation in daily life occurs when environmental demands align with an individual's capabilities. For people with ADHD, the relationship between sensory processing differences and barriers to participation remains underexplored.
Objectives: To characterise self-reported sensory processing experiences of individuals with ADHD across the lifespan and explore interactions between sensory experiences and participation in daily living activities.
Data Sources: Ten databases were systematically searched up to August 2026. Manual reference screening of included studies was also conducted.
Eligibility Criteria: Participants had a medical diagnosis of ADHD, were not taking ADHD-specific medication and were not autistic. Consistent with a neurodiversity-affirming approach, participants were recognised as experts in their own experiences, with only self-reported sensory experiences included. Peer-reviewed studies published in English were included, with no age restrictions.
Methods: This systematic review was registered with PROSPERO (CRD42023434725) and conducted in accordance with PRISMA guidelines.
Results: Thirteen studies met the inclusion criteria. Across the lifespan, participants reported sensory processing differences from peers without ADHD, including hyper- and hyposensitivity across sensory domains. Limited longitudinal research and the underrepresentation of older adults restricted understanding of developmental trajectories. Sensory differences were associated with barriers to participation, particularly within work and higher education settings.
Limitations: Methodological limitations included small samples, incomplete reporting of measurement properties and participant medication use, and an absence of matched comparison groups in some studies.
Conclusions: Evidence remains limited and is predominantly measurement-focused rather than centred on lived experience. Future research should provide detailed methodology, adopt neurodiversity-affirming approaches, and prioritise co-production to develop sensory-based strategies that support accessibility, participation, and uphold difference-rather-than-deficit principles for people with ADHD.

1. Introduction

Knowledge of one's own sensory processing patterns can be a powerful tool to empower a person to make decisions about how they interact with the world around them (Dunn, 2001). Sensory processing can be understood as encompassing the receiving, organising, and acting on sensations received from both within and outside of the body in order to engage in activities effectively (Machingura et al., 2021). When a person's individual sensory needs and preferences do not align with expectations of them within a given activity or environment, barriers to

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participation can be created (MacLennan et al., 2023). Inequitable access can then be perpetuated by systemic barriers that marginalise the needs of individuals whose sensory processing profiles do not reflect the dominant neurotype (Finnigan, 2024).

Attention-deficit/hyperactivity disorder (ADHD) is a common neurodevelopmental disorder (Scandurra et al., 2019). This statement is regularly paraphrased in introductions to literature about ADHD, illustrating a dominant biomedical perspective of disability which assumes that ADHD is concerned with dysfunction and deficit (Bölte et al., 2021). Interventions are subsequently directed towards treating perceived negative symptoms, such as impulsivity, hyperactivity, and inattention (American Psychiatric Association, [APA] 2022; World Health Organisation, [WHO] 2022). Interventions are often aimed at preventing associated risks, which have been said to include poor mental health, substance misuse, obesity, divorce, and prison incarceration (French et al., 2024).

Understanding ADHD via the perspective of the neurodiversity paradigm (Singer, 2016) means that strengths, well-being, and optimal participation in daily life are considered diminished by barriers to a person's positive interactions with their environment, rather than inherent pathological deficits (Dwyer, 2022). The real and distinct challenges experienced by many people with ADHD are not minimised (Nicholson and Lee, 2026). Rather, impairment is understood as functional limitations that may arise from physical, sensory, and/or cognitive characteristics that can be observed during a diagnostic process (Barnes, 1991); these limitations are understood as neurodivergent differences that interact with environmental demands. Environments can be adapted in order to enable participation (Nicholson and Lee, 2026).

The neurodiversity paradigm reframes conditions such as ADHD as existing within the breadth of differences found within human variability (Swanepoel, 2024) and aligns with many facets of the social model of disability (Dwyer, 2022). The concept of neurodivergence acknowledges co-occurring, often multidimensional, neurodevelopmental differences, including diagnostic conceptualisations of ADHD (Fletcher-Watson, 2022). Embracing diversity is a core principle of designing interventions that adopt a neurodiversity-affirming ethos, which seeks to challenge the assumption that neurodivergent people need to align their behaviours with those of neurotypical people in order to participate in activities successfully (Lerner, Gurba, & Gassner, 2023). Rather, it is essential that environments, both physical and societal, are modified to include the needs of neurodivergent individuals so that people of all neurotypes have the same opportunities for success (Cherewick & Matergia, 2024).

Emerging evidence from clinical research suggests that people with ADHD experience sensory processing differences along with inattentive, hyperactivity, and impulsivity characteristics (Jurek et al., 2025). Anecdotal evidence across social media, internet blogs, and lay magazines depicts difficulties that adults with ADHD have with sensory processing differences and it often recommends resources for managing these in daily life (The mini ADHD Coach, 2023; ADDitude, 2023). Of concern is that online content can vary in quality and evidence-based foundations (Lui et al., 2025; Hall & Keenan, 2025). In a consensus statement by Adamou et al., (2021), which was written in conjunction with the UK Adult ADHD Network, challenges with sensory regulation were prioritised. The statement called for self-management techniques to empower individuals with ADHD. This was primarily based on research findings of sensory processing differences for children.

A systematic review by Costa-Lopez et al. (2021) highlights important relationships between sensory processing and quality of life for many people, though not specifically for people with ADHD. Findings implied a relationship between lower tolerance for incoming sensory stimuli and worsened daily functioning, health, and well-being. Sensory processing characteristics and difficulties with academic and functional abilities have also been reported for children with ADHD (Lane & Reynolds, 2019). These researchers suggested that 'atypical' sensory processing is an "overlooked diagnostic dimension" (Lane & Reynolds, 2019, p.3).

Diagnostic definitions of ADHD have not kept pace with personal accounts of neurodivergence (Ginapp et al., 2022) or academic discourse (Honkasilta & Koutsoklenis, 2022) and have not benefited from the same advancements in conceptual understanding as other neurodivergences (for example, Heasman & Gillespie, 2019; Pearson & Rose, 2021; Petty and Clegg, 2025). For individuals with ADHD, their families, educators, and clinicians to work from an accurate conceptualisation, ADHD phenomenology must be understood. We adopt the standpoint that ADHD is a neurodivergent condition; as such, the voices of people with ADHD are central to any agenda to improve their lives (Sonuga-Barke et al., 2023; Twinley, 2024).

In a contemporary, comprehensive systematic review and meta-analysis of pharmacological and non-pharmacological interventions available for adults with ADHD, Ostinelli et al., (2025) highlighted the value of self-report data from people with ADHD in research. Their findings suggested that whilst ADHD medication can demonstrate a positive impact on ADHD symptoms over short-term periods, quality of life outcomes have not seen the same improvement. Furthermore, the effects of non-pharmacological interventions, such as cognitive behavioural therapy, mindfulness, and psychoeducation, were inconsistently efficacious across studies. Limited evidence for both the longer-term efficacy of ADHD medication and non-pharmacological interventions (Ostinelli et al., 2025) has implications for people with ADHD, particularly in terms of longer-term quality of life (Bellato et al., (2025). Importantly for this review, research-informed interventions for people with ADHD make no reference to sensory processing differences (Ostinelli et al., 2025; Peterson et al., 2024).

This review characterises self-reported sensory processing experiences of individuals diagnosed with ADHD across the lifespan, with an analysis of quantitative, qualitative, and mixed-method research. Self-report data within the context of this review included data given by people with ADHD via interviews, surveys, standardised questionnaires, and experimental tasks requiring verbal responses to indicate sensory experiences. The review sought to describe any patterns in the personal descriptions of sensory processing experiences, including differing sensory profiles, and to consider how these experiences might shape participation in everyday activities. In doing so, it asks how existing research does, or does not, support efforts to identify and dismantle sensory barriers to participation for people with ADHD. Whilst we do not begin with an assumption that sensory processing differences define ADHD, we set out to present the available evidence of the characteristics of sensory experiences and possible impacts on daily life as reported by people with ADHD. Individuals with ADHD are experts in their own sensory experiences and, together with clinical and research-derived understandings, should contribute to a valid conceptualisation of sensory processing for people with ADHD. In line with the neurodiversity paradigm and what has been outlined to be essential design for neurodiversity research (Fletcher-Watson, 2022), we believe that research should be co-produced with people with ADHD and focus on sensory accessibility and participation to drive positive societal change and address epistemic injustice.

The article contributes to disability and neurodiversity studies by showing that the sensory processing experiences of people with ADHD have usually been studied as a measure of deficit rather than as a reflection of relational experiences that can be shaped by barriers within the social and physical environment.

2. Research Process

This systematic review used a PRISMA statement (Page et al., 2020) as the foundation of its methodological design and was registered with PROSPERO (CRD42023434725).

2.1. Search Strategy and Inclusion Criteria

The search strategy was populated using the search tool Patient, Interventions, Comparison, Outcomes, Study Design (PICOS; Methley et al., 2014, see Table 1). A list of search terms (see Table 2) was created from reviewing sensory processing assessments (including: the Sensory Profile 2, Dunn, 2014; Sensory Processing Measure [SPM], Parham et al., 2021; Adolescent/adult Sensory History [AASH], May-Benson, 2015) and the contemporary theoretical model of Sensory Integration dysfunction (Bundy & Lane, 2000). Truncation, wildcards and Boolean operators were used to combine search terms from three key areas: sensory processing, sensory-related terms, and ADHD (see Table 3).

Studies were included if they: (i) were full-text, peer-reviewed, English-language articles; (ii) involved participants formally diagnosed with ADHD; (iii) excluded participants with co-occurring autism diagnoses; and (iv) had self-reported sensory processing experiences as data. Exclusion criteria were subsequently refined to reject studies where participants were taking ADHD-specific medication due to research findings suggesting that this medication can alter sensory experiences (Romanos et al., 2008). Four studies were included that did not report any medication use but did not explicitly state that no ADHD-specific medication was being taken; this is acknowledged as a limitation of this review.

2.2. Study Selection

The search was conducted across the following platforms with no date restrictions: APA PsycArticles; APA Psycinfo; CINAHL; EMBASE; ProQuest for Applied Social Sciences Indexes and Abstracts; PubMed Central; PubMed for MEDLINE; Scopus; The Cochrane Library; and Web of Science. Searches were conducted until 5 February 2024. An update is provided in August 2026. Additional articles were sourced through reference and citation searches of the full-text articles included in the review.

2.3. Data Collection and Quality Appraisal

Risk of bias was reduced by having a second researcher screen 10% of the studies at the title and abstract levels. Inter-rater agreement for article inclusion at abstract screening was 95%, resolved to 100% after discussion. Data extraction was conducted by the first author and encompassed participant demographic information, sample size, study aims, study design, all quantitative and/or qualitative self-reported sensory processing experiences, conclusions and implications for practice, and any reported effects of sensory processing on activity participation. Extracted data were systematically tabulated for the purpose of cross-study synthesis. Included studies were critically appraised for methodological quality using the Mixed Method Appraisal Tool (MMAT; Hong et al., 2019) and the Critical Review Form – Quantitative Studies (Law et al., 1998).

Table 1
Patient, Intervention, Comparison, Outcome and Study Design (PICOS) Summary.

PICOS	Inclusion Criteria	Exclusion Criteria
Patient	All ages Medical diagnosis of ADHD	Medical diagnosis of autism Self-identification of ADHD Taking ADHD medication
Intervention	Self-report via standardised or non-standardised report, including questionnaires, interviews, focus groups	Parent/carer/clinician report relating to sensory processing, Observational or performance-based psychometrics
Comparison	Not applicable	Not applicable
Outcome	A description/ characterisation of sensory processing differences experienced by people with ADHD as detailed by self-report only	Sensory processing differences described by anybody other than the person with ADHD, including a parent, carer, family member, educator, researcher, or clinician report of sensory processing differences
Study Design	Qualitative, quantitative, or mixed methods data.	Non-peer reviewed research Literature published in languages other than English

Table 2
Systematic Review Search Terms.

Activity	Discrimination	Olfactory	Tactile
ADHD	Gustatory	Organisation	Social
Attention-deficit/ hyperactivity disorder	Defensive	Over-responsivity	Social participation
Affect	Dyspraxia	Perception	Somatodyspraxia
Attention	Emotional	Planning	Spatial
Auditory	Engagement	Postural control	Taste
Aversive	Fine motor	Postural ocular	Threshold
Avoidance	Hearing	Praxis	Touch
Balance	Hyper-reactivity	Processing	Under-responsivity
Body Awareness	Hypo-reactivity	Proprioception	Vestibular-Bilateral
Body Scheme	Mood	Reactions	Integration and Sequencing (VBIS)
Clowning	Motor activities	Sensitivity	Withdrawal
	Motor coordination	Sensory	
	Movement	Smell	

Table 3
Systematic Review Search String.

Search String	"sens* AND AD*HD OR attention deficit*hyperactivity disorder OR attention deficit disorder AND "Activity*level*" OR Affect OR Attent* OR Auditory OR Avers* OR Avoid* OR Balance OR Body awareness" OR Body scheme" OR Clowning NOT Clown" OR Coordination OR Defensive OR Discriminat* OR Dysprax* OR Emotional OR Engagement OR "Fine motor" OR "Gross motor" OR Gustat* OR Hearing OR "Hyper reactive*" OR "Hypo reactive*" OR Idea* OR Integrat* OR Interocept* OR Language OR "Low registration" OR Modulat* OR "Motor*activit*" OR Motion OR "Motor coordination" OR Movement OR Olfact* OR Organisation OR "Over responsiv*" OR Percept* OR Plan* OR "Postural control" OR "Postural*ocular" OR Praxis OR Processing OR Proprioception OR React* OR Registration OR Regulat* OR Seek* OR "Self*efficacy" OR "Self*esteem" OR Sensitivity OR Smell OR Social OR "Social participation" OR Somatodyspraxia OR Spatial OR Tactile OR Taste OR Threshold* OR Touch* OR "Under responsive*" OR Vestibular OR "Vestibular Bilateral integration and Sequencing" OR "VBIS" OR Visual OR Withdraw*

2.4. Community Involvement Statement

This review included researchers with and without ADHD diagnosis who collaborated on the design, analysis, and dissemination of the findings.

3. Results

3.1. Description of Studies

A total of 15,922 records were identified through searches of 10 databases. After removing 9212 duplicate records, 6740 records remained for title screening. Following title screening, 6488 records were excluded, leaving 256 records for abstract screening. After abstract screening, a further 177 records were excluded, and 79 full-text articles were assessed for eligibility. Of these, 66 articles were excluded because they did not meet the predefined inclusion and exclusion criteria. Consequently, 13 studies were included in the final review (see Fig. 1).

Descriptions of each study are provided in Table 4. Studies were

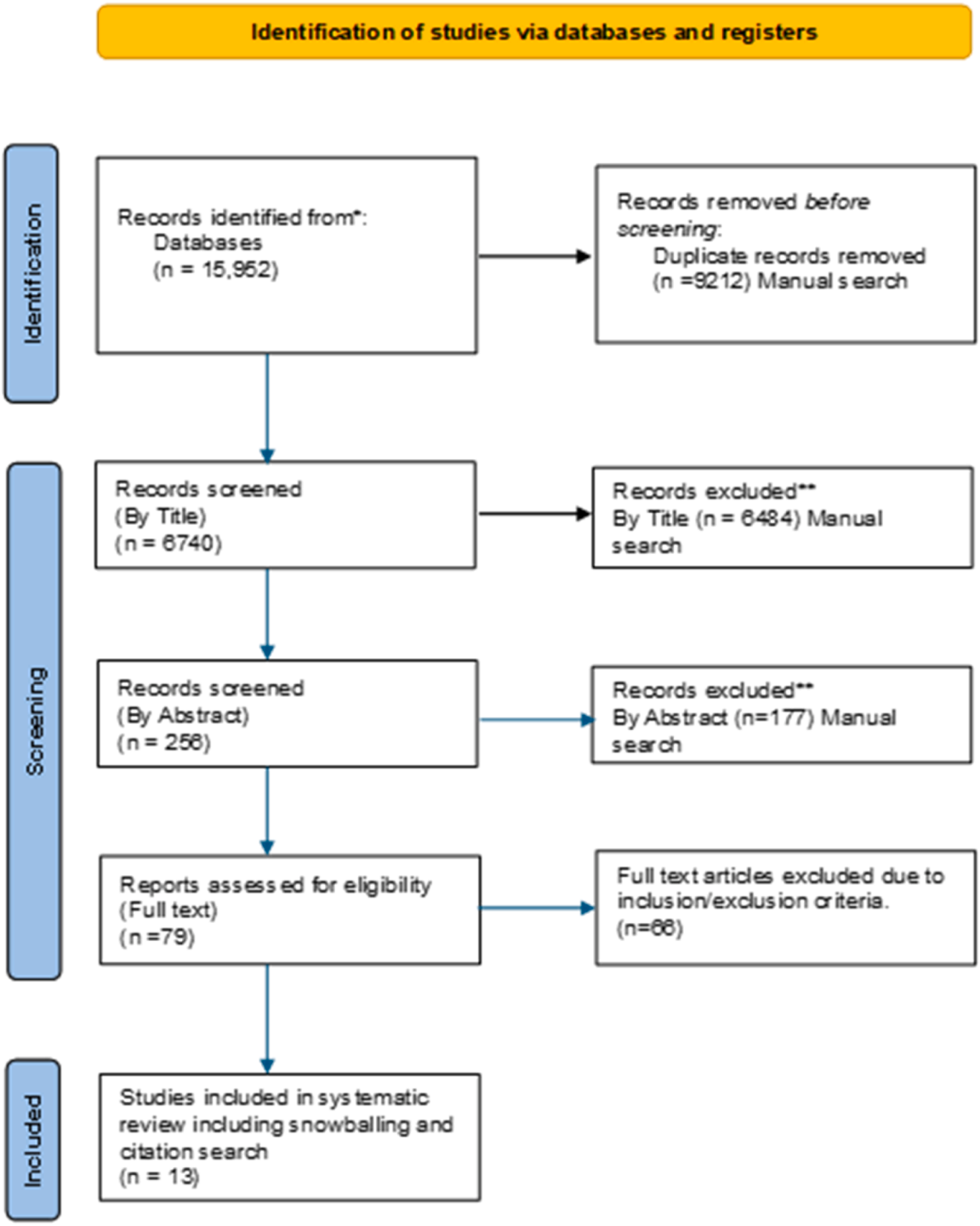

Fig. 1. PRISMA Flow-Diagram.

published between 2008 and 2023. Three studies originated in the United States, two each in Germany, Isreal, and the Netherlands, and one each in Denmark, Iran, Ireland and Taiwan. Participant ethnicity information was available only in two studies, both indicating participants were European Caucasian. The age range of participants was five years to 49 years and five months. Sample sizes ranged from 6 to 75 with a total of 469 participants represented across all studies. Across studies, 59% of participants were male (range 35–80%). All studies used non-probability convenience sampling (e.g., internet adverts, social media, existing research projects). Five studies employed a case-control design; three used surveys only; one study used each of: case-control and survey, convergent parallel mixed-method, cross-sectional and survey, and quasi-experimental designs. Participants were all diagnosed with ADHD using standardised assessments or psychiatric clinical interviews aligned to the International Classification of Diseases 10th Revision (ICD−10, WHO, 1993), or Diagnostic and Statistical Manual of Mental Disorders 4th Edition (DSM-IV, Sibley et al., 2022; American Psychiatric Association, 1994; American Psychiatric Association, 2000), 4th Edition with Text Revision (APA, 2000) or 5th Edition (APA, 2013). ADHD medication cessation prior to test conditions across studies ranged from the night before to 48 h before, or longer than 48 h before for non-stimulant medication. Two studies included participants with ADHD who were

Table 4
Descriptive Data of Included Studies Retrieved: Systematic Review of Sensory Processing Experiences of Adults with ADHD.

Author Reference	Age Range (yr)	Study Design	Participant numbers ADHD/ Comparison group	Measurement	Summary of Findings
Adra et al. (2021)	18 <	Quantitative. Survey of sensory modulation subtypes and neuro-imaging study.	25/29	Sensory modulation disorders (SMD) subscales within the Sensory processing 3 dimensions scale (sensory processing3) - questionnaire.	Participants with ADHD scored significantly higher than comparison participants in the Sensory Craving subscale – Visual domain and Sensory Under-responsivity – Visual and Auditory domains.
Broring et al. (2008)	6–12	Quantitative. Pilot study. Survey of Tactile Defensiveness.	47/35	Touch inventory for elementary school aged children (TIE) – questionnaire.	Females with ADHD had significantly higher tactile defensiveness scores than males with ADHD and comparison participants.
Clince et al. (2016)	18 <	Qualitative. Quantitative. Convergent, parallel mixed method study of sensory processing patterns of higher education students.	6/0 28/0	Qualitative – interview. Quantitative - Adult and Adolescent Sensory Profile (AAsensory processing).	Qualitative – Themes generated: Study and Exam Environments and Choice of Leisure Activity. • "I have a hard time studying when it's complete silence." • Being involved in physical activity was a coping mechanism Quantitative: 71.4% of ADHD participants' raw scores were "more than most people" for low registration. Higher mean scores than the standardisation group in low registration, sensory sensitivity, sensation avoiding quadrants. ADHD group scored significantly higher mean scores than the ASD group but still less than the standardisation (comparison) group.
Etter et al. (2021)	18 <	Quantitative. Case control study of orofacial somatosensation and speech motor control.	28/22	Von Frey hair monofilaments. Baseline Discrim-A-Gon 2-point Discriminator discs.	Significant differences in point pressure detection and discrimination thresholds but only for the right side of tongue.
Ghanizadeh et al. (2012)	8–15	Quantitative. Case control study of smell identification.	50/50	Olfactory testing kits.	The sensory identification score and sensory threshold scores were statistically lower for people with ADHD than the comparison group.
Grinblat & Rosenblum (2022)	18 <	Quantitative. Quasi-experimental study of work participation, sensory processing, and sleep.	69/52	Adult and Adolescent Sensory Profile (AAsensory processing) and Occupational Questionnaire (OQ).	ADHD participants had significantly higher mean scores in low registration, sensory sensitivity, and sensation avoiding quadrants. Sensory sensitivity quadrant scores significantly affected work participation according to the OQ.
Kamath et al. (2020)		Quantitative. Survey of self reported sensory processing experiences.	23/22	Adult and Adolescent Sensory Profile (AAsensory processing).	ADHD participants scored significantly higher in the low registration, sensation seeking, sensory sensitivity quadrants. Modality scores indicate a main effect of diagnosis for movement, visual, touch, activity and auditory domains.
Mazor-Karsenty et al. (2018)	18 <	Quantitative. Case control study of aversive auditory sound perception.	20 Sensory Modulation Disorder (SMD) & ADHD/ 6 ADHD / 20 Comparison participants	The Battery of Aversiveness to sounds (BAS).	ADHD participants showed higher mean scores when high and medium intensity sounds were detected, with high intensity sounds reaching marginal significance for participants with ADHD vs. comparison participants.
Romanos et al. (2008)	6–17	Quantitative. Case control study of odour sensitivity.	20/20/20 ADHD and medicated/ ADHD no-medication/ Comparison participants	Sniffin' Sticks.	ADHD patients without medication had significantly higher odour sensitivity scores (lower threshold) than comparison participants, and higher scores than those ADHD participants taking medication.

(*continued on next page*)

Table 4 (*continued*)

Author Reference	Age Range (yr)	Study Design	Participant numbers ADHD/ Comparison group	Measurement	Summary of Findings
Scherder et al. (2008)	5–12	Quantitative. Survey. Case control study of somatosensory functioning.	50/35	Child pain inventory (CPI) – questionnaire. Testing to forearm recording detection: cold/warm tube (temperature), blunt/ sharp pencil on forearm (sensory discrimination of pain), cotton wool (light touch) forearm	ADHD participants made significantly more errors in temperature discrimination and the sensory discrimination aspects of pain than comparison participants.
Stankovic et al. (2021)	13–16	Quantitative. Cross sectional study. Survey.	36/36	Sniffin' sticks. Taste spray. Food Neophobia Test – questionnaire. Food preference scale – questionnaire.	No difference in self-reported dietary patterns. No significant difference in food neophobia test. Chemosensory function in ADHD significantly lower in olfactory and gustatory testing.
Tien et al. (2019)	7–15	Quantitative. Case control study of auditory sensory discrimination.	75/22	Auditory detection task - detect signal embedded in transient background noise.	Auditory sensory discrimination scores for ADHD participants were lower than the comparison participants at 35 and 45 decibels (dB).
Weiland et al. (2011)	18 <	Quantitative. Case control study of olfactory and gustatory sensitivity.	12/12	Sniffin' sticks and taste strips.	No difference in odour threshold or sensitivity between groups.

drug naïve (Romanos et al., 2008; Tien et al., 2019; Weiland et al., 2011). Four studies did not report any medication use (Clince et al. , 2016; Grimblat & Rosenblum, 2022; Kamath et al., 2020; Mazor-Karsenty et al., 2018), therefore, the results are reported with the caveat that medication use may have influenced those findings.

3.2. Quality Appraisal of Available Studies

All studies were non-randomised. Common strengths included clear research questions, appropriate study designs, and documentation of ethical approval and consent. Lack of clarity, rationale and standardisation regarding ADHD-specific medication use and its cessation prior to studies commencing was a concerning feature across studies. Studies lacked methodological rigour in the following areas: use of non-standardised outcome measures (Scherder et al., 2008; Tien et al., 2019); test conditions not controlled between participant groups (Ghanizadeh et al., 2012; Grinblat & Rosenblum, 2022; Stankovic et al., 2021); outcome measure validity and reliability data not provided (Etter et al. 2021; Grinblat & Rosenblum, 2022; Mazor-Karsenty et al., 2018; Romanos et al., 2008; Stankovic et al., 2021; Tien et al., 2019; Weiland et al., 2011); and modification of outcome measures by language translation (Broring et al., 2008), digital use (Grinblat & Rosenblum, 2022), or statistical analysis (Clince et al., 2016). Methodological concerns suggest potential bias, limiting the findings' relevance to individuals with ADHD.

3.3. Self-reported Sensory Processing Differences

A total of 12 studies reported quantitative data on self-reported sensory processing experiences following exposure to specific stimuli under standardised test conditions or from standardised scales. Participants completed an auditory detection task, identifying a sound embedded in transient background noise with a yes/no response (Tien et al., 2019). The Battery of Aversiveness to Sounds (BAS) rated the unpleasantness of common sounds played to the participant, e.g., apple eating (Mazor-Karsenty et al., 2018). Olfactory testing kits presenting five common scents in glass sniff bottles assessed odour identification ability, with odour threshold scores obtained by presenting scents until they could not be detected (Ghanizadeh et al., 2012). Sniffin' Sticks measured odour sensitivity by participants smelling odourant pens and making a verbal response limited to a range of possible scents (Romanos et al., 2008; Weiland et al., 2011; Stankovic et al., 2021). Taste sprays/strips with taste solutions were presented to assess taste sensitivity, with participants asked to indicate bitter, sweet, sour, or salty descriptions (Weiland et al., 2011). Lip and tongue tactile discrimination and detection were measured via Von Frey hair monofilaments, and Baseline Discrim-A-Gon 2-point Discriminators were used for two-point discrimination ability. Here, the test instruments are applied to the target area (e.g., participant's tongue) and a verbal response was given if detected (Etter et al., 2021). Temperature and discrimination tests involved blunt, sharp, hot and cold items placed on the forearm, with participants indicating detection (Scherder et al., 2008).

One study reported qualitative data as part of a mixed-methods approach, asking higher education students to complete a standardised self-report scale of sensory processing experiences (AASP; Brown & Dunn, 2002) and take part in a semi-structured interview discussing how aspects of their educational experience (study, learning, and social environment) might have been influenced by sensory preferences identified by the AASP (Clince et al., 2016).

The majority of studies used the AASP (Clince et al, 2016; Grimblat and Rosenblum, 2022; Kamath et al., 2020), which aims to group participant experiences into seven sensory domains (e.g., tactile, smell), and identify patterns of sensory processing responsivity in quadrants (e.g., low registration and sensation seeking). Other standardised sensory processing surveys included: the Child Pain Inventory (CPI, McGrath et al., 1996); Sensory Modulation Disorders subscales within the Sensory Processing 3 Dimensions Scale (SP3D, Mulligan et al., 2019); and the Touch Inventory for Elementary School-Aged Children (TIE, Royeen & & Fortune, 1990). These yield numerical data based on pre-defined response options where participants rate the frequency of a behaviour in response to sensory stimuli, for example, 'Almost Never' to 'Almost Always' in response to "I am distracted if there is a lot of noise around" (AASP; Brown & Dunn, 2002).

3.4. Descriptions and Patterns of Sensory Processing

Descriptions of sensory processing by children with ADHD suggested differences in auditory (Tien et al., 2019), olfactory (Romanos et al.

2008; Ghanizadeh et al. 2012; Stankovic, Thompson and Ovesen 2021), gustatory (Stankovic et al., 2021), and somatosensory domains (Bröring et al., 2008). Auditory differences related to lower scores compared with peers without ADHD for detecting a sound within background noise (Tien et al., 2019), suggesting hyposensitivity responses. Differences in olfactory sensory processing suggested both hyper- and hyposensitivity responses for participants with ADHD, with hypersensitivity to smells reported in the study by Romanos et al., (2008) and hyposensitivity reported by by Ghanizadeh et al., (2012) and Stankovic et al., (2021). Differences in olfactory sensory processing may reflect the wider participant age ranges of 5 years 10 months to 17 years 1 month reported by Romanos et al., (2008). In contrast, the participants' age ranges in the studies by Ghanizadeh et al., (2012) and Stankovic et al., (2021) were 8–15 years and 13–16 years, respectively. Age-specific results were not provided by Romanos et al., (2008), however, both Romanos et al., (2008) and Stankovic et al. (2021) used the same testing device, introducing the possibility that including younger children with ADHD may have influenced the detection of hypersensitivity to olfactory stimuli and signify potential changes or fluctuation in olfactory sensitivity throughout childhood years. Gustatory sensory processing difference was not suggested to be associated with differences in food neophobia or self-reported dietary patterns (Stankovic et al., 2021). Responses to somatosensory stimuli showed both hyper- and hyposensitivity; children with ADHD, especially girls, reported lower touch tolerance, as reported using the TIE (Bröring et al. 2008); hyposensitivity was suggested by lower accuracy of scores in touch perception, pain, and temperature discrimination tests (Scherder et al. 2008).

Findings from studies with adults mainly reported sensory experiences from standardised surveys rather than psychophysical tests. Auditory sensory processing differences including sensory craving and sensory under-responsivity (SUR) responses were indicated by the SP3D (Adra et al., 2021). Kamath et al. (2020) reported that a diagnosis of ADHD was associated with differences in auditory sensory processing after controlling for anxiety according to the AASP (Brown & Dunn, 2002). One study investigated olfaction and gustation responses for female participants, noting increased sensitivity to bitterness; however, the results from medicated and non-medicated participants with ADHD had not been differentiated for this particular variable and therefore could not be used (Weiland et al., 2011). Concerning somatosensation, ADHD diagnosis was associated with touch and movement sensory processing differences (Kamath et al., 2020) and increased point-pressure detection and discrimination thresholds in one area of the tongue (Etter et al., 2021). Etter et al. (2021) suggested hyposensitivity to touch, though the effect on speech production was not discussed.

Further patterns of participants' responsiveness to sensory stimuli included low registration of sensory stimuli (Clince et al., 2016; Kamath et al., 2020; Grinblat & Rosenblum, 2022), increased sensory seeking (Kamath et al., 2020), sensory sensitivity (Clince et al., 2016; Kamath et al., 2020; Grinblat & Rosenblum, 2022), and sensation avoidance (Clince et al., 2016; Grinblat & Rosenblum, 2022). These findings should be interpreted with caution as participant medication use was unknown.

Visual sensory processing differences were only reported in studies that surveyed adult participants, with results suggesting increased sensory craving responses to visual stimuli (Adra et al., 2021) and an effect of ADHD diagnosis on visual sensory processing (Kamath et al., 2020).

No research was longitudinal in design. Participant responses for auditory (Adra et al., 2021; Kamath et al., 2020; Mazor-Karsenty et al., 2018; Tien et al., 2019) and somatosensory differences (Bröring et al., 2008; Etter et al., 2021; Kamath et al., 2020; Scherder et al., 2008) were reported for both children and adults. In this regard, people with ADHD reported greater difficulty detecting (Tien et al., 2019), responding to (Adra et al., 2021), and tolerating sounds (Mazor-Karsenty et al., 2018), alongside increased sensory craving responses (Adra et al., 2021). Differences in somatosensation related specifically to higher oral tactile detection and discrimination thresholds meaning hyposensitivity (Etter et al., 2021), hypersensitivity to touch (Broring et al., 2008), and hyposensitivity to pain and temperature discrimination (Scherder et al., 2008).

In summary, both hypo- and hypersensitivity responses for sensory processing have been reported by children and adults with ADHD. Differences were observed across multiple sensory domains including auditory, olfactory, gustatory, somatosensory, and visual domains. Specifically for children, differences in auditory, olfactory, gustatory, and somatosensory discrimination (including discrimination of pain and temperature stimuli and reduced tolerance to touch) have been suggested. For adults, differences in auditory, visual, and somatosensory (oral detection and discrimination) sensory processing were indicated.

3.5. Daily Functioning and Sensory Processing

Two studies explored the relationship between sensory processing differences described by people with ADHD and participation in daily living activities. Both studies omitted ADHD-specific medication use. Sensory processing differences were suggested to impact participation in work and higher education. Grinblat and Rosenblum (2022) explored individual participation challenges in the workplace for 69 adults with ADHD aged 21–46 years. Participants completed questionnaires rating ADHD symptoms, sensory processing characteristics, sleep, executive functioning, and activity participation. A significant relationship was reported between sensory sensitivity and disrupted work performance (Brown & Dunn, 2002), with differences in low registration and sensation avoidance also noted. Clince et al. (2016) reported sensory processing differences for 18 higher education students, including low registration, sensory sensitivity, and sensation-avoiding, according to a modified AASP (Brown & Dunn, 2002). Six participants took part in an interview. Thematic analysis reported that sensory processing differences impacted the students' functioning in terms of experiencing difficulties with study/exam environments and leisure choices. One quote by a student indicated the need for background noise to aid concentration when studying, with a second statement indicating some students reported physical activity as a coping mechanism. The study concluded that assessing sensory processing preferences can support functional improvements through reasonable adjustments in higher education.

Studies with child participants discussed an influential relationship between sensory processing capabilities and functioning across various educational, social, employment, and general environmental contexts, however, no study investigated this relationship.

3.6. Lifespan Sensory Processing Differences

Somatosensory (Bröring et al., 2008; Scherder et al., 2008) and auditory (Mazor-Karsenty et al., 2018; Tien et al., 2019; Kamath et al., 2020; Adra et al., 2021) sensory processing differences were reported across childhood and adulthood. Due to the small number of studies and the absence of longitudinal designs, stability or change in sensory processing across the lifespan cannot be reported with confidence. No data was available for adults with ADHD over the age of 50, therefore, a full lifespan perspective of self-reported sensory processing experiences is missing.

3.7. Review Update

Since the conclusion of the review, three articles required comment. The studies were completed in Italy, Sweden and Iran respectively. Fabio et al. (2024) conducted a survey comparing experiences across sensory processing components (neurological thresholds and behavioural self-regulation responses) and 6 sensory domains for 138 13–18-year-olds with ADHD (n = 69; Males=45) and without ADHD (n = 69; Males=45). They used the Adolescent version of the Sensory Profile (Dunn, 1999). The main findings were significantly higher scores for sensory sensitivity, sensation seeking, sensory avoidance, and low registration for the young people with ADHD, along with significantly

higher scores in all sensory domains. Frost-Karlsson et al. (2024) explored somatosensory processing experiences with 51 adults aged 18–35 years with ADHD (n = 27, Males=11) and without ADHD (n = 24; Males=10) via subsections of the Sensory Profile (Dunn, 1999) and sensory perception quotient (Tavassoli, Hoekstra, & Baron-Cohen, 2014) questionnaires alongside an experimental measure. Recordings of somatosensory evoked potentials were taken when the participants arm was touched by the experimenter and participant. Findings suggested that adults with ADHD experienced greater tactile sensitivity than participants without ADHD. Finally, Kazemy-Pour et al. (2025) investigated the impact on participation in meaningful activities of executive functioning and sensory processing using a survey with 138 adults (aged 18–40 years) with ADHD (n = 70; Male=34) and without ADHD (n = 68; Male=34). They reported significant differences (scored higher than non-ADHD peers) in sensory sensitivity, sensation seeking, sensory avoidance, and low registration, with a significant correlation and predictive impact of sensory processing (and executive function) on participation in meaningful activities. Limitations of these studies are noted, including a lack of detailed information regarding medication use (Fabio et al., 2024), diagnostic criteria used for ADHD diagnoses (Frost-Karlsson et al., 2024; Kazemy-Pour et al., 2025), and co-occurring autism diagnoses (Fabio et al., 2024; Kazemy-Pour et al., 2025).

Taken together with the complete findings of this review, these studies support the presence of sensory processing differences in both childhood and early to mid-adulthood for people with ADHD; however, they continue to highlight the lack of detailed exploration of lived experiences for people with ADHD in research and exploration of how differences in sensory processing might influence participation in daily living activities. Kazemy-Pour et al. (2025) concluded that further research is needed into the factors affecting participation for people with ADHD.

4. Discussion

This is the first review of self-reported sensory processing experiences for people with ADHD across the lifespan, including exploration of the potential relationships between sensory processing experiences and participation in daily living activities. Of importance is not simply the presence of sensory processing differences reported by people with ADHD, but how schools, workplaces, services, and public spaces are organised in ways that make these differences disabling.

Self-reported sensory processing differences were observed across multiple sensory domains and over the lifespan until mid-adulthood. Results suggest that people with ADHD experience both hyper- and hyposensitivity responses to sensory stimuli and suggest that strategies of both avoidance and seeking-out sensory stimuli are made in attempt to regulate sensory processing experiences. These findings contribute to the growing evidence of sensory processing differences for individuals with ADHD (Fabio et al., 2024; Jurek et al., 2025) and support the assertion by Lane and Reynolds (2019) that sensory processing is a potential diagnostic characteristic of ADHD that has lacked consideration.

It is acknowledged that the evidence base in this area is not well developed and has methodological constraints as described. Moreover, self-reported sensory processing experiences are not fully aligned with the nature of much of the available evidence, which includes task-based and psychophysical studies, meaning the integration of this evidence with direct lived-experience is difficult. Whilst psychophysical measures of sensory processing 'abilities' of people with ADHD dominate the research, people with ADHD will continue to be rated against norm-based data, with differing experiences interpreted as deficits (Bradley et al., 2025). Sensory processing experiences may also exist beyond the scope of current measures. Further research on phenomenological accounts of sensory processing experiences is needed to inform targeted, evidence-based interventions. Without robust qualitative research, sensory processing approaches that offer support to individuals with ADHD and their networks remain in their infancy.

Aligned with the neurodiversity paradigm (Singer, 2016), research that integrates inclusive and participatory approaches alongside traditional measures aims to reframe clinical, academic, and societal understandings of ADHD. This would emphasise sensory processing 'differences' and meaningful self-regulation (Adamou et al., 2021), as well as advocacy for adaptations to social and physical environments (Bradley et al., 2025). An active partnership between individuals and the NHS is the future vision of healthcare (UK Government, 2025), presenting an opportunity for people with ADHD, with support from clinicians, to influence this change and cultivate a genuine collaboration framework (Twinley, 2024). The reviewed literature spans a transitional period where research designs that promote neurodiversity-affirming methodology featuring the voices of experts by experience are increasing (Rutherford & Johnston, 2022).

Data from the 13 reviewed studies suggest patterns in auditory, olfactory, gustatory, visual, and somatosensory processing domains, with differences in responsivity to sensory stimuli noted across studies with children and adults. No research was found concerning potential vestibular, interoceptive, or proprioception differences for people with ADHD; these are critical areas where such differences can significantly impact function (Moghadam et al., 2018; Bruton et al., 2025). Knowledge regarding the lifespan presentation of broader ADHD characteristics including sensory processing differences may assist in effective service planning and resource allocation for non-pharmacological interventions and reasonable adjustments, thereby reducing a negative discourse of healthcare costs for people with ADHD (Dodds et al., 2024) and provide an alternative to research into medication effectiveness (French et al., 2024; Jennum et al., 2025). A dynamic continuation of inattention, hyperactivity, and impulsivity characteristics for children and young adulthood with ADHD (Sibley et al. 2022) presents the possibility that sensory processing differences and participation in daily living activities may also fluctuate in later adulthood, adding emphasis to the call for further research.

Perceptible changes in academic and clinical awareness concerning the needs of people with ADHD in relation to sensory processing are apparent (Frost-Karlsson et al., 2024; Jurek et al., 2025). The consensus statement by Ademou et al. (2021) acknowledged sensory regulation challenges for people with ADHD and also recognised the value of self-management strategies. Clince, Connelly and Nolan's (2016) research pre-dates the consensus statement yet foregrounds neuro--affirming recommendations, suggesting that Occupational Therapists are well placed to assist in reducing participation barriers by exploring environmental adaptations, reasonable adjustments and self-management strategies, including sensory diets and the management of leisure time. Whilst limited conclusions can be drawn about how sensory processing differences interact with activity participation, a neurodiversity-affirming goal for people with ADHD would be to view sensory processing differences as a foundation for understanding their sensory processing strengths and challenges and be supported to enhance independence through self-advocacy (Bradley et al., 2025).

In-depth discussion of sensory processing and participation enablers within educational and workplace settings cannot be facilitated on the basis of the review findings; however, literature from broader neurodiversity studies can inform understanding of potential avenues for consideration. In a scoping review by Mealings and Buchholz (2025), evidences suggested that children with ADHD experienced poorer performance in short term memory and attention tasks due to auditory and/or visual distractions, and indicated strategies such as sound amplification (teacher wearing a microphone), the use of visual cues, and introduction of movement through sitting on a therapy ball to support participation in learning. In terms of healthcare accessibility, the importance of architectural modifications, including controlling light intensity, improving acoustic insulation, use of neutral colour palettes, and provision of separate spaces with alternative sensory stimulation, has been suggested as supporting sensory regulation and thus participation in activities for children with additional needs, such

as ADHD, across Occupational Therapy clinic settings (Khademi Kalantari, 2025). For neurodivergent adults accessing community spaces, sensory responsive environments have been proposed for offering areas to accommodate various sensory needs including calming and stimulating activity areas, which are co-designed with neurodivergent people (Finnigan, 2024). Finally, provision of spaces that accommodate neurodivergent students' needs who have diverse sensory profiles, has been reported as a valued investment in university settings for reducing barriers to socialising and working, and for contributing to a sense of belonging (Hamilton et al., 2026).

Some studies within this systematic review may have been excluded due to language, poor indexing, or publication as grey literature. As a result, the findings might lack cultural breadth and be biased towards larger studies with significant results, potentially limiting the overall value of this review. To mitigate this impact, a wide range of sensory processing-related search terms were used across 10 databases, supplemented by reference and citation searches. The decision to exclude studies with individuals actively taking ADHD-specific medication and individuals without a formal diagnosis of ADHD may have had a marginalising effect on the results, meaning some valuable insights have been missed. The findings will, however, enable a wider population of people who either do not want to take ADHD medication due to perceived negative effects (e.g., low mood, reduced appetite, Titheradge et al., 2022) or who are not eligible, to access the findings and implications. A critical appraisal of the 13 included studies revealed collective weaknesses, primarily due to the absence of outcome measure validity and reliability data, as well as a lack of standardisation of outcome measures or conditions. The findings must be considered with caution, in particular, those which do not specify ADHD medication use.

Future research should consider including larger participant samples and balanced comparison groups matched for demographics. The experiences of older individuals with ADHD should not be overlooked; these individuals continue to work and study, contribute to society, and navigate the evolving nature of social and familial relationships and responsibilities in mid-to-late adulthood, all of which may be affected by differences in sensory processing and the barriers created by inaccessible environments (Nyström, Petersson & Janlöv, 2020). Researchers should utilise measures with known validity and reliability data, and where possible, those that represent people with ADHD in the conceptualisation, design, and standardisation. Further research into the sensory processing experiences of people with ADHD should carefully consider the use of medications and their wash-out periods to ensure any recommendations have a clear reach.

The self-reported adaptive responses to sensory stimuli of individuals with ADHD require further investigation and may reveal a valuable repertoire of strategies. This presents an opportunity for multidisciplinary professionals to empower those with ADHD to explore non-pharmacological methods of managing challenging experiences both within tasks and in environments where sensory processing differences are not accommodated.

This systematic review represents a step in characterising the full extent of sensory processing differences experienced by individuals with ADHD, utilising a neurodiversity-affirming approach that centres personal narratives. We highlight tentative evidence for differences in sensory processing profiles from childhood through to mid-adulthood in auditory, olfactory, gustatory, somatosensory, and visual sensory processing domains with both hyper- and hyposensitivity responses to sensory experiences. A gap in research representing the lived-experiences of older adults with ADHD exists, along with data pertaining to interoception, vestibular, and proprioception sensory processing experiences. Participation barriers for people with ADHD in terms of self-reported sensory processing experiences and engagement in daily living activities can be suggested but should not be regarded as resolved. It can be stated that foundations for further research have been established.

It is essential that we expand understanding of the characterisation of sensory processing for individuals with ADHD beyond anecdotal knowledge of sensory processing differences and offer practical support to build self-advocacy and independence skills that can enhance accessibility, participation, and quality of life opportunities for people with ADHD (Attoe & Climie, 2023). This cannot be accomplished without people with lived experience contributing to the characterisation of ADHD and involvement in its research (French, 2024).

Author Contributions

Author [a] and Author [c] contributed to the study conception and design. Data collection and analysis was carried out by Author a[a]. Author [b] acted as a second reviewer for article screening and quality appraisal for a sample of the data. The first draft of the manuscript was written by Author [a]. All authors revised, read and approved the final manuscript.

CRediT authorship contribution statement

Stephanie Petty: Writing – review & editing, Validation, Supervision, Conceptualization. **Victoria Sally Dunn:** Writing – review & editing, Writing – original draft, Methodology, Formal analysis, Data curation, Conceptualization. **Philip Hodgson:** Writing – review & editing, Formal analysis.

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.

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