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SENSORY MODULATION (C LAI, SECTION EDITOR)

Assessing Sensory Processing in Adults

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Abstract

Purpose of Review Sensory processing disorders may occur throughout the developmental lifespan; hence, appropriate assessment tools should be available. However, the current state of evidence may be limited to children. In this review, we identify three tools assessing sensory processing in adults: Adolescent/Adult Sensory Profile, Glasgow Sensory Questionnaire, and the Adult Sensory Processing Scale.

Recent Findings Herein, we provide an overview of these assessment tools, issues on their utility, and research and practice areas worth reflecting on prior to considering their use. Among the assessment tools reviewed, the Adolescent/Adult Sensory Profile was most widely used with several translations and has been utilized among several clinical groups. Each assessment tool may be considered based on the diagnosis of the population. Nevertheless, all were based on the sensory integration theory and may serve to supplement the diagnosis of sensory processing disorder in adults.

Summary While these tools may help inform practice and research on sensory processing in adults, future research is still needed to systematically synthesize all possible available assessment tools and critically appraise their measurement properties.

Keywords Sensory processing · Sensory integration · Adults · Assessment

Introduction

Sensory processing incorporates registering, modulating, and discriminating sensations received through the sensory system to produce an adaptive response [1]. Processing sensory information allows individuals to regulate their responses automatically in an efficient and comfortable manner [2]. Sensory processing has been suggested to contribute to the development of basic skills (i.e., motor, language, perception, behavior) necessary to support participation in daily life [3, 4•]. Therefore, it is imperative that appropriate assessment is in place to determine whether issues pertaining to an individual's sensory processing are present.

Sensory processing disorder (SPD) refers to a condition where individuals have difficulty organizing and using sensory information from the external environment [1]. While no universally accepted definition exists, previous proposals suggest a nosology for SPD diagnosis [5] based on the patterns of responses to sensory information in daily life activities: sensory modulation disorder (SMD), sensory-based motor disorder (SBMD), and sensory discrimination disorder (SDD). Probably, the most encountered pattern of SPD in both practice and research is SMDs, where individuals show difficulty in grading their responses to sensory information. These may manifest as overresponsivity, underresponsivity, or seeking/craving [6•, 7]. The impaired ability to regulate the intensity of responses to sensory information in SMD may affect their participation in daily life activities [8].

SPD may be found among individuals across developmental stages. Previous research suggests that around 10–20% of children may display SPD-related symptoms [9, 10]. The prevalence is much higher among those with neurodevelopmental conditions; however, it may still occur in the typically developing populations [10, 11•]. For example, as much as 90% of children with autism have been reported to display sensory processing issues [12]. There is less

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evidence in the literature on SPD estimates among adult populations. Much of the research in this area has mainly focused on children [13, 14••]. Thus, estimating SPD among the adult population is quite challenging. Neurodevelopmental disorders in childhood may persist into adulthood. Age-related changes may also occur among individuals affecting how they perceive and process sensory information. Likewise, evidence suggests that SPD may also occur in healthy adults and those with neurological and cognitive conditions [15, 16, 17•, 18•, 19•]. It should not be hard to imagine that the SPD rates among adults may at the very least reflect those of children. Nevertheless, the behavioral manifestations of sensory processing in adults may differ from children [20, 21]. Therefore, it is imperative that relevant assessments should be available for the adult population.

Tools Assessing Sensory Processing in Adults

Even with the high prevalence of SPD, its occurrence in both healthy and clinical populations, and impact on participation in daily activities, there are still few assessment tools available [6•]. The available sensory processing assessments include questionnaires (proxy or self-administered), standardized tests, and clinical observations. However, synthesized evidence on these sensory processing assessments has been limited to pediatric populations [22, 23]. Less explored are those specifically aimed at adult populations. The most relevant evidence review scoped assessment tools specifically among adolescents and adults with autism [14••]. While SPD-related symptoms may occur more commonly among this population, recent evidence includes aging, neurological and cognitive conditions may also contribute [15, 19•]. Herein, we review three of the more commonly used tools in assessing sensory processing among adults, regardless of their condition. In the next sections, we provide a succinct description of these tools and the recent evidence supporting their use.

Adolescent/Adult Sensory Profile (AASP)

The Adult Sensory Profile was developed due to the lack of clinical measures that can assess sensory processing among the adult population [20, 21]. It is based on the Sensory Profile [24–27]. Originally intended for the adult population, it is currently being used as a self-questionnaire to include adolescents and older adults to provide information on their behavioral responses to daily sensory experiences. The construct is based on Dunn's model of sensory processing, looking at patterns of responses to various sensory modalities. In its most current version, the Adolescent/Adult Sensory Profile (AASP) is recommended for use among individuals 11 through < 65 years.

While considered a self-administered questionnaire, a proxy might be considered to accomplish the AASP in cases where the individual cannot do so. It consists of 60 items organized into sensory processing categories: Taste/Smell, Movement (vestibular/proprioceptive), Visual, Touch, Activity Level, and Auditory. The individual rates each item based on the frequency the behavior described is engaged in (i.e., Almost Never–Almost Always). Following a similar format for scoring with the original Sensory Profile [24–27], the AASP categorizes these items into four quadrants allowing a picture of the individual's neurological thresholds and behavioral responses: Low Registration, Sensation Seeking, Sensory Sensitivity, and Sensation Avoiding. One of the strengths of the AASP, apart from being considered as probably the first formal tool to assess sensory processing among the adult population, is its standardized scores that determine cutoff scores for each quadrant scores and its classification system, which determines the propensity of behavioral responses to sensory information in daily events [24–27].

The AASP is commercially available and has been widely reported in the literature. Its ability to assess a wide range of age groups and clinical populations may be one of the reasons why it has been used consistently in research and has been translated into different cultures and languages. There is evidence of its utility among healthy adults, and adults with neurological, psychiatric, and cognitive conditions [15, 16, 17•, 18•, 19•, 28••]. The AASP has been translated and validated in several languages, including Spanish, Chinese, Arabic, Hebrew, Korean, Japanese, and Persian, and is widely used in occupational therapy. The widespread use and availability of translated versions of the AASP may provide insight into the stability of its psychometric properties across cultures and diagnoses.

Glasgow Sensory Questionnaire (GSQ)

The Glasgow Sensory Questionnaire (GSQ) is a 42-item self-administered questionnaire that aims to measure the frequency of atypical sensory processing events [29]. GSQ was specifically designed to provide specific information on hypersensitivity and hyposensitivity to seven sensory modalities: visual, auditory, gustatory, olfactory, tactile, vestibular, and proprioception. Each item looks at behavioral responses or preferences to sensory stimuli. The questionnaire was based on previous literature on sensory-related signs and symptoms associated with autism, as well as reports from parents of children with autism [30, 31]. One particular tool used in its development is the Sensory Experiences Questionnaire [30], which was influenced by the conceptual models of sensory processing [5, 25, 32], similar to the AASP. In fact, as part of its psychometric properties, the GSQ was also found to be correlated with AASP [33••].

The GSQ is primarily a self-administered questionnaire. Participants are asked to answer each of the 42 items on a 4-point scale (i.e., never–always). It is unclear whether provisions for proxy answering are possible. However, based on the available literature, it seems that the GSQ was developed primarily for individuals with autism who have enough comprehension to independently accomplish self-report measures [29, 33••, 34••]. A parent-completed version of the GSQ [35] does exist; however, the veracity of the reported information should be considered. There is also apparent flexibility in the modality used to gather data from the GSQ. While in the original study that first established its psychometric property, it was administered online, other authors have also used "pen-and-paper" or mixed methods.

The GSQ was primarily developed to be used for adolescents and adults within the autism spectrum. Currently, there are known validated translations of the tool used in Japan, the Netherlands, France, and China. The accumulating evidence on the use of GSQ to measure sensory processing among the adult population across cultures may provide insight into the stability of its psychometric property. However, it may be limited only to healthy adults or those presenting symptoms within the autism spectrum.

Adult Sensory Processing Scale (ASPS)

The Adult Sensory Processing Scale (ASPS) was developed in order to better understand patterns of response to sensory stimuli or information in daily life activities grounded on distinct sensory systems in adults [13]. It seeks to further research on how occupational choices may be associated with diverse processing modes within a specific sensory system. Unlike the AASP, the ASPS can measure patterns of responses (i.e., overresponsiveness, underresponsiveness, sensory seeking) distinct to the different sensory systems (i.e., auditory, visual, tactile, vestibular, and proprioceptive). What the ASPS shares with AASP and GSQ is the influence of the sensory integration theory of Ayres [1, 32].

The ASPS is a self-report measure designed to determine behavioral responses in each of the five sensory systems it assesses, distributed in 39 items. The individuals are asked to rate each item based on the frequency of affective responses using a 5-point scale (i.e., always–never). Measurement property evidence of the ASPS has been limited to healthy adults [13, 36••]. Likewise, its development and canonical psychometric properties were established using an online survey method.

At present, there are only two known versions of the ASPS: English and Turkish. The measurement properties of the ASPS seem to reflect the stability of its reliability and validity within and between cultural versions. Its utility beyond the healthy adult population will need to be further investigated. However, it may very well be a candidate for generic use, regardless of clinical conditions. Given its constructs, it may be a tool worth considering supplementing the commonly clinically diagnosed sensory modulation disorders. Because of its novelty, future research is needed to further understand its psychometric properties across different cultures, apart from what it has now.

Current Recommendations

The evidence on the available outcome measures of sensory processing in adults is a dearth compared to childhood populations. This short review provides salient recommendations on selected tools that may serve as options when assessing sensory processing in the adult population: AASP, GSQ, and ASPS. Between the three, the GSQ and ASPS may serve as a direct adjunct to provide empirical support in diagnosing SPD. Nevertheless, the more commonly used and reported AASP provides useful information on the current sensory thresholds of adults within a continuum, thereby possibly informing interventions more.

As reported in this review and elsewhere, issues pertaining to sensory processing in adults may occur in different clinical populations and even in seemingly healthy or normative populations. Of the three assessment tools reviewed herein, the AASP has been shown to be useful when working with a varied population. The strength of GSQ is the evidence that supports its use specifically among adults within the autism spectrum. Although newer in its development, the ASPS provided initial evidence of its utility among healthy adults.

This review highlights the cross-cultural stability of the constructs measured across the three reviewed outcome measures of sensory processing among the adult population. Clinicians and researchers working in other cultures not covered by the currently available versions will need to translate these tools and perform language equivalency and cultural validation prior to their use.

Concluding Remarks

This review identified three possible assessment tools that might be considered in assessing sensory processing among adults. It is important to note that while there are differences among these tools, they are based on the sensory integration theory. Other assessment tools and procedures that may bear the same terminologies should be carefully considered whether they measure the same constructs. This review adopted a convenient method of selecting the assessment tools described herein. Future research will need to explicitly identify the extent of evidence on this matter, with emphasis on evaluating their measurement properties in order to inform research and practice.

Declarations

Conflict of Interest The authors declare no competing interests.

Human and Animal Rights and Informed Consent This article does not contain any studies with human or animal subjects performed by any of the authors.

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