Agnosia

**Indexing Metadata/Description**

- **Title/condition:** Agnosia
- **Synonyms:** Auditory agnosia; somatosensory agnosia; tactile agnosia; topographagnosia; visual agnosia
- **Anatomical location/body part affected:** The brain; lesions are generally small and localized
- **Area(s) of specialty:** Adult Neurological Disorders, Pediatric Genetic and/or Neurological Disorders
- **Description:** Agnosia is defined as the failure to recognize incoming information despite an intact sensory system.\(^1\)\(^2\) It has been described as having “perception stripped of its meaning.”\(^2\) The condition is rare and can affect any single sense (e.g., vision, hearing, touch) or any specific thing (e.g., faces, sounds, colors, objects).\(^1\)\(^2\) Typically, agnosia is an acquired condition; however, cases of developmental visual agnosia and developmental (also called congenital) proposagnosia have been reported\(^19\)\(^22\)\(^23\)\(^24\)
- **ICD-9 codes:**
  - 784.69 other: acalculia, agnosia, agraphia NOS, apraxia
- **ICD-10 codes:**
  - R48.1 agnosia

(ICD codes are provided for the readers’ reference, not for billing purposes)

- **G-codes**
  - **Spoken Language Comprehension G-code Set:**
    - G9159, Spoken language comprehension functional limitation, current status at time of initial therapy treatment/episode outset and reporting intervals
    - G9160, Spoken language comprehension functional limitation, projected goal status at initial therapy treatment/outset and at discharge from therapy
    - G9161, Spoken language comprehension functional limitation, discharge status at discharge from therapy/end of reporting on limitation
  - **Spoken Language Expressive G-code Set:**
    - G9162, Spoken language expression functional limitation, current status at time of initial therapy treatment/episode outset and reporting intervals
    - G9163, Spoken language expression functional limitation, projected goal status at initial therapy treatment/outset and at discharge from therapy
    - G9164, Spoken language expression functional limitation, discharge status at discharge from therapy/end of reporting on limitation
  - **Other Speech Language Pathology G-code Set:**
    - G9174, Other speech language pathology functional limitation, current status at time of initial therapy treatment/episode outset and reporting intervals
    - G9175, Other speech language pathology functional limitation, projected goal status at initial therapy treatment/outset and at discharge from therapy
    - G9176, Other speech language pathology functional limitation, discharge status at discharge from therapy/end of reporting on limitation
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Source: https://www.cms.gov/.

› **Reimbursement:** Reimbursement for therapy will depend on insurance contract coverage. No specific issues or information regarding reimbursement have been identified.

› **Presentation/signs and symptoms:** With agnosia, a person is unable to identify a specific thing (e.g. objects, language, sounds, faces) when that item is presented through the affected sensory modality (e.g., vision, hearing, touch).\(^{(1,2)}\) With true agnosia, the patient will immediately identify the item if it is presented through a different, unaffected modality.\(^{(1)}\) For example, a patient with a tactile agnosia would not be able to identify a ball he or she is holding without looking at it. When the patient is able to see the ball, he or she will immediately name the object. Agnosia is modality specific, and deficits will coincide with the type of agnosia the patient has. The following are descriptions of the most common types of agnosia. Agnosia is a rare phenomenon\(^{(1,2,3)}\).

- **Auditory agnosias**
  – Auditory agnosia: inability to assign meaning to environmental sounds or other nonspeech sounds.\(^{(1,4)}\) Patients have intact hearing abilities, including auditory brainstem response (ABR) and normal audiogram, but are unable to recognize sounds. For example, a patient would hear an ambulance siren but would be unable to state what the sound was until he or she was able to see the ambulance with its lights on.
  – Phonagnosia: inability to recognize familiar voices.\(^{(1)}\) This problem is rare and appears only to present difficulty to patients when they talk on the phone or listen to the radio.
  – Pure word deafness/auditory verbal agnosia: inability to assign meaning to spoken words. Patients have intact hearing abilities, including ABR and normal audiogram, as well as intact underlying language abilities, but they are unable to recognize spoken words.\(^{(1,5,6)}\) For example, a patient would not understand a command if it were spoken to him/her, but the moment it was written down, he or she would be able to comprehend it.\(^{(21)}\)

- For detailed information on pure word deafness, see *Clinical Review...Agnosia, Auditory Verbal; CINAHL Topic ID Number: T903016*

- **Visual agnosias**
  – Apractagnosia: inability to copy or draw simple shapes and objects\(^{(2)}\).
  – Prosopagnosia: inability to recognize familiar faces despite intact vision, an ability to describe faces, and an ability to recognize objects.\(^{(1,2)}\) Patients are able to identify that what they are looking at is a face, but they cannot tell you who at whom they are looking. This inability applies to friends and family as well as famous faces. A patient might look at a photo of Martin Luther King, Jr. and not recognize it, however, if asked, “Who is the African American civil rights leader of the 1960s who delivered the ‘I have a dream’ speech?,” the patient could answer correctly. In a case study of an individual who was first diagnosed with developmental prosopagnosia at the age of 8, authors reported that (despite no neurological or psychiatric conditions) the patient considerable impairment of recognize and integrating meaning in facial expressions.\(^{(12)}\) For some cases of developmental prosopagnosia, it appears that the neurological visual mechanisms...
responsible for processing faces do not properly develop.\textsuperscript{(23,24)} For other children with developmental prosopagnosia, facial detection ability is not impaired; however, they are unable to assign the correct identity to different faces\textsuperscript{(23)}.

- Although traditionally prosopagnosia was thought to affect only the ability to recognize faces, some studies suggest that affected persons might have subtle impairments of object recognition as well.\textsuperscript{(18)}

  - Pure object agnosia/visual object agnosia: inability to recognize objects by looking at them despite intact eye and optic tract function.\textsuperscript{(1,4,7-2)} The patient is immediately able to name the object once it is placed in his or her hands.

  - A subtype of object agnosia has been described as “pure word blindness” in which a patient can hear a word and speak a word and understand, but if he or she sees the word written down it is meaningless.\textsuperscript{(20)}

  - Simultagnosia: inability to attend to or recognize more than one object in a field of vision; patient is unable to see a scene or picture as a whole.\textsuperscript{(1-2,10)} The patient might see a picture of a kitchen and describe each appliance, but never refer to it as a “room” or a “kitchen.” When accompanied by optic ataxia and ocular apraxia, it is termed Balint’s syndrome.\textsuperscript{(1,4,10)}

  - Topographagnosia/environmental agnosia: inability to orient oneself in a location or navigate using a map.\textsuperscript{(1,2)}

  - Agnosia for object orientation: visuospatial agnosia in which the patient is unable to mentally rotate objects, write letters or copy drawings with correct orientation.\textsuperscript{(11)}

- Tactile agnosias

  - Tactile agnosia/astereognosis: inability to recognize an object through touch alone.\textsuperscript{(1,2,3)} The patient will have intact sensation of the affected hand, but if the patient holds an object without being able to see it, the patient will be unable to name the object. Once the object is in view, the patient will name it immediately.

- Anosognosia: a lack of awareness of or a failure to recognize physical, cognitive, sensory, perceptual, or emotional deficits in one’s self.\textsuperscript{(12)} For detailed information on assessment and treatment of anosognosia, see Clinical Review…Anosognosia; CINAHL Topic ID Number: T708764

\textbf{Causes, Pathogenesis, & Risk Factors}

\textbf{Causes:} Agnosias are usually caused by small, localized brain lesions.\textsuperscript{(1)} Disagreement among researchers exists as to whether the lesions that cause agnosia affect the sensory system itself (i.e., vision) or if the lesions cause damage to the processing centers of the brain that are responsible for transmitting the sensory information to other parts of the brain.\textsuperscript{(2)}

Agnosias have been associated with brain damage from the following:

- Anoxia\textsuperscript{(4)}

- Brain tumor\textsuperscript{(3-4)} (for detailed information on assessment and treatment of communication disorders in patients with brain tumors, see the series of Clinical Reviews on this topic)

- Stroke\textsuperscript{(1,4,5,6,9)} (for detailed information on rehabilitation of communication disorders in patients after stroke, see the series of Clinical Reviews on this topic)

- Dementia/cortical atrophy\textsuperscript{(10,13)} (for detailed information on assessment and treatment of communication disorders in patients with dementia, see the series of Clinical Reviews on this topic)

- Diabetes\textsuperscript{(2)}

- Encephalitis\textsuperscript{(4,14)}

- Meningioma\textsuperscript{(3)}

- Parkinson disease\textsuperscript{(1)} (for detailed information on assessment and treatment of communication disorders in patients with Parkinson disease, see Clinical Review…Parkinson Disease (Speech); CINAHL Topic ID Number: T708751)

- Seizures\textsuperscript{(15)} (for detailed information on assessment and treatment of communication disorders in patients with seizures, see Clinical Review…Epilepsy: Speech Therapy; CINAHL Topic ID Number: T708979)

- Toxins (drug or alcohol abuse)\textsuperscript{(4)}

- Trauma (e.g., motor vehicle accident, sports injury, gunshot wound)\textsuperscript{(4,7)} (for detailed information on assessment and treatment of communication disorders in patients after traumatic brain injury, see the series of Clinical Reviews on this topic)

- Hydrocephalus\textsuperscript{(16)}

\textbf{Pathogenesis:} Each agnosia originates from damage to different areas of the brain.
• Apractagnosia (inability to draw/copy simple shapes): right hemisphere, usually parietal lobe, lesions\(^2\)
• Auditory agnosia (inability to recognize environmental sounds): auditory association cortex/left temporal gyrus\(^1\)
• Object/visual agnosia (inability to recognize objects): combination of lesions in the visual association and/or lesions that separate the visual association cortex from other association areas of the brain;\(^1\) bilateral temporal lobe lesions in combination with occipital lobe lesions\(^4,9\)
• Phonagnosia (inability to recognize familiar voices): dorsal pathways of the pure auditory cortex\(^1\)
• Prosopagnosia (inability to recognize faces): fusiform gyrus (Brodmann’s areas 37 and 20);\(^1\) bilateral occipitotemporal lesions;\(^2,4\) ventral visual cortex\(^2\)
• Pure word deafness (inability to assign meaning to spoken language): bilateral lesions of Heschl’s gyrus or corpus colossal lesion with concurrent lesion in the left auditory association cortex\(^1\)
• Simultagnosia (inability to perceive more than one object at a time): dominant occipital lobe lesion\(^4\)
• Tactile agnosia/astereognosis (inability to recognize objects by touch): posterior parietal/insular lesions;\(^1,4\) postcentral gyrus and supramarginal gyrus\(^3\)
• Topographagnosia (inability to read maps/navigate one’s environment): right hemisphere, usually parietal lobe, lesions\(^2\)

Risk factors: Risk factors for agnosia are related to the specific risk factors associated with the underlying cause of brain damage.

**Overall Contraindications/Precautions**

- General precautions for this patient population are safety precautions. Patients with agnosia do not “recognize” objects, sounds, and/or touches and are therefore at a higher risk for injury if they are confronted with dangerous situations. For example, patients with tactile agnosia should not feel around for an object they cannot see because if they should encounter a knife or scissors, they would not realize that they should handle it lightly. A patient with auditory agnosia would not recognize the sound of a fire alarm or smoke detector as a danger signal and should not be left alone.
- Patients should carry an identification card at all times that states that they have had a brain injury and may act strangely if separated from family or friends. Information about how to contact the patient’s family should be included on the ID card\(^1\).
- It is important that children with developmental prosopagnosia are taught how to identify safe adults, including their caregivers, using something other than facial features (e.g., voice, clothing, “secret word”). This is especially important in crowded, public places if the child becomes separated from his or her parents\(^24\).

See specific Contraindications/precautions to examination and Contraindications/precautions under Assessment/Plan of Care.

**Examination**

**Contraindications/precautions to examination**

- It is common for patients with agnosia to be unaware of their deficits prior to examination and treatment.\(^1,5\) A family member or a caregiver should be present during examination. It is important for the examining clinician to proceed with caution throughout both examination and treatment to ensure the patient does not feel embarrassed, humiliated, or patronized.
- During a speech-language evaluation it is of utmost importance to be aware of a patient’s pain tolerance and level of frustration. The time of day and the number of previous evaluations can affect the patient’s alertness and performance. A patient’s culture and native language should also be considered to determine the appropriateness of examination questions and materials.
- Patients with agnosia can have difficulty completing formal standardized tests due to visual or auditory agnosia.

**History**

**History of present illness/injury**

- **Mechanism of injury or etiology of illness:** What is the underlying cause of the brain damage? See Causes, above, for associated underlying causes. Most cases of agnosia are acquired; however, cases of developmental agnosia have been described in the literature\(^19,22,23,24\).
- **Course of treatment**
  - **Medical management**: Medical management will vary depending on the underlying cause of agnosia. The patient will most likely be under the care of an internal medicine physician and a neurologist, but might also require the care of a cardiologist, endocrinologist, and/or psychiatrist or psychologist.
  - **Medications for current illness/injury**: Determine what medications physician has prescribed; are they being taken?
  - **Diagnostic tests completed**: Refer to neurological imaging (e.g., MRI, CT scan) for description of site and extent of brain damage.
  - **Home remedies/alternative therapies**: Document any use of home remedies or alternative therapies (e.g., acupuncture) and whether or not they help.
  - **Previous therapy**: Document whether patient has had speech, occupational, or physical therapy for this or other conditions and what specific treatments were helpful or not helpful.
  - **Aggravating/easing factors**: In which contexts and situations are symptoms exacerbated? Has the patient developed his or her own methods of compensating for deficits?
  - **Nature of symptoms**: Document nature of symptoms; with which modality (e.g., hearing, vision, touch) do symptoms present?
  - **Other symptoms**: Document other symptoms patient may be experiencing that could exacerbate the condition and/or symptoms that could be indicative of a need to refer to physician.
  - **Psychosocial status**: With agnosia, as with other communicative disorders, symptoms or reports of depression (such as feelings of hopelessness), anxiety, or suicidal feelings should be taken seriously and referrals to psychologist or psychiatrist should be made immediately\(^1\)\(^10\)\(^17\).
  - **Hearing**: A full audiological evaluation for patients suspected of having an auditory agnosia is appropriate prior to speech and language testing; in order to determine if difficulty comprehending speech and language is due to an underlying agnosia versus a hearing loss, hearing loss must be ruled out and/or treated prior to further evaluation for agnosia.
  - **Barriers to learning**
    - **Are there any barriers to learning?** Yes _ No__
    - **If Yes, describe _______________**

- **Medical history**
  - **Past medical history**
    - **Previous history of same/similar diagnosis**: Did the patient have a premorbid communication disorder such as agnosia, aphasia, apraxia, anomia, or dementia? Does the patient have preexisting hearing or vision deficits?
    - **Comorbid diagnoses**: Ask patient and/or caregiver about other problems, including diabetes, cancer, heart disease, complications of pregnancy, psychiatric disorders, and orthopedic disorders.
    - **Medications previously prescribed**: Obtain a comprehensive list of medications prescribed and/or being taken (including over-the-counter drugs).
    - **Other symptoms**: Ask patient about other symptoms he or she is experiencing, including symptoms of depression\(^1\)\(^10\)\(^17\).

- **Social/occupational history**
  - **Patient’s goals**: Document what the patient, family, and/or caregiver hope to accomplish with therapy and in general.
  - **Vocation/avocation and associated repetitive behaviors, if any**
    - **Does the patient participate in any language-based recreational activities?**
    - **Does the patient work or attend school?**
    - **Does the patient regularly use a computer/telephone?**
  - **Functional limitations/assistance with ADLs/adaptive equipment**: Does the patient require use of any assistive or adaptive equipment such as a cane, a walker, a wheelchair, glasses, hearing aids, or any form of alternative/augmentative communication (AAC) (e.g., device, pen and paper, picture book)?
  - **Living environment**: Document information about the patient’s living environment including with whom the patient lives (e.g., caregivers, family members). Identify if there are barriers to independence in the home; any modifications necessary? With agnosia, patients might need to alter their living environment. For auditory agnosias, lights or vibrations need to be used with telephones and alarms. For visual agnosias, sound or tactile cues can be used to alert patients to dangerous objects.

- **Relevant tests and measures**: (While tests and measures are listed in alphabetical order, sequencing should be appropriate to patient medical condition, functional status, and setting)
Arousal, attention, cognition (including memory, problem solving): Disturbances of arousal, attention, and cognition might exacerbate an agnosia due to the interdependence of cognitive and communicative processes. Review any available reports on cognitive impairment from a physician or neuropsychologist, if possible. These nonlinguistic cognitive processes can be assessed using formal or informal measures; examples include:

– Mini-Mental State Examination (MMSE) – to assess overall cognitive impairment; sections include: Orientation to Time, Orientation to Place, Registration, Attention and Calculation, Recall, Naming, Repetition, Comprehension, Reading, Writing, Drawing

– Psycholinguistic Assessments of Language Processing in Aphasia (PALPA) – to assess all aspects of language through 60 subtests, including expressive and receptive language, reading, and writing

Assistive and adaptive devices: Note the use of any AAC system, including high-tech or low-tech (e.g., pen and paper)

– Assess appropriateness and readiness for AAC system. For detailed information on assessment and treatment of communication disorders with AAC, see the series of Clinical Reviews on this topic

Motor function (motor control/tone/learning): It is important to rule out motor impairment during the assessment of a patient with agnosia. If it appears the patient is unable to hold or examine objects secondary to poor motor function, refer to physical or occupational therapy for further assessment

Muscle strength: It is important to rule out muscle weakness during the assessment of agnosia. If it appears the patient is unable to hold or examine objects secondary to reduced muscle strength, refer to physical or occupational therapy for further assessment

Oral structure and oral motor function: Complete a full oral mechanism exam. The patient should have intact lingual, labial, and velar strength, range of motion, and rate. If the patient is unable to verbalize due to an oral motor impairment, the underlying cause might be dysarthria. For detailed information on dysarthria, please see the series of Clinical Reviews on this topic

Perception (e.g., visual field, spatial relations): The patient’s sensory perception must be intact for deficits to be attributed to or diagnosed as agnosia. Vision, hearing, and touch must be thoroughly examined. A neurologist, physical therapist (PT), or occupational therapist (OT) can assess perception, including perception of normal touch, light touch, pinprick, position sensation, vibration, and temperature. An audiologist should complete a full audiological evaluation. An ophthalmologist should complete a full visual examination. If during the exam it appears that the patient has altered perception, refer to audiology, ophthalmology, PT, OT, or neurology for further testing

Speech and language examination (including reading): A complete and detailed evaluation of the patient’s communication skills is necessary. A pure agnosia is modality-specific and can only be diagnosed if all other speech, language, cognitive, and perceptual deficits are ruled out. Several sessions might be required to complete the initial evaluation so that a proper treatment program can be developed. Testing includes any or all of the following diagnostic tests:

– Speech: A motor speech evaluation should be performed to identify or rule out coexisting apraxia and/or dysarthria. (For information on assessment and treatment of apraxia, see Clinical Review...Apraxia of Speech [Acquired]; Accession Number: 5000008019; for information on assessment and treatment of dysarthria [spastic, flaccid, ataxic, hypokinetic, and hyperkinetic], see the series of Clinical Reviews on dysarthria)

– Language: Assess expressive and receptive language skills

- Due to the fact that brain damage is the underlying cause of both aphasia and agnosia, patients with agnosia may have concomitant aphasia

- For detailed information on assessment and treatment of aphasia, see the series of Clinical Reviews on this topic

- Patients with agnosia can have difficulty completing formal standardized tests due to visual or auditory agnosia.

Examples of formal tests of language include:

- Boston Diagnostic Aphasia Examination (BDAE) – to assess expressive and receptive language skills as well as visual spatial and quantitative skills

- Boston Naming Test (BNT) – to assess object naming through line drawings

- Western Aphasia Battery (WAB) – to assess expressive and receptive language skills

– Voice: Briefly assess vocal function, including vocal quality, loudness, pitch, and endurance; if there are specific concerns regarding voice, refer to otolaryngologist for complete workup to rule out laryngeal pathologies prior to completing a full evaluation. For detailed information on assessment of the voice, see the series of Clinical Reviews on this topic

– Reading: Assess reading and writing skills as part of a complete evaluation of agnosia; patients with pure word deafness will not comprehend spoken language; however, they will likely have intact reading and writing skills that can be utilized
as part of a compensatory treatment plan.(21) For detailed information on acquired reading impairment (alexia/acquired dyslexia), see the series of Clinical Reviews on this topic

• **Special tests specific to diagnosis:** Research and expert opinion have provided examples of specific testing that should be included depending on the type of agnosia the patient appears to have. The following are informal tests that can be completed to determine the extent of certain types of agnosia:
  – Auditory agnosia – with the patient’s eyes closed, the examiner makes different environmental sounds (with items in the room or with an audio recording). The patient is asked to identify what sound he or she is hearing.(4)
  – Object agnosia – place several common objects in front of the patient and ask him or her to name the objects. If the patient is unable to name the object by sight, ask the patient to pick the object up and identify it.(4) The patient should be able to point to the object if the examiner names it, as well as explain how it is used.
  – Prosopagnosia – examiner should provide a variety of faces, including pictures of celebrities, politicians, and athletes as well as pictures of friends and family members provided by the patient or family/caregiver. Ensure that the pictures are age and culturally appropriate (i.e., American teen pop stars should not be used when testing geriatric immigrants). For faces the patient is unable to identify visually, the examiner should assess the patient’s knowledge of the person in the picture by asking a question.(1) For example, if the patient is looking at a picture of George Washington, the examiner could ask, “Who was the first president of the United States?” In order to differentially diagnose prosopagnosia from an object agnosia, ask the patient to label the parts of the person’s face (i.e., nose, mouth, eyes)(1)
    - The Benton Faces Test is a standardized test of facial discrimination(7,8)
    - Cambridge Face Memory Test: an online test in which the subject is asked to memorize 6 different faces and then recall them in progressively more difficult tasks (http://www.bbk.ac.uk/psychology/psychologyexperiments/experiments/facememorytest/startup.php)(25,26)
  – Simultagnosia – show the patient a picture of a scene and ask the patient to describe the picture; patients with simultagnosia will describe only parts of the picture at a time and will be unable to identify the scene as a whole.(1) For example, the patient may label clowns, animals, and trapeze artists in a picture but will be unable to refer to the whole picture as a circus.
  – Tactile agnosia – present an array of objects for patient to touch while his or her eyes are closed. If the patient is unable to name an object by touching it, prompt him or her to look at the object. The patient should be able to name the object by looking at it.(3,4)

• **Swallow examination:** Depending on the underlying cause of agnosia, patients can be at risk for dysphagia; it is appropriate to complete a brief screen of swallowing skills during the speech and language evaluation. If the screen indicates dysphagia is present, complete a full evaluation of swallowing skills. For additional information on swallowing evaluations, see the series of Clinical Reviews on dysphagia assessment.

• **Tracheostomy examination:** If present, assess tracheostomy tube and document date of placement, current respiratory status, and use of speaking valve. For detailed information on assessment of patients with tracheostomies, see Clinical Review...Dysphagia: Children with Tracheostomy; CINAHL Topic ID Number: T709082 and Clinical Review...Dysphagia: Adults with Tracheostomy; CINAHL Topic ID Number: T709084. For detailed information on assessment of a tracheostomy tube and use of a speaking valve, see Clinical Review...Passy-Muir Tracheostomy & Ventilator Swallowing and Speaking Valve; CINAHL Topic ID Number: T708919

**Assessment/Plan of Care**

 › Contraindications/precautions
  • Only those contraindications/precautions applicable to this diagnosis are mentioned below, including with regard to modalities. Rehabilitation professionals should always use their professional judgment
  • Patients with this diagnosis are at risk for falls; follow facility protocols for fall prevention and post fall prevention instructions at bedside, if inpatient. Ensure that patient and family/caregivers are aware of the potential for falls and educated about fall prevention strategies. Discharge criteria should include independence with fall prevention strategies.
  • As with any treatment, the therapist must cater the treatment program specifically to the individual patient’s and family’s needs.
  • A specific precaution noted in the literature regarding treatment of agnosia deals with interference. In one case study, the patient’s ability to recognize faces was actually worse after treatment. Investigators hypothesized that due to the brain
damage that caused prosopagnosia, the patient had less healthy brain tissue with which to learn new information. The treatment protocol for this patient actually seemed to “use” too much of this healthy brain function, leaving the patient better at the treatment task but worse at the carryover goal of recognizing faces.\(^2\) With agnosia, it is important that the therapist continually assess the patient’s progress to ensure treatment is ameliorating rather than exacerbating the symptoms.

- Patients with agnosia are also at risk for swallowing and feeding difficulties. Ensure that the patient and family/caregivers are aware of potential aspiration risks and educated about strategies when appropriate.

### Diagnosis/need for treatment:
The diagnosis of agnosia may be made when the patient fails to recognize items in one specific modality despite intact sensory perception. The specific type of agnosia is determined based on the modality and the type of symptoms with which the patient presents.

### Rule out:
Any and all other speech, language, cognitive, or sensory impairments must be ruled out or identified as contributing to the patient’s failure to recognize or identify objects, sounds, or language. In order to differentiate a language disorder, such as Wernicke’s aphasia, from a pure word agnosia, the therapist must determine that the patient’s language center is intact. This can be accomplished with written language portions of standardized tests such as the BDAE and the WAB.

### Prognosis:
The prognosis for agnosia varies depending on the underlying cause. If the underlying cause is stroke or head injury, the prognosis is commensurate with the extent of the original brain damage—the prognosis is better for mild strokes or brain injuries. If the underlying cause of agnosia is a degenerative neurological disease, the prognosis is less favorable and agnosia would be expected to worsen as the underlying disease progresses.

### Referral to other disciplines
- Referrals should be made to physical and occupational therapy if there appears to be an underlying motor or muscle control/strength deficit.
- Referral to neurology should be made for a full neurological workup in the case of a patient who presents with an agnosia with no known underlying cause.
- Referral to psychology, psychiatry, or neuropsychology should be made if the patient reports feelings of depression, hopelessness, or other emotional distress.
- Referral to ophthalmology should be made if patient appears to have visual field cut or poor vision.
- Referral to audiology should be made to identify or rule out hearing loss, if appropriate.

### Treatment summary:
Treatment for agnosia is not well studied. This is primarily due to the rarity of pure agnosias. The majority of evidence is found in case studies, with additional recommendations coming from expert opinion. In general, therapists have two types of approaches: the remedial approach, in which the therapist aims to improve the patient’s ability to recognize items in the affected modality, and the training of compensatory strategies, in which the patient is taught how to work around his or her deficits.\(^1,4,5,6,9\)

- **Remedial approach**
  - In a remedial approach for auditory agnosia, the therapist would drill the patient on environmental sounds.\(^4\) Examples of tasks would be:
    - playing a sound and asking the patient to identify it
    - playing a sound and asking the patient to identify it given an array of pictures
    - naming a sound and then asking the patient to identify it from a set of sounds played
    - Unfortunately, research on this approach for auditory agnosia has not shown it to be effective.\(^4\)
  - Remedial approaches for pure deafness/auditory verbal agnosia can also include drills and lip reading.\(^1,5,6\)
    - Therapist can drill minimal pairs with the patient in order to improve the patient’s auditory discrimination of speech sounds; minimal pairs are words that differ by only one distinctive feature (e.g., “mad,” “sad”).
    - Fast ForWord is a commercially available computer program that drills auditory language.\(^1\)
    - Therapist can educate patient on the lip postures that correlate to phonemes and drill the patient to increase proficiency.
    - According to preliminary research and case studies, both minimal pair drills and lip-reading strategies can improve auditory comprehension in pure word deafness.\(^5,6\)
  - Remedial approach for visual agnosias
    - Drills to practice discrimination between common objects.\(^4\)
    - Easy Street Environment: used at hospitals and rehab centers, the Easy Street Environment is a modular community with life-size streets, banks, ATMs, stores, offices, etc., with which the patient and therapist can simulate real-life situations to improve functional object recognition.\(^4\)
- The patient is asked to match identical objects to each other, working up to matching an object to a drawing and to matching an object to its written name.\(^1\)

- Group therapy might be appropriate for patients with visual agnosias.
  - In a study conducted in Sweden, researchers found that patients with visual agnosia improved by watching adults without agnosias and picking up clues (e.g., looking at others during a meal to remember which utensil was a fork).\(^{17}\)
  - In a case study involving a male patient with visual agnosia, measurable improvement was noted in object recognition scores following a course of therapy that centered around therapeutic activities that indirectly trigger visual representations (e.g., woodworking, sketching).\(^2\)

- The author of this study recommended the following types of activities to achieve these results with other patients with visual agnosia:
  - Activities requiring gazing and visual attention.\(^9\)
    - Sketching
    - Coloring
  - Activities requiring both visual and tactile senses.\(^9\)
    - Woodcarving
    - Leather crafting
    - Metal carving
  - Activities that do not require continuous visual stimulation.\(^9\)
    - Working with stained glass
    - Creating a mosaic with tiles or colored paper
  - Recreational activities.\(^9\)
    - Fishing
    - Basketball

- Developmental prosopagnosia
  - Holistic face training might improve face recognition in children with developmental prosopagnosia.\(^{25}\)
    - Based on a study conducted in the United States with 24 children with developmental prosopagnosia; half of the study participants were treated immediately, and the other half were placed in a delayed-treatment control group
    - The goal of the training was to increase the subjects’ ability to better recognize feature spacing (e.g., space between the mouth and nose, distance between eyes and eyebrows)
    - Treatment consisted of a computer training program for 15 days, 30-40 minutes per day using different lifelike faces created with a face-making software program
    - At baseline and after training, researchers assessed front-view face discrimination, face discrimination with view-point changes, and holistic face processing. The subjects in the treatment group demonstrated moderate but significant overall training-related improvements on measures of front-view face discrimination compared with the delayed-treatment group. The subjects who progressed through the training to the most difficult levels (i.e., those who were the best responders to the training) exhibited the greatest improvements in front-view face discrimination and demonstrated significantly increased holistic face processing, achieving scores similar to typically developing controls
  - Authors of a case study utilized Greebles, which are 3-D computerized objects made up of a “body” and 4 “appendages” protruding from the main body.\(^2\)
    - The patient (who had prosopagnosia and object agnosia) was trained over 31 sessions to identify the Greebles as “male” or “female” as well as to recognize specific Greebles that were assigned an “identity”
    - The goal of therapy was to train the subject to focus on specific features in order to improve facial discrimination
    - Results were measured by naming accuracy as well as reaction time
      - In this study, the patient learned to correctly identify the Greebles as well as demonstrated a decrease in reaction time
      - Therapy appeared to generalize to object naming, as post-therapy tests of object naming improved; however, there was a detrimental effect on facial recognition, as post-therapy tests of facial discrimination were less accurate

- Remedial approach for tactile agnosia
  - Have the patient feel a variety of objects with his or her eyes closed, followed immediately by looking at the object to provide visual feedback.\(^4\)
  - Limited research has been done regarding the efficacy of this type of treatment.\(^4\)
• Compensatory strategies
  – Compensatory strategies for auditory agnosia include utilizing the patient’s intact senses to alert the patient to danger, urgency, or alarms\(^6\)
    - Use flashing lights on the anything around the house that typically makes a sound (e.g., telephone, doorbell, smoke alarms)
    - Use vibrate function on cell phone
    - Use bed-vibration alarm clock
    - Patients with phonagnosia would be instructed to utilize strategies on the phone such as caller ID and asking the person on the other line to identify him or herself when calling\(^1\)
  – Compensatory strategies for pure word deafness include focusing on the intact language skills
    - Patient carries pen and paper at all times in order to have people write to communicate
    - Closed captioning on the television\(^1\)
  – Compensatory strategies for proposagnosia include training the patient to utilize alternative cues to improve facial recognition
    - Focusing on a unique facial feature such as a scar, moustache, eyebrow shape, crooked teeth, or nose shape that can be associated with a specific person\(^1\)
    - Asking friends and family members to speak when they approach the patient is helpful because patients with prosopagnosia can generally identify voices immediately\(^6\)
  – Compensatory strategies for pure object agnosia include:
    - Utilizing intact sensations such as touch and hearing to identify an object (e.g., have the patient describe an object out loud to trigger its name; or reach out to touch the object carefully to aid recall)\(^1,4\)
    - Putting tactile markers with varying textures around the house (e.g., putting Velcro on the stove or by the electrical panel to indicate danger and soft material such as felt on the telephone to indicate safe items)\(^1\)
    - Organizing the home to increase independence (e.g., having a caregiver hang pieces of clothing that match together in the closet; organizing the refrigerator so that fruit is always on the left, dairy is on the top shelf)\(^1\)
  – Compensatory strategies for simultagnosia include:
    - Patient can describe everything he or she is seeing aloud and deduce what "whole" is being seen\(^1\)
    - The patient might require modeling from the therapist when learning this technique (e.g., with a kitchen, “I see a refrigerator, a stove, a sink, a microwave. I think I’m looking at a kitchen”)
    - Color-coding items in closets and drawers to help the patient focus on desired item\(^10\)
    - Using functional adaptive equipment such as a talking watch or calculator\(^10\)
    - Using brightly colored cards to keep place while reading or writing\(^1,10\)
  – Compensatory strategies for tactile agnosia include:
    - Utilize intact vision by having the patient describe the object he or she is touching to trigger its name\(^4\)

<table>
<thead>
<tr>
<th>Problem</th>
<th>Goal</th>
<th>Intervention</th>
<th>Expected Progression</th>
<th>Home Program</th>
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</thead>
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<tr>
<th>Condition Description</th>
<th>Goal: Increase ability</th>
<th>Therapeutic Strategies</th>
<th>Additional Notes</th>
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</thead>
<tbody>
<tr>
<td>Auditory agnosia – inability to recognize environmental sounds</td>
<td>to identify environmental sounds</td>
<td>Remedial approaches to auditory agnosia</td>
<td>Although no standardized protocol for progression has been established, logical progression would involve having the patient initially identify very common sounds (e.g., dogs barking, ambulance sirens) and progress toward less recognizable or common environmental sounds</td>
</tr>
<tr>
<td>Auditory agnosia – inability to recognize environmental sounds</td>
<td>Ensure patient safety; utilize compensatory strategies</td>
<td>Compensatory strategies for auditory agnosia</td>
<td>The patient is expected to utilize these strategies daily</td>
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<tr>
<td>Phonagnosia – inability to recognize familiar voices</td>
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<td>Compensatory strategies for phonagnosia</td>
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</tr>
<tr>
<td>Pure word deafness/verbal auditory agnosia – inability to recognize spoken words</td>
<td>Increase recognition of spoken words</td>
<td>Remedial approaches to pure word deafness/verbal auditory agnosia</td>
<td>The patient will initially be drilled at sound and syllable level and is expected to increase as able to words, sentences, and paragraphs</td>
</tr>
<tr>
<td>Pure word deafness/verbal auditory agnosia – inability to recognize spoken words</td>
<td>Increase ability to perform functional activities of daily living</td>
<td>Compensatory strategies for pure word deafness/verbal auditory agnosia</td>
<td>The patient is expected to utilize these strategies daily</td>
</tr>
<tr>
<td>Prosopagnosia – inability to recognize faces</td>
<td>Utilize compensatory strategies to recognize friends and family members</td>
<td><strong>Therapeutic strategies</strong>&lt;br&gt;Compensatory strategies for prosopagnosia&lt;br&gt;See <em>Treatment summary</em>, above</td>
<td>The patient is expected to utilize these strategies daily</td>
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<td>Pure object agnosia/visual object agnosia – inability to recognize common objects</td>
<td>Improve object recognition</td>
<td><strong>Greebles training regimen</strong>&lt;br&gt;(2)&lt;br&gt;See <em>Treatment summary</em>, above</td>
<td>One example of progression is as speed and accuracy of recognition for the Greebles improves, the SLP can guide the patient to utilize these same feature-recognition strategies for naming objects</td>
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<td>Improve object recognition</td>
<td><strong>Therapeutic strategies</strong>&lt;br&gt;Remedial approaches to pure object/visual object agnosia&lt;br&gt;See <em>Treatment summary</em>, above</td>
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<td>Increase ability to perform functional activities of daily living</td>
<td><strong>Therapeutic strategies</strong>&lt;br&gt;Compensatory strategies for object/visual agnosia&lt;br&gt;See <em>Treatment summary</em>, above</td>
<td>The patient is expected to utilize these strategies daily</td>
</tr>
<tr>
<td>Simultagnosia – inability to perceive multiple objects as a whole</td>
<td>Increase ability to perform functional activities of daily living</td>
<td><strong>Therapeutic strategies</strong>&lt;br&gt;Compensatory strategies for simultagnosia&lt;br&gt;See <em>Treatment summary</em>, above</td>
<td>The patient is expected to utilize these strategies daily</td>
</tr>
<tr>
<td>Tactile agnosia – inability to recognize objects through touch</td>
<td>Improve tactile identification of objects</td>
<td><strong>Therapeutic strategies</strong></td>
<td>Although no standardized protocol for progression has been established, logical progression would involve having the patient initially identify very common objects through touch only (e.g., hair brush, keys, spoon) and progress toward less recognizable or common objects</td>
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**Desired Outcomes/Outcome Measures**

- Improved auditory comprehension
  - Boston Diagnostic Aphasia Examination (BDAE)
  - Boston Naming Test (BNT)
  - Mini-Mental State Examination (MMSE)
  - Psycholinguistic Assessments of Language Processing in Aphasia (PALPA)
  - Western Aphasia Battery (WAB)
- Improved auditory sound recognition
- Improved facial recognition
  - Benton Faces Test
  - Cambridge Face Memory Test
- Improved object recognition
  - Visual Perception Test for Agnosia
- Increased independence in ADLs
- Increased safety in the home or work environment

**Maintenance or Prevention**

- Maintenance of skills in a person with agnosia will depend on continued use of compensatory strategies; the extent to which the patient is able to maintain these skills and/or prevent further decline will vary with respect to the degree of the underlying agnosia and the extent of underlying brain injury
- For treatments that involve drills, patients will likely maintain progress made if they continue to utilize the home programs following discharge from therapy

**Patient Education**

- For information about agnosia, see the National Institutes of Health’s Web site for the Office of Rare Diseases Research, https://rarediseases.info.nih.gov/diseases/8/agnosia
Find information about stroke prevention, risk factors, and recovery at the National Stroke Association Web site, www.stroke.org

Note
Recent review of the literature has found no updated research evidence on this topic since previous publication on January 8, 2016

References