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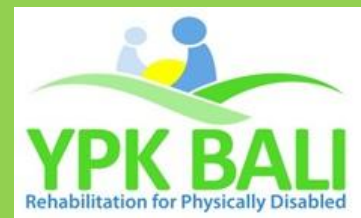
# Flowchart Sensori Integrasi

## Manual

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## Sensory Integration

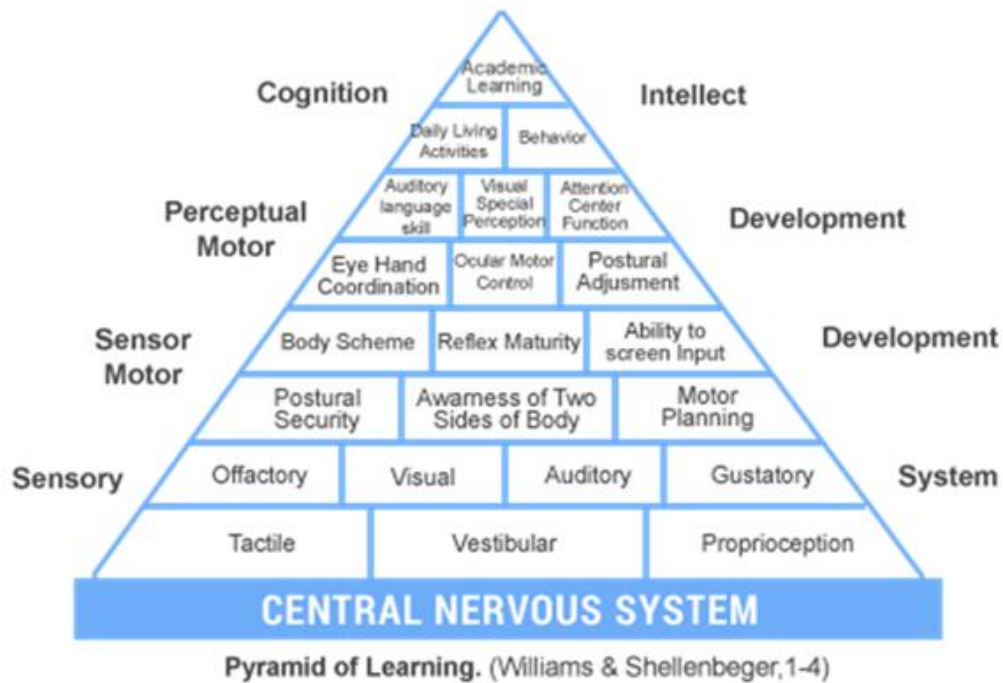
Sensory Integration is the neurologic process whereby stimuli are processed by the senses to get information which can be used in the daily life (Stock Kranotwitz, 2005). The stimuli are used to survive, to satisfy the needs, to learn and to live life smoothly. The information which comes in through the senses helps through the ears in the form of sound waves. The information comes in through the five external senses, vision, auditory, tactile, olfactory and gustatory.

- Vision (sight), where information is taken in through the eyes in the form of light, color, shape and depth.
- Auditory (hearing), where information is primarily taken in through the ears to understand the message.
- Tactile (touch), where information is taken in through the skin which includes temperature, pressure, vibration and pain.
- Gustatory (taste), where information is taken in through the tongue in the form of flavor and structure.
- Olfactory (smell), where information is obtained through the nose in the form of smell.

There are also two other internal senses, vestibular and proprioception. This manual and the flowchart pays no attention to those two internal senses, because of the fact it is difficult to measure the influence of these internal senses. It takes more time to learn and implement these parts of Sensory Integration. The two internal senses are (Stock Kranotwitz, 2005);

- Vestibular, gives the information through balance and the movement of the neck, eyes and body, what is reflected in what the position is of the body (standing, sitting).
- Proprioception, gives the information through the muscles, skin and joints. It gives information about the movements are made and where the extremities are placed relative to the body and the area.

With the help of the five external senses, people can develop themselves according to the Pyramid of learning (Williams & Shellenberg, 1996). You can see in the picture, the sensory has to be present to create a base for developing or learning. If there are problems on sensory level, it is difficult to develop or learn. However, if you focus on the senses which are developed adequately, it is possible to learn and develop.



### Sensory Processing Disorder

A Sensory Processing Disorder (SPD) is the inability to use the information, which comes in through the senses, for living the daily life smoothly (Stock Kranotwitz, 2005). SPD are usually identified in children, but they can also affect adults. SPD are commonly seen in developmental disorders like autism. SPD may affect one sense, like hearing, touch, or taste, but it may also affect multiple senses. Children can be over- or under-responsive to the things they have difficulties with.

Everyone has some Sensory Integration problems now and then, because no one is well regulated all the time. All kinds of stimuli can temporarily disrupt normal functioning of the brain, either by overloading it with, or by depriving it of, sensory stimulation. Please note that Sensory Integration can be effective for every child, the child don't have to have a SPD (Dunn & Rietman, 2006).

## Types of Sensory Integration

Sensory Integration can be categorized in four types. The four types are Seeker, Bystander, Sensor and Avoider (Dunn, 2013). The types are based on what kind of stimuli threshold someone has and how they search for stimuli. In the schedule below can be seen how the categories are organized.

Neurologic Threshold	<i>Behavioral Response/ Self-regulation Continuum</i>	
	<i>Passive</i>	<i>Active</i>
<b><i>HIGH stimuli (habituate)</i></b>	Bystander	Seeker
<b><i>LOW stimuli (sensitization)</i></b>	Sensor	Avoider

The information which can be found within the schedule is;

- A Seeker; has a high stimuli threshold and is searching active for stimuli.
- A Bystander; has a high stimuli threshold, although is not searching for it (passive).
- A Sensor; has a low stimuli threshold, although is not avoiding stimuli (passive).
- An Avoider; has a low stimuli threshold and is active in avoiding stimuli.

Example: when it is known a child is a seeker for tactile input, it does not have to mean that the child is also a seeker on the other senses. It is possible the child has a normal threshold for those senses. Also it is possible the child is a seeker on vision as well, but an avoider on auditory.

## Instructions for using the flowchart

Before you start with using the flowchart, be sure the following points are ruled out.

- The child has no diagnoses of the external senses, like deafness, blindness, sensory palsy, ect.
- The child is not feeling sick or has pain somewhere.

Also you have to make sure that the child understands what the activity/task of the therapy is.

- Explain the activity/task to the child.
- Say what you are going to do.
- Tell the child what he has to do.
- Make sure the child has understand you.

Some children have a delay in their reaction time (A. Rozier, personal communication, February 2, 2015). If you explain the task or intervention to them, give them the time to process the information. If you keep repeating the message, the child will not understand the information and does not know what he has to do.

In the following chapters, you can follow the steps which are made within the flowchart;

1. Does the child react/ not react on stimuli?
2. Does the child react positive/negative on stimuli?
3. Explanation about SI-type and interventions.

### Does the child not react on stimuli?

When the child does not react on stimuli of a certain sense, he might be hyposensitive for this kind of input (Dunn & Rietman, 2006). Make sure the child is not diagnosed with blindness, deafness, palsy or other dysfunctions. The symptoms below are indicating when someone is a bystander or in other words, hyposensitive for input on the different senses.

**Bystander for visual input** (Sensory Processing Disorder, w.d.; Stock Kranotwitz, 2005):

- Child is not following objects when you are moving them in front of their head.
- Difficulty judging spatial relationships in the environment, like bumps into objects/people or missteps on curbs and stairs.
- Child has difficulty telling the difference between similar printed letters or figures.
- Child has a hard time seeing the "big picture", for example focuses on the details or patterns within the picture.
- Child has difficulty locating items among other items, for example papers on a desk, clothes in a drawer, items on a grocery shelf, or toys in a bin/toy box.
- Difficulty controlling eye movement to track and follow moving objects.
- Child has difficulty telling the difference between different colors, shapes, and sizes.
- Complains about "seeing double".
- Difficulty finding differences in pictures, words, symbols, or objects.
- Confuses left and right.

**Bystander for auditory input (Sensory Processing Disorder, w.d.; Stock Kranotwitz, 2005):**

- Child often does not respond to verbal cues or to name being called.
- Appears to "make noise for noise's sake".
- Loves excessively loud music or TV.
- Seems to have difficulty understanding or remembering what was said.
- Reacts oblivious to certain sounds.
- Reacts confused about where a sound is coming from.
- Talks self through a task, often out loud.
- The child has little or no vocalizing or babbling.
- Needs directions repeated often, or will say, "What?" frequently.

**Bystander for tactile input (Sensory Processing Disorder, w.d., Stock Kranotwitz, 2005):**

- The child may crave touch, needs to touch everything and everyone.
- The child is not aware of being touched/bumped unless done with extreme force or intensity.
- The child is not bothered by injuries, like cuts and bruises, and shows no distress with shots.
- The child may not be aware that hands or face are dirty or feel his/her nose running.
- The child may be self-abusive; pinching, biting, or banging his own head.
- Mouths objects excessively.
- Frequently hurts other children or pets while playing.
- Repeatedly touches surfaces or objects that are soothing.
- Seeks out surfaces and textures that provide strong tactile feedback.
- Thoroughly enjoys and seeks out messy play.
- Craves vibrating or strong sensory input
- Does the child react on tactile stimuli?

**Bystander for gustatory input (SPD Australia, 2015):**

- The child may lick, taste, or chew on inedible objects.
- Prefers foods with intense flavor, like excessively spicy, sweet, sour, or salty.
- Excessive drooling past the teething stage.
- Acts as if all foods taste the same.
- The child can never get enough condiments or seasonings on his/her food.

**Bystander for olfactory input (SPD Australia, 2015):**

- The child has difficulty discriminating unpleasant odors.
- The child may drink or eat things which are poisonous because they do not notice the noxious smell.
- The child is unable to identify smells from scratch 'n sniff stickers.
- The child does not notice odors that others usually complain about.
- Fails to notice or ignores unpleasant odors.
- The child makes excessive use of smelling when introduced to objects, people, or places.



## Interventions for a bystander

It depends on the aim of the therapy before you can choose what kind of SI-based intervention you are going to use within the therapy. Sometimes it is better to distract the child from the therapy and sometimes you want the child to be focused on the activity during the therapy.

If the aim is stretching, it is not necessary the child is focused. The intervention for most of the children will be distracting them for the pain which the stretching can give them. Although, a bystander is most of the time not paying attention when the stimuli is less than his threshold (Stock Kranwitz, 2005). It is not necessary to distract him.

If the child is a bystander for tactile stimuli, it is possible you get his attention because during stretching you give him tactile stimuli. Use the attention to make a combination of stretching and focusing.

When you give a therapy in which the bystander has to focus, such as hand function training, you have to use interventions which are unpredictable (Dunn & Rietman, 2006). This is because a bystander has a high threshold, so he can handle surprises. With surprises like letting a toy certainly appear, speak to the child in different pitches with your voice or with touching the child with a soft toy on different body parts, you will achieve his focus.

If the child is a bystander for gustatory or olfactory input, you will not directly notice it. The child is not sensitive for tastes, smells or structures in the mouth. If you want to get their focus within activities, find out on which senses are more sensitive. Try different interventions within those certain senses, to see if you get their attention on this level.

### Does the child react on stimuli?

When a child react on stimuli, he can react in two ways; positive or negative. When a child reacts positive you will notice he is starting to laugh, wants more of the input or is pointing to the source of the input. If a child reacts negatively on the input, you may notice wailing, crying or madness in the child.

### Does the child react positive on stimuli?

When a child reacts positive on stimuli of a certain sense, it might be a seeker for this sense. A seeker is seeking for stimuli which can satisfy his needs (Dunn & Rietman, 2006). A seeker can show you what his needs are by pointing to an object, following something with his eyes, or laughing at certain moments. If you see a child wants always more of a certain sense, you may conclude the child is a seeker for this sense.

**Seeker for visual input** (Sensory Processing Disorder, w.d.; Stock Kranotwitz, 2005):

- Child is following objects when you are moving them in front of their head.
- Child likes to look to videos or moving objects.
- Child moves objects closer and further from his eyes to make more visual input.
- Child likes to observe people especially when they are moving.
- Child is not following objects when you are moving them in front of their head.
- Child enjoys bright lights and contrasts in colors, likes bright colors.

**Seeker for auditory input** (Sensory Processing Disorder, w.d.; Stock Kranotwitz, 2005):

- Child enjoys loud sounds and wants to have more of it or moves closer to the source of the sound.
- Makes loud noises
- Loves excessively loud music or TV.
- Reacts enthusiastic to certain sounds.

**Seeker for tactile input** (Sensory Processing Disorder, w.d. Stock Kranotwitz, 2005):

- Likes to touch objects with different structures.
- Is touching people till it is irritating others.
- The child may be self-abusive; pinching, biting, or banging his own head.
- Frequently hurts other children or pets while playing.

**Seeker for gustatory input** (SPD Australia, 2015):

- Frequently chews on hair, shirt, or fingers.
- Constantly putting objects in mouth.
- Child likes to eat food with different structures and temperatures such as ice cream, chips or soup.

**Seeker for olfactory input** (SPD Australia, 2015):

- The child has aberrant need to smell on subjects with strong odors.
- The child likes to eat food with a strong odor, such as durian, union or garlic.

## Interventions for a seeker

Some children who are a seeker, are better focused when their needs are satisfied. For them it is recommendable to give enough stimuli so they can achieve their threshold before you start with an activity in which they have to focus (A. Rozier, personal communication, February 2, 2015). An advice can be to use the stretching time to give the child the stimuli he needs.

If the child is a seeker for visual input, you can stretch the child in a crowded room. Place the child in a position where he is able to look around. If the child wants to, you can give him something like a toy or video which satisfy his needs for visual input.

If the child is a seeker for auditory input, you can give the child something like a toy with noises or let him listen to music to satisfy his needs for auditory input. The child will enjoy himself without putting attention on the pain he might have during the stretching time.

If the child is a seeker for tactile input, you can give the child several toys with different structures whereby he can choose which will satisfy his needs for tactile input.

If the child is a seeker for gustatory or olfactory input, you can give the child something like a toy with different structures, a strong odor or something he may put in his mouth or put against his lips whereby he can satisfy his needs for tactile input.

When you want the child to be focused during an activity (for example hand function training), you first have to know on which sense he is a seeker. When you know this, you can choose on which sense you will focus during the activity. Make sure you achieve the stimuli threshold within the activity. If you offer the child too little stimuli, he will be searching for visual input outside the therapy which results in no focus on the activity.

Use for a visual seeker visual games, like puzzles, games with a lot of bright colors and different contrasts. Use for auditory seekers your voice to give auditory stimuli, support the child for example by counting. Use for tactile seekers more physical contact or allow him to touch you. Give him the possibility to play with different toys, which he may choose himself.

### Does the child react negative on stimuli?

When the child reacts negatively on the stimuli, he might be hypersensitive for the input (Dunn & Rietman, 2006). The stimuli threshold is easily achieved and the child can be easily sensory overloaded. The symptoms below are indicating when someone is a sensor/avoider or in other words, hypersensitive for visual input.

#### Sensor/avoider for Visual input (Sensory Processing Disorder, w.d.):

- Sensitive to bright lights, the child will squint, cover eyes, cry and/or get headaches from the light.
- The child has difficulty keeping eyes focused on task/activity.
- Easily distracted by other visual stimuli in the room.
- The child has difficulty in bright colorful rooms or a dimly lit room.
- Rubs his/her eyes, has watery eyes or gets headaches after reading or watching TV.
- Avoids eye contact.
- Enjoys playing in the dark.

#### Sensor/avoider for auditory input (Sensory Processing Disorder, w.d.):

- The child is distracted by sounds not normally noticed by others, like humming of refrigerators, fans, heaters, or clocks ticking.
- Fearful of the sound of a flushing toilet (especially in public bathrooms), vacuum, hairdryer, squeaky shoes, or a dog barking.
- Started with or distracted by loud or unexpected sounds.
- The child is bothered/distracted by background environmental sounds, like lawn mowing or outside construction
- Frequently asks people to be quiet.
- The child runs away, cries, and/or covers ears with loud or unexpected sounds.
- The child may refuse to go to movie theaters, parades, skating rinks, musical concerts etc.
- The child may decide whether they like certain people by the sound of their voice.

#### Sensor/avoider for tactile input (Sensory Processing Disorder, w.d.):

- The child becomes fearful, anxious or aggressive with light or unexpected touch.
- As an infant, did/does not like to be held or cuddled, may arch back, cry, and pull away.
- Distressed when diaper is being, or needs to be, changed.
- Becomes frightened when touched from behind or by someone/something they can not see (such as under a blanket).
- Avoids group situations for fear of the unexpected touch.
- Resists friendly or affectionate touch from anyone besides parents or siblings.
- A raindrop, water from the shower, or wind blowing on the skin may feel like torture and produce adverse and avoidance reactions.
- May overreact to minor cuts, scrapes or bug bites.
- Avoids touching certain textures of material (blankets, rugs, stuffed animals).
- Refuses to wear new or stiff clothes, clothes with rough textures, turtlenecks, jeans, hats, or belts, etc.
- Avoids using hands for play.

- Avoids/dislikes/aversive to "messy play", like sand, mud, water, glue, glitter, playdoh, slime, shaving cream/funny foam etc.
- Will be distressed by dirty hands and want to wipe or wash them frequently.
- Distressed by seams in socks and may refuse to wear them.
- Distressed by clothes rubbing on skin; may want to wear shorts and short sleeves year round, toddlers may prefer to be naked and pull diapers and clothes off constantly.
- May want to wear long sleeve shirts and long pants year round to avoid having skin exposed
- Distressed about having face washed.
- Is a picky eater, only eating certain tastes and textures; mixed textures tend to be avoided as well as hot or cold foods; resists trying new foods.
- May refuse to walk barefoot on grass or sand.
- May walk on toes only.

#### Sensor/avoider for gustatory input (SPD Australia, 2015):

- The child is a picky eater, often with extreme food preferences, like limited repertoire of foods, picky about brands, etc.
- The child may only eat "soft" or pureed foods past 24 months of age.
- The child may gag with textured foods.
- The child has difficulty with sucking, chewing, and swallowing, may choke or have a fear of choking.
- The child may only eat hot or cold foods.
- Refuses to lick envelopes, stamps, or stickers because of their taste.
- Dislikes or complains about toothpaste and mouthwash.
- Avoids seasoned, spicy, sweet, sour or salty foods; prefers bland foods.

#### Sensor/avoider for olfactory input (SPD Australia, 2015):

- Reacts negatively to, or dislikes smells which do not usually bother, or get noticed, by other people.
- Tells other people (or talks about) how bad or funny they smell.
- Refuses to eat certain foods because of their smell.
- The child is offended and/or nauseated by bathroom odors or personal hygiene smells.
- Bothered/irritated by smell of perfume or cologne.
- The child is bothered by household or cooking smells.
- The child may refuse to play at someone's house because of the way it smells.
- Decides whether he/she likes someone or some place by the way it smells.

#### Interventions for a sensor/avoider.

For children who are a sensor/avoider, it is important to not exceed the stimuli threshold of the child (Dunn & Rietman, 2006). During stretching or doing task/activities, it is easy to give too many stimuli. If it is not necessary to give stimuli, do not give it, otherwise the child may show aberrant behavior. Try to dismiss the input of the sense where the child is sensitive for. Choose the therapy environment, or position in the room carefully.

With stretching you already give a lot of tactile input. Is the child easily overloaded during tactile input? Find out which sense he enjoys and try to distract him of the tactile input which giving him input in something which he enjoys (music, video's etc.). Try to give him as little as necessary tactile input during stretching.

If the child is a sensor/avoider for visual input, you need to be sure the child is not getting too much visual input and his stimuli threshold won't be exceeded. Choose the setting carefully on visual input, let not too many visual input in the sight of the child. You may give therapy in a room with a lot of people, but place the child with his back to the people, whereby he can't see them. Make sure there are no bright lights shining in the eyes of the child.

If the child is a sensor/avoider for auditory input, you need to be sure the child is not getting too much auditory input and his stimuli threshold will be exceed. Choose the setting carefully and make sure it is not crowded and busy with auditory input. Search for a place with less noises whereby he only have to concentrate on your voice.

If the child is a sensor/avoider for tactile input, you have to give the activity on the stimuli threshold of the child. Make sure the child is feeling fine. Do not touch the child when it is not necessary, the child may touch you if he is ready for it. Be careful with taking on shoes or clothes, it may irritating the child when a small piece is not fitting well. If the child does not like to walk on bare feet, put his socks on.

If the child is a sensor/avoider for gustatory input, make conscious choices when he has to eat or drink. Ask the parents how the child reacts when you give him certain drinks or food and how you have to do this. They know the best on which way the child won't be overstimulated. Do not touch the lips of the child if it is not necessary.

If the child is a sensor/avoider for olfactory input, do not use olfactory input, when it is not necessary. Be conscious about the smell of certain objects. If you notice there is a certain smell in the therapy room, observe the reaction of the child and take into consideration to go to another room if the child reacts negative.

## Tips for different kinds of interventions

### Tips for a seeker/bystander for visual input (Dunn & Rietman, 2006; Stock Kranotwitz, 2005):

- Use objects which are bright colored, like balls.
- Use different contrasts, like different color objects as the background.
- Use visual games, like puzzles.
- If you want the child to be focused on the activity and not focused on other stimuli in the area, you have to choose a setting with less stimuli (exclude visual stimuli) and a activity with more visual stimuli.

### Tips for a sensor/avoider for visual input (Dunn & Rietman, 2006; Stock Kranotwitz, 2005):

- Use object which are giving not that many visual stimuli, use the same color as the different objects, place not too many objects in the sight of the child.
- Choose a setting which has less visual stimuli and is not crowded. When you have to be in a crowded area, place the child with his back to the visual stimuli.
- Focus during the activity on the four other senses (If the child is not a sensor/avoider of the other senses).
- If the visual threshold of the child is exceeded, give the child the opportunity to go away.

### Tips for a seeker/bystander for auditory input (Dunn & Rietman, 2006; Stock Kranotwitz, 2005):

- Use objects which makes noises.
- Support the child during the task/activity with auditory stimuli, like counting or singing.
- Let the child make noises/ let him talk during the task/activity.
- Use different pitches in your voice to get the attention of the child.
- If the child is derived from the activity by the auditory stimuli of the environment, you should choose a setting which is less crowded, and give the auditory stimuli the child needs through the activity.

### Tips for a sensor/avoider for auditory input (Dunn & Rietman, 2006; Stock Kranotwitz, 2005):

- Make sure the environment does not have too many auditory stimuli, before starting therapy, search for a therapy environment with less auditory stimuli.
- Explain the task/activity only one time and check if the child understands what he has to do. Make sure only one therapist is giving the child instructions.
- Do not give the child extra auditory stimuli during the activity, like talking, singing, laughing, music, others who are talking etc.

### Tips for a seeker/bystander for tactile input (Dunn & Rietman, 2006; Stock Kranotwitz, 2005):

- Use toys/objects with different structures, like hard/soft, smooth/rough, etc.

- Let the child touch the things he wants to touch.
- Give the child extra stimuli during stretching.

#### Tips for a sensor/avoider for tactile input (Dunn & Rietman, 2006; Stock Kranotwitz, 2005):

- Prepare the child mentally for what is coming during stretching, tell the child; 'I am going to touch your leg.'
- Do not touch the child when it is not necessary.
- If you have to touch the child, probably it is better to touch him a little bit harder than softer.
- Let the child choose the object for the task/activity.
- Give the child the opportunity to go away of the situation he does not like.
- Be careful with putting on (correcting) shoes and clothes, it may be irritating the child when it fits not well.

#### Tips for a seeker/bystander for gustatory input (Dunn & Rietman, 2006; Stock Kranotwitz, 2005):

- Let the child make noises with his mouth, he likes the feeling it gives him.
- Let the child touch his mouth with his hands.
- Give the child toys/object he may investigate with his mouth.

#### Tips for a sensor/avoider for gustatory input (Dunn & Rietman, 2006; Stock Kranotwitz, 2005):

- Make sure the child won't have to touch his mouth during the therapy.
- When the child has to eat or drink as an activity, choose something he likes (according to his parents).

#### Tips for a seeker/bystander for olfactory input (Dunn & Rietman, 2006; Stock Kranotwitz, 2005):

- Use toys/objects made of different materials, it can smell different.
- Choose the setting, a crowded room and outside are more aromas.

#### Tips for a sensor/avoider for olfactory input (Dunn & Rietman, 2006; Stock Kranotwitz, 2005):

- Use objects in which the smell is the same.
- Let the child choose the setting.
- Give the child the opportunity to go away if he is not feeling fine with the situation.



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