



## Moving Beyond the Senses **5**

# How the HIDDEN Senses Affect Attention and Learning at School

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When we teach children about their senses, there is not usually much emphasis on the important role that the sensory systems play in learning. Without our senses, we would have no way of taking in and processing any type of information from the world around us, thus all that we know and do is based on some initial sensory experience. In addition, most classroom lessons on the senses focus on only five senses: sight, sound, touch, taste and smell. However, there are two additional senses that are equally important and foundational to our experiences in the world: the position sense and the sense of movement. In this article, we will discuss the ways in which these lesser known senses impact children in classrooms.

### **The Position Sense (The Sense of Proprioceptive)**

This sense tells us about the position of our whole body and how much force we are using during tasks. Through receptors in the muscles, tendons and joints, this sense works “behind the scenes,” helping us to make automatic adjustments that put our bodies in the best position for the task. In a single task we can see a myriad of ways this sense helps us to be efficient and comfortable. For example, we use the position sense to know how close or far we should be away from our desk, how

## Optimal Learning Environments

much to bend or extend our arm when writing, how much force to use when pressing on a pencil and how much to adjust, stretch, and move our body to avoid cramping or discomfort while sitting. One of the main considerations related to the position sense at school is that traditional classroom furniture is often not conducive to posture that supports neuromuscular or sensory needs, such that children are often in poor positions for much of their time in the classroom.

One of the main ways in which the position sense is often compromised at school is due to the common significant mismatch between size of students in relation the chairs and desks they use throughout the day. In fact, several studies suggest that less than 20% of school children sit at chair-desk combinations suitable for their body height. Considering the vast range of height and weight among students and the custom of equipping classrooms with few or sometimes only one size of chairs and desks, it is not surprising that few students find an optimal match. Complicating the equation further is the fact that dimensions for children in the earlier grades change in the same child from the beginning to end of a school year. The situation is compounded by the fact that a great deal of school furniture is out of date and does not conform to minimum orthopedic or physiological requirements.

A simple rule of healthy ergonomics is the 90-90-90 rule. Early orthopedic studies recognized that keeping most joints (i.e. at the head/neck, the elbows, and the hips/knees) at 90° angles reduced stress on muscles and joints. Chairs and desks that are not the appropriate size for student make this ergonomically-sound position impossible.

### Position Sense Solutions at School

Adjustable height chairs and desks offer the best solution to ensuring that students are sitting in optimal positions for learning and paying attention. Office “task” or “swivel” chairs

An adjustable height task chair allows this student to sit in an ergonomically positive position at the correct height for his size; the motion in the chair also give him the chance to move in safe and appropriate ways that will help him to stay alert and to pay attention.



with pneumatic mechanisms provide some of the most cost-effective ways to offer appropriate heights for students. Adjustable height desks are an alternative solution, but they are often more cumbersome to adjust. If adjusting a seat to the optimal height at a table or desks brings the student's feet off the floor, a small step stool, box or foot ring can be a simple remedy. Consideration of the placement of visual information, distances between furniture, heights of other classroom materials, such as shelving or hooks, and organization of materials that need to be reached or put away can also improve the positioning used by students throughout their school day.

### The Movement Sense (The Vestibular Sense)

The sense of movement detects the pull of gravity and movements of the head, so that we can perceive the way we are moving through the world. Some people may know that this sense has something to do with the feeling of being dizzy when we turn around and that is also the sense that controls balance. However, there are many other important roles of this sensory system which are not commonly known. Like the position sense, the sense of movement operates in an automatic way to support many basic functions. For example, this sense helps us coordinate motions of our eyes and head, in actions

such as looking up at a blackboard then back down at a worksheet. Without this sense alerting the eye muscles that the head is moving, the words on the board and page can “jump around” making it difficult to read and to keep our place.

Since this sense is designed to detect the pull of gravity, it also helps us to keep our head and body upright against. The sense of movement is also our internal “GPS” helping us to know up from down, right from left, etc., in an experiential way, so that we can understand and use these navigational concepts. Neurologically, this sense lays the groundwork for communication between the two sides of the body, thus allowing us to reach across our body midline, coordinate both hands in a task and to develop a dominant hand for skills. In addition, this sense is critical to our state of alertness. When we do not move much, or in slow rhythmic ways, our brain interprets this as a signal to relax and sleep. More vigorous movement indicates that it is time to be awake and engaged.

While furniture for adults, especially in the workplace, has offered a myriad of options tailored to individual preferences for decades, the idea that children would benefit from seating that offers motion is only recently becoming acknowledged. Expecting children to “sit still” and learn is a flawed concept. When we sit still, our brains think it is time to go to sleep. Students will naturally try to fight this feeling by fidgeting in their chairs, swaying side to side, or tipping back in their chairs.

### Movement Sense Solutions at School

Considering the tendency toward more sedentary activities due to increased use of computers and other digital devices, as well as fewer opportunities for movement with less time spent at recess and in physical education, the need to think about and plan “movement breaks” during the school day is more essential than ever. Choices in seating options which provide safe and non-distracting motion for students are also critical. While research with



Rocking chairs that blend in with other classroom furniture provide a calming and organizing seating option for students while they read, search, and collaborate.

ball-chairs and air-filled seat cushions shows generally favorable results, these options are not very practical in most school settings. Rather, task or “swivel” chairs, noted above as options which provide adjustment for height, also provide side-to-side, and some up-and-down movement, thus are smart options. Classroom style rockers are also a great choice for reading, tablet work and collaborative classroom activities. While teachers are sometimes hesitant to introduce “moving” chairs into classrooms, numerous projects have demonstrated that once the teachers experience the improved attention and learning that occurs with safe and non-distracting motion, they do not want to return to static classroom chairs.

### Conclusion

While the choice of adjustable height, dynamic seating can be a bit more expensive upfront, the potential long-term savings to school districts can be significant. Better attention and behavior can provide not only academic, physical and mental health benefits, but positive financial outcomes as well. Static furniture does not support children’s

sensory or learning needs. Considering that school-age children often spend up to 9 hours sitting per day, those who make decisions about classroom furniture need to be informed about the consequences of poor seating choices. An investment in appropriate, comfortable and supportive classroom furniture is the least we can do to help to ensure success for students. ■

**DR. ZOE MAILLOUX** is globally recognized for her expertise in child development, sensory integration, autism, & occupational therapy. With more than 35 years of experience, Zoe has been a champion for increasing understanding of individual differences, with the aim of enhancing participation in meaningful ways, for people of all abilities. With experience in executive leadership of non-profit therapy practices, Zoe known for developing innovative programs to support children & families.



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