Visual “Noise,” Distractibility and Classroom Design

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This is the second in a series of three posts that focus on types of noise and distraction, and their effects on learning.

Have you ever found yourself avoiding a task that demanded a lot of concentration by tidying up your workspace? You may have just been procrastinating starting something unpleasant, but you also
may have been onto something. It may be that clutter in your workspace was actually taking up mental energy that you needed to devote to the task at hand, and that removing visual clutter freed up mental resources and improved your concentration. In my last post, I talked about the negative effects that background noise can have on children, particularly in the context of the learning environment. In this post, I am going to talk about how visual “noise,” or clutter and other visual distractions in the environment, can also detract from children’s learning and performance.

Research with toddlers and young children suggests that their visual environment can have major consequences for attention, cognition, and learning. Infants living in more “chaotic” households (e.g., homes containing more noise and crowding) appear to struggle with visually identifying complex objects compared to infants living in more orderly households (1(https://www.sciencedirect.com/science/article/pii/S0163638316300315)). In one study, researchers placed cameras on children’s heads to examine what they were seeing when their parents tried to teach them new words for unfamiliar objects (2(https://link.springer.com/article/10.3758%2Fs13423-013-0466-4)). Key factors that appeared to help children learn the words included: (a) the object tended to be closer to them (and thus appear larger) than other objects in the background and (b) other objects that could potentially compete for attention were either not present or less central compared to the target object. In another study that tested 3-year-olds’ ability to learn from an e-book, researchers found that when “bells and whistles” that were unrelated to the main narrative were included, children’s understanding and memory of the story were worse than when a simpler version was used (3(https://onlinelibrary.wiley.com/doi/full/10.1111/mbe.12028)). These results highlight some of the many ways distraction—visual and auditory—can interfere with young children’s attention and learning.

Similar effects have been reported with older, school-aged children. For example, research has shown that educationally-relevant decorations can distract kindergarteners from attending to a teacher during a short science lesson, consequently harming learning scores relative to a lesson in a sparser visual environment (4(http://journals.sagepub.com/doi/abs/10.1177/0956797614533801)). In another study, 7-12 year-olds watched recordings of teachers giving a lesson in rooms with varying degrees of visual decoration. Children spent more time looking around the room, paid less attention to the teacher, and had lower learning scores when the room was highly decorated than when the room had fewer decorations. Finally, they reported that these patterns were even more pronounced in children with autism spectrum disorder (5(http://psycnet.apa.org/buy/2017-19804-001)). Some of these harmful effects might decrease as children become more familiar with the classroom, but there is reason to believe that young children might be distracted even when chaotic or highly decorated visual environments are familiar. Reducing visual clutter may be beneficial in helping children focus on the task at hand. However important these factors are when considering typically developing children, they are likely to be of even greater concern when considering children with attention or learning difficulties. This could be an important consideration for Speech-Language Pathologists working one-on-one with young children.

The research findings described here have important implications for classroom environment design. They suggest that classrooms should be designed with some amount of restraint in the number of posters and other wall-hangings that are used decorate the space. Yet this could pose other problems. If you recall from the last post on auditory noise, the reverberation of sound within a room can impair children’s ability to understand speech. One potential solution, offered by Manlove and colleagues (6(https://link.springer.com/article/10.1023%2FA%3A1016663520205)), was that children could sew colorful quilts to hang on the walls and absorb soundwaves. This highlights the fact that sometimes best practices from a visual attention perspective may be at odds with best practices from
a speech comprehension perspective. But perhaps even more importantly, anyone who has seen a preschooler cry when dropped off at school would agree that classrooms must also be locations where children can feel comfortable and happy. What kind of classroom would it be if children could not hang their artwork on the walls?

Any ideal solution must consider all of these factors. For example, perhaps one or two adjoining walls might be kept minimally decorated or bare. Those walls could create the backdrop for children to face when observing a teacher giving a lesson. Alternatively, smartboards could be used to project decorations (e.g., photos of children’s drawings) in some moments but be hidden from view at other times when attention to the instructor is critical. This sort of solution may only be possible in classrooms that have already have smartboards or the financial means to purchase them. However, low-tech solutions may also be possible and in some cases even better. A neutral-colored curtain could temporarily cover decorated walls, which would cost less than a smartboard, and also provide the added benefit of decreasing reverberation. This could help both the acoustic and visual aspects of the environment in ways that are aligned with our knowledge of learning, attention, and cognition. Critically, this kind of solution tackles these kinds of problems without advocating for austere, depressing spaces devoid of artwork or color.

These are just a few possible solutions to optimally design learning environments for children. However, it is important to keep in mind all the ways changing one factor might influence other equally important factors. Remember the study described previously about how the presence of other objects in the child’s visual field harms their ability to learn the name of a new object? You could easily jump to the conclusion that parents should keep their homes bare and clutter-free if they want their children to develop large vocabularies. On the surface, this seems at least somewhat reasonable. On the other hand, we know from other research that enriched environments are important for development (e.g., [7](https://onlinelibrary.wiley.com/doi/full/10.1002/cne.901230110)), and there may be potential concerns related to removing so-called clutter from a child’s environment if that “clutter” consists of toys and other potentially enriching materials. Further, anyone who has a young child knows that there are many demands on a parent’s time. It would be easy to argue that parents keep their homes very tidy and put away toys that a child isn’t currently using. But what good is that strategy if it takes away time that might be better spent talking and engaging with a child?

It is clear that there are many factors to consider when designing the daycares and classrooms occupied by infants and young children. Even typically developing children have very limited attention spans, which means that they will learn best with minimal potential distractions. For children with attention or learning disabilities, reducing distractions is likely even more vital. That said, balance is key, and care must be taken to create learning spaces conducive to warm and positive experiences for children who are simultaneously undergoing socio-emotional development. This research suggests that regulating the characteristics of young children’s learning environments may be beneficial for learning and development; however, caution must be observed to ensure that we do not create austere, impoverished learning environments while trying to reduce visual distractions. Although regulations may be beneficial, particularly to the extent that they can suggest ways to minimize distractions without sacrificing enrichment (e.g., hanging children’s artwork in the hallway rather than take it down entirely), more research is necessary to fully understand the optimal characteristics and layout of these environments. In my next post, I will talk about role of technology in classroom design, both in terms of some of the ways it might be beneficial as well as some potential pitfalls.

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