

ADAPTIVE MOTOR LEARNING & THE PRESCHOOL CHILD

Worksheet and References

Tara Fenamore, M.A.
Doctoral Candidate
Interdisciplinary Studies in Education
Teachers College, Columbia University

Central Question: Do research-based “best practices” universally adopted by early childhood centers in the United States and abroad facilitate the learning of *adaptive psychomotor behavior*?

Adaptive Psychomotor Behavior is defined as (1) a coordinated response to environmental stimuli to accomplish goals in the here-and-now, and (2) supportive of the musculoskeletal health of the changing system across its lifetime. Behavior that fails to meet both criteria is *maladaptive*.

Claims:

1. Typically developing children are not taught adaptive psychomotor behaviors in schools that employ research-based “best practices” in Early Childhood Education.
2. Particularly in Westernized countries, the learning of adaptive psychomotor behavior is stymied by critical gaps in motor learning processes that inadvertently result from cultural and educational practices.
3. Adaptive psychomotor behavior must be learned and systematically encouraged through the integration of structured educational procedures into standard curricula.

Purpose: Redefining adaptive psychomotor behavior in children may inspire practical changes in how motor learning and development is taught and assessed in the early childhood classroom.

Hypothesis 1: The occurrence of maladaptive spinal deviations in children is correlated with increases in physical and cognitive demand, which has recently been demonstrated in an adult population (Baer, Vasavada, & Cohen, 2019).

- I have developed a qualitative research study to test this hypothesis, titled, “Do maturation & cognitive demand influence the occurrence of *forward head posture* in children performing a graphomotor task?” I have been unable to collect data due to restrictions placed on research with human subjects in the social sciences during the COVID-19 pandemic.

Hypothesis 2: Developing a curriculum that scaffolds the learning and stabilization of adaptive psychomotor behavior in childhood will improve musculoskeletal health outcomes across development.

- This hypothesis is much more difficult to test. However, I hope to make strides towards testing this hypothesis throughout my career by incorporating Psychophysical Education into early childhood curricula.

Significance:

- (1) Back pain in children was previously believed to be uncommon, but there is a growing body of research that suggests it is a more prevalent problem (Huguet et al., 2016; Kamper et al., 2016; Kamper & Williams, 2017; Kjar et al., 2011; Michaleff et al., 2014).
 - (2) Spinal pain in childhood and adolescence is an important predictor of chronic spinal pain in adulthood (Jeffries, Milanese, & Grimms-Somers, 2007; Brattberg, 2004; Brattberg, 1994).
 - (3) Spinal pain in adulthood is a prevalent problem and has persisted as the leading cause of “Years Lived with Disability” (YLDs) globally and across all ages, according to the WHO Global Burden of Disease Study (2017).
 - The Global Burden of Disease Study (2017) was jointly developed by the World Health Organization (WHO) and the Institute for Health Measurement and Evaluation (IHME). The IHME website is a useful resource. You can change the parameters of the statistical modeling software to view different GDS 2017 data sets that show the correlation between specified disease processes and the average number of years a person will live with disability (YLDs). The data referenced in the Global Burden of Disease Study (2017) can be found using the following link: <https://vizhub.healthdata.org/gbd-compare/>
-

PRESENTATION REFERENCES

- Baer, J.L., Vasavada, A., & Cohen, R.G. (2019). Neck posture is influenced by anticipation of stepping. *Human Movement Science, 64*, 108-122.
doi: <https://doi.org/10.1016/j.humov.2019.01.010>
- Brattberg, G. (1994). The incidence of back pain and headache among swedish school children. *Quality of Life Research, 3(1)*, 27-31. doi: 10.1007/BF00433372
- Brattberg, G. (2004). Do pain problems in young school children persist into early adulthood? A 13-year follow-up. *European Journal of Pain, 8(3)*, 187-199, doi: <https://doi.org/10.1016/j.ejpain.2003.08.001>
- Czaprowski, D., Stolinski, L., Tyrakowski, M., Kozinoga, M., & Kotwicki, T. (2018). Non-structural misalignments of body posture in the sagittal plane. *Scoliosis & Spinal Disorders, 13(6)*. doi: <https://doi.org/10.1186/s13013-018-0151-5>
- Dimon, T., & Brown, G.D. (2011). *The body in motion: Its evolution and design*. Berkeley, CA: North Atlantic Books.
- Huguet, A., Tougas, M.E., Hayden, J., McGrath, P.J., Stinson, J.N., & Chambers, C.T. (2016). Systematic review with meta-analysis of childhood and adolescent risk and prognostic factors for musculoskeletal pain. *Pain, 157*, 2640-2656. Doi: 10.1097/j.pain.0000000000000685
- Institute for Health Metrics and Evaluation (IHME). Findings from the Global Burden of Disease Study 2017. Seattle, WA: IHME, 2018.
- Jeffries, L.J., Milanese, S.F., Grimmer-Somers, K.A. (2007). Epidemiology of adolescent spinal pain: A systematic overview of the research literature. *Spine, 32(23)*, 2630-2637. doi: 10.1097/BRS.0b013e318158d70b
- Kamper, S.J., Henschke, N., Hestbaek, L., Dunn, K.M., & Williams, C.M. (2016). Musculoskeletal pain in children and adolescents. *Brazilian Journal of Physical Therapy, 20*, 275-284. Doi: <https://doi.org/10.1590/bjpt-rbf.2014.0149>

- Kamper, S.J., & Williams, C.M. (2017). Musculoskeletal pain in children and adolescents: A way forward. *Journal of Orthopaedic & Sports Physical Therapy*, *47*(10), 702-704, doi: <https://doi.org/10.2519/jospt.2017.0109>
- Kjaer, P., Wedderkopp, N., Korsholm, L., & Leboeuf-Yde, C. (2011). Prevalence and tracking of back pain from childhood to adolescence. *BMC Musculoskeletal Disorders*, *12*, 98-108. doi: 10.1186/1471-2474-12-98
- MacDonald, J., Stuart, E., & Rodenberg, R. (2017). Musculoskeletal low back pain in school-aged children: A review. *JAMA Pediatrics*, *171*, 280-287. doi: 10.1001/jamapediatrics.2016.3334
- Magill, R., & Anderson, A. (2016). *Motor Learning and Control: Concepts and Applications*. Dubuque: McGraw-Hill Education.
- Michaleff, Z.A., Kamper, S.J., Maher, C.G., Evans, R., Broderick, C., & Henschke, N. (2014). Low back pain in children and adolescents: A systematic review and meta-analysis evaluating the effectiveness of conservative interventions. *European Spine Journal*, *23*, 2046-2058. doi: 10.1007/s00586-014-3461-1
- Silva, A.G., Punt, T.D., Sharples, P., Vilas-Boas, J.P., & Johnson, M.I. (2009). Head posture and neck pain of chronic nontraumatic origin: A comparison between patients and pain-free persons. *Archives of Physical Medicine and Rehabilitation*, *90*(4), 669-674. <https://doi.org/10.1016/j.apmr.2008.10.018>.
- Thelen, E. (2005). Dynamical systems theory and the complexity of change. *Psychoanalytic Dialogues*, *15*, 255-280. doi: <https://doi.org/10.1080/10481881509348831>
- Tweet, J., & Lewis, K. (2015). *Grandmother fish: A child's first book of evolution*. New York, NY: Feiwel & Friends.