Title

Comparisons of different focuses of attention on children's learning and performance: a systematic review

Abstract

A growing body of investigation has suggested the benefits of an external focus of attention on the performance and learning of motor skills in adults and the elderly. This systematic review investigates the effects of focus of attention on the performance and learning of motor skills in children with typical and atypical development. The literature search was conducted in the electronic databases PubMed, Science Direct, Web of Science, and Scielo, with data inception in December 2023. Of the 43 studies in the review, 30 involved the performance and learning of motor skills in children with typical development. The current systematic review demonstrates that the direction of instructions/feedback can influence the performance and learning of children's motor skills, regardless of the children's developmental condition or task. © 2024 Informa UK Limited, trading as Taylor & Francis Group.

Authors

Flôres F.; Drews R.; Marconcin P.; Cardozo P.

Author full names

Flôres, Fábio (57210371857); Drews, Ricardo (55617900700); Marconcin, Priscila (57170756400); Cardozo, Priscila (55879638100)

Comparisons of different focuses of attention on children's learning and performance: a systematic review

Author(s) ID

57210371857; 55617900700; 57170756400; 55879638100

Year

2024

Source title

International Review of Sport and Exercise Psychology

DOI

10.1080/1750984X.2024.2349988

Link

https://www.scopus.com/inward/record.uri?eid=2-s2.0-85192225112&doi=10.1080 %2f1750984X.2024.2349988&partnerID=40&md5=55a49892300bf181e5976c1364 1b504c

Affiliations

Insight: Piaget Research Center for Ecological Human Development, Instituto Piaget, Lisbon, Portugal; Research Center in Sports Performance, Recreation, Innovation and Technology (SPRINT), Portugal; Faculdade de Educação Física e Fisioterapia, Universidade Federal de Uberlândia, Uberlândia, Brazil; Faculty of Health Sciences,

Comparisons of different focuses of attention on children's learning and performance: a systematic review

Universidad Autónoma de Chile, Providencia, Chile; Escola Superior de Educação Física, Universidade Federal de Pelotas, Pelotas, Brazil

Authors with affiliations

Flôres F., Insight: Piaget Research Center for Ecological Human Development, Instituto Piaget, Lisbon, Portugal, Research Center in Sports Performance, Recreation, Innovation and Technology (SPRINT), Portugal; Drews R., Faculdade de Educação Física e Fisioterapia, Universidade Federal de Uberlândia, Uberlândia, Brazil; Marconcin P., Insight: Piaget Research Center for Ecological Human Development, Instituto Piaget, Lisbon, Portugal, Faculty of Health Sciences, Universidad Autónoma de Chile, Providencia, Chile; Cardozo P., Escola Superior de Educação Física, Universidade Federal de Pelotas, Pelotas, Brazil

Author Keywords

attention; children; Motor development; motor learning; skill

References

Abdollahipour R., Land W., Valtr L., Banatova K., Janura M., External focus facilitates cognitive stability and promotes motor performance of an interceptive task in children, International Journal of Sport and Exercise Psychology, (2022); Abdollahipour R., Nieto M., Psotta R., Wulf G., External focus of attention and autonomy support have additive benefits for motor performance in children, Psychology of Sport and Exercise, 32, pp. 17-24, (2017); Abdollahipour R., Psotta R., Is an external focus of attention more beneficial than an internal focus to ball catching in children?, Kinesiology, 49, 2, pp. 235-241, (2017); Agar C., Humphries

Comparisons of different focuses of attention on children's learning and performance: a systematic review

C.A., Naguin M., Hebert E., Wood R., Does varying attentional focus affect skill acquisition in children? A comparison of internal and external focus instructions and feedback, The Physical Educator, 73, 4, pp. 639-651, (2016); Aisen M., Kerkovich D., Mast J., Mulroy S., Wren T., Kay R., Rethlefsen S., Cerebral palsy: Clinical care and neurological rehabilitation, The Lancet Neurology, 10, 9, pp. 844-852, (2011); Asadi A., Aiken C.A., Heidari S., Goudini R., Saeedpour-Parizi M.R., The effects of attentional focus on visuomotor control during observational learning in children with autism spectrum disorder, Research in Autism Spectrum Disorders, 98, (2022); Asadi A., Aiken C.A., Heidari S., Kochackpour F., The effect of attentional instructions during modeling on gaze behavior and throwing accuracy in 7 to 10 year-old children, Human Movement Science, 78, (2021); Bahmani M., Babak M., Land W., Howard J., Diekfuss J., Abdollahipour R., Children's motor imagery modality dominance modulates the role of attentional focus in motor skill learning, Human Movement Science, 75, (2021); Barkley R., Poillion M., Attention deficit hyperactivity disorder: A handbook for diagnosis and treatment, Behavioral Disorders, 19, 2, pp. 150-152, (1994); Barnes K., Howard J., Howard D., Kenealy L., Vaidya C., Two forms of implicit learning in childhood ADHD, Developmental Neuropsychology, 35, 5, pp. 494-505, (2010); Becker K., Smith P.J.K., Age, task complexity, and sex as potential moderators of attentional focus effects, Perceptual and Motor Skills, 117, 1, pp. 130-144, (2013); Bodasinska A., Zielinski J., Makaruk H., Influence of attentional instructions on football juggling performance in children, Journal of Physical Education and Sport, 19, 3, pp. 1560-1564, (2019); Brocken J.E.A., Kal E.C., van der Kamp J., Focus of attention in children's motor learning: Examining the role of age and working memory, Journal of Motor Behavior, 48, 6, pp. 527-534, (2016); Chang J., Wu T., Wu W., Su F., Kinematical measure for spastic reaching in children with cerebral palsy, Clinical Biomechanics, 20, 4, pp. 381-388, (2005); Chiviacowsky S., Wulf G., Avila L.T.G., An external focus of attention enhances motor learning in children with intellectual disabilities, Journal of Intellectual Disability Research, 57,

Comparisons of different focuses of attention on children's learning and performance: a systematic review

7, pp. 627-634, (2013); Chiviacowsky S., Wulf G., Wally R., An external focus of attention enhances balance learning in older adults, Gait & Posture, 32, 4, pp. 572-575, (2010); Chow J., Koh M., Davids K., Button C., Rein R., Effects of different instructional constraints on task performance and emergence of coordination in children, European Journal of Sport Science, 14, 3, pp. 224-232, (2014); Chua L., Jimenez-Diaz J., Lewthwaite R., Kim T., Wulf G., Superiority of external attentional focus for motor performance and learning, Systematic Reviews and Meta-Analyses. Psychological Bulletin, 147, 6, (2021); Emanuel M., Jarus T., Bart O., Effect of focus of attention and age on motor acquisition, retention, and transfer: A randomized trial, Physical Therapy, 88, 2, pp. 251-260, (2008); Fathi Khatab S., Ghasemi A., Mousavi Sadati S., The effect of focus instructions on dart throwing performance in children with and without developmental coordination disorder, Annals of Applied Sport Science, 6, 2, pp. 55-60, (2018); Flores F., Menezes K., Corazza S., Copetti F., Katzer J., Efeitos do foco de atenção na aprendizagem do chute em crianças, Revista Portuguesa de Ciências Do Desporto, 15, 3, (2015); Flores F., Menezes K., Katzer J., Influences of gender on attention and learning of motor skills, Journal of Physical Education, 27, 1, (2016); Flores F., Rodrigues L.P., Copetti F., Lopes F., Cordovil R., Affordances for motor skill development in home, school, and sport environments: A narrative review, Perceptual and Motor Skills, 126, 3, (2019); Flores F., Schild J., Chiviacowsky S., Benefits of external focus instructions on the learning of a balanced task in children of different ages, International Journal of Sport Psychology, 45, 4, pp. 311-320, (2015); Freudenheim A.M., Wulf G., Madureira F., Pasetto S.C., Correa U.C., An external focus of attention results in greater swimming speed, International Journal of Sports & Coaching, 5, 4, pp. 533-542, (2010); Ghorbani S., Dana A., Christodoulides E., Effects of external focus of attention on learning static balance among girls with ADHD, Biomedical Human Kinetics, 12, 1, pp. 69-74, (2020); Green B.N., Johnson C.D., Adams A., Writing narrative literature reviews for peer-reviewed journals: Secrets of the trade, Journal of Chiropractic Medicine, 5, 3,

Comparisons of different focuses of attention on children's learning and performance: a systematic review

pp. 101-117, (2006); Grgic J., Mikulic P., Effects of attentional focus on muscular endurance: a meta-analysis, International journal of environmental research and public health, 19, 1, pp. 1-10, (2022); Hadler R., Chiviacowsky S., Wulf G., Schild J., Children's learning of tennis skills is facilitated by external focus instructions, Motriz: Revista de Educação Física, 20, 4, pp. 418-422, (2014); Hodges N.J., Franks I.M., Attention focusing instructions and coordination bias: Implications for learning a novel bimanual task, Human Movement Science, 19, 6, pp. 843-867, (2000); Jarus T., Ghanouni P., Abel R.L., Fomenoff S.L., Lundberg J., Davidson S., Caswell S., Bickerton L., Zwicker J.G., Effect of internal versus external focus of attention on implicit motor learning in children with developmental coordination disorder, Research in Developmental Disabilities, 37, pp. 119-126, (2015); Jeyanthi S., Arumugam N., Parasher R., Effect of physical exercises on attention, motor skill and physical fitness in children with attention deficit hyperactivity disorder: a systematic review, ADHD attention deficit and hyperactivity disorders, 11, 2, pp. 125-137, (2019); Krajenbrink H., van Abswoude F., Vermeulen S., van Cappellen S., Steenbergen B., Motor learning and movement automatization in typically developing children: The role of instructions with an external or internal focus of attention, Human Movement Science, 60, pp. 183-190, (2018); Li L.-L., Li Y.-C., Chu C.-H., Pan C.-Y., Chen F.-C., External focus of attention concurrently elicits optimal performance of suprapostural pole-holding task and postural stability in children with developmental coordination disorder, Neuroscience Letters, 703, pp. 32-37, (2019); Lohse K.R., The influence of attention on learning and performance: Pre-movement time and accuracy in an isometric force production task, Human Movement Science, 31, 1, pp. 12-25, (2012); Lola A., Tzetzis G., Manou V., Aleksandropoulu S., Attentional focus on learning fundamental movement skills in children, Physical Activity Review (CzsMËtochowa), 10, 1, pp. 60-67, (2022); Makaruk H., Porter J., Bodasinska A., Palmer S., Optimizing the penalty kick under external focus of attention and autonomy support instructions, European Journal of

Comparisons of different focuses of attention on children's learning and performance: a systematic review

Sport Science, 20, 10, pp. 1378-1386, (2020); Marchant D., Attentional focusing instructions and force production, Frontiers in Psychology, 1, pp. 1-9, (2011); Marchant D., Greig M., Bullough J., Hitchen D., Instructions to adopt an external focus enhance muscular endurance, Research Quarterly for Exercise and Sport, 82, 3, pp. 466-473, (2011); Marchant D., Griffiths G., Partridge J., Belsley L., Porter J., The influence of external focus instruction characteristics on children's motor performance, Research Quarterly for Exercise and Sport, 89, 4, pp. 418-428, (2018); McKay B., Wulf G., Lewthwaite R., Nordin A., The self: Your own worst enemy? A test of the self-invoking trigger hypothesis, Quarterly Journal of Experimental Psychology, 68, 9, pp. 1910-1919, (2015); McNamara S.W.T., Becker K.A., Silliman-French L.M., The differential effects of attentional focus in children with moderate and profound visual impairments, Frontiers in Psychology, 8, (2017); McNevin N., Shea C., Wulf G., Increasing the distance of an external focus of attention enhances learning, Psychological Research, 67, 1, pp. 22-29, (2003); Numminen H., Service E., Ruoppila I., Working memory, intelligence and knowledge base in adult persons with intellectual disability, Research in Developmental Disabilities, 23, 2, pp. 105-118, (2002); Page M., McKenzie J., Bossuyt P., Boutron I., Hoffmann T., Mulrow C., Shamseer L., Tetzlaff J., Akl E., Brennan S., Chou R., Glanville J., Grimshaw J., Hrobjartsson A., Lalu M., Li T., Loder E., Mayo-Wilson E., McDonald S., Moher D., The PRISMA 2020 statement: An updated guideline for reporting systematic reviews, Journal of Clinical Epidemiology, 134, pp. 178-189, (2021); Palmer K., Matsuyama A., Irwin J., Porter J., Robinson L., The effect of attentional focus cues on object control performance in elementary children, Physical Education and Sport Pedagogy, 22, 6, pp. 580-588, (2017); Pascua L., Wulf G., Lewthwaite R., Additive benefits of external focus and enhanced performance expectancy for motor learning, Journal of Sports Sciences, 33, 1, pp. 58-66, (2015); Peh S., Chow J., Davids K., Focus of attention and its impact on movement behaviour, Journal of Science and Medicine in Sport, 14, 1, pp. 70-78, (2011);

Comparisons of different focuses of attention on children's learning and performance: a systematic review

Pereira-Junior F., Bonuzzi G., Influence of attentional focus distance on motor learning of skilled children, European Journal of Human Movement, 48, pp. 85-91, (2022); Perreault M.E., French K.E., External-focus feedback benefits free-throw learning in children, Research Quarterly for Exercise and Sport, 86, 4, pp. 422-427, (2015); Perreault M.E., French K.E., Differences in children's thinking and learning during attentional focus instruction, Human Movement Science, 45, pp. 154-160, (2016); Petranek L.J., Bolter N.D., Bell K., Attentional focus and feedback frequency among first graders in physical education, Journal of Teaching in Physical Education, 38, 3, pp. 198-199, (2019); Pourazar M., Effects of external and internal focus of attention in motor learning of children with cerebral palsy, International Scholarly and Scientific Research & Innovation, 11, 6, pp. 311-316, (2017); Pratt H., Greydanus D., Intellectual disability (mental retardation) in children and adolescents, Primary Care: Clinics in Office Practice, 34, 2, pp. 375-386, (2007); Psotta R., Abdollahipour R., Janura M., The effects of attentional focus instruction on the performance of a whole-body coordination task in children with developmental coordination disorder, Research in Developmental Disabilities, 101, (2020); Roshandel S., Taheri H., Moghadam A., Do children benefit external focus of attention as much as adults? A motor learning study, Modern Applied Science, 11, 7, (2017); Saemi E., Amo-Aghaei E., Moteshareie E., Yamada M., An external focusing strategy was beneficial in experienced children but not in novices: The effect of external focus, internal focus, and holistic attention strategies, International Journal of Sports Science and Coaching, (2022); Saemi E., Porter J., Wulf G., Ghotbi-Varzaneh A., Bakhtiari S., Adopting an external foucs of attention facilitates motor learning in children with attention deficit hyperactivity disorder, Kinesiology (Zagreb, Croatia), 45, 2, pp. 179-185, (2013); Samsudin N.A., Low J.F.L., The effects of different focus of attention on throwing skills among autistic spectrum disorder children, Journal of Fundamental and Applied Sciences, 9, 6S, (2018); Shin H., Kim R., Lee J.-M., Effects of internal focus and external focus of attention on postural

Comparisons of different focuses of attention on children's learning and performance: a systematic review

balance in school-aged children, Physical Therapy Rehabilitation Science, 2019, 3, pp. 158-161, (2019); Silva M., Lessa H., Chiviacowsky S., External focus of attention enhances children's learning of a classical ballet pirouette, Journal of Dance Medicine & Science, 21, 4, pp. 179-184, (2017); Simpson T., Ellison P., Carnegie E., Marchant D., A systematic review of motivational and attentional variables on children's fundamental movement skill development: The OPTIMAL theory, International Review of Sport and Exercise Psychology, 14, 1, (2021); Singh H., Shih H.-T., Kal E., Bennett T., Wulf G., A distal external focus of attention facilitates compensatory coordination of body parts, Journal of Sports Sciences, 40, 20, pp. 2282-2291, (2022); Skriver K., Roig M., Lundbye-Jensen J., Pingel J., Helge J.W., Kiens B., Nielsen J.B., Acute exercise improves motor memory: Exploring potential biomarkers, Neurobiology of Learning and Memory, 116, pp. 46-58, (2014); Tse A., Effects of attentional focus on motor learning in children with autism spectrum disorder, Autism, 23, 2, pp. 405-412, (2019); Tse A., van Ginneken W., Children's conscious control propensity moderates the role of attentional focus in motor skill acquisition, Psychology of Sport and Exercise, 31, pp. 35-39, (2017); van Abswoude F., Nuijen N., van der Kamp J., Steenbergen B., Individual differences influencing immediate effects of internal and external focus instructions on children's motor performance, Research Quarterly for Exercise and Sport, 89, 2, pp. 190-199, (2018); van Cappellen-van Maldegem S., van Abswoude F., Krajenbrink H., Steenbergen B., Motor learning in children with developmental coordination disorder: The role of focus of attention and working memory, Human Movement Science, 62, pp. 211-220, (2018); van der Heide J., Hadders-Algra M., Postural muscle dyscoordination in children with cerebral palsy, Neural Plasticity, 12, 2-3, pp. 197-203, (2005); Wu W.F.W., Porter J.M., Brown L.E., Effect of attentional focus strategies on peak force and performance in the standing long jump, The Journal of Strength & Conditioning Research, 26, 5, pp. 1226-1231, (2012); Wulf G., (2007); Wulf G., Attentional focus and motor learning: A review of 15 years, International

Comparisons of different focuses of attention on children's learning and performance: a systematic review

Review of Sport and Exercise Psychology, iFirst article, pp. 1-28, (2012); Wulf G., Chiviacowsky S., Cardozo P., Additive benefits of autonomy support and enhanced expectancies for motor learning, Human Movement Science, 37, pp. 12-20, (2014); Wulf G., Chiviacowsky S., Drews R., External focus and autonomy support: Two important factors in motor learning have additive benefits, Human Movement Science, 40, pp. 176-184, (2015); Wulf G., Chiviacowsky S., Schiller E., Avila L.T.G., Frequent external-focus feedback enhances motor learning, Frontiers in Psychology, 1, (2010); Wulf G., Hobeta M., Prinz W., Instructions for motor learning: Differential effects of internal versus external focus of attention, Journal of Motor Behavior, 30, 2, pp. 169-179, (1998); Wulf G., Lewthwaite R., Effortless motor learning? An external focus of attention enhances movement effectiveness and efficiency, Effortless Attention: A New Perspective in the Cognitive Science of Attention and Action, pp. 75-101, (2010); Wulf G., Lewthwaite R., Optimizing performance through intrinsic motivation and attention for learning: The OPTIMAL theory of motor learning, Psychonomic Bulletin and Review, 23, 5, pp. 1382-1414, (2016); Wulf G., McNevin N., Shea C., The automaticity of complex motor skill learning as a function of attentional focus, The Quarterly Journal of Experimental Psychology: Section A, 54, 4, pp. 1143-1154, (2001); Wulf G., McNevin N.H., Fuchs T., Ritter F., Toole T., Attentional focus in complex skill learning, Research Quarterly for Exercise and Sport, 71, 3, pp. 229-239, (2000); Wulf G., Prinz W., Directing attention to movement effects enhances learning: A review, Psychonomic Bulletin & Review, 8, 4, pp. 648-660, (2001); Wulf G., Shea C., Lewthwaite R., Motor skill learning and performance: A review of influential factors, Medical Education, 44, 1, pp. 75-84, (2010); Zachry T., Wulf G., Mercer J., Bezodis N., Increased movement accuracy and reduced EMG activity as the result of adopting an external focus of attention, Brain Research Bulletin, 67, 4, pp. 304-309, (2005)

Comparisons of different focuses of attention on children's learning and performance: a systematic review

Correspondence Address

F. Flôres; Insight: Piaget Research Center for Ecological Human Development, Instituto Piaget, Lisbon, Portugal; email: flores.saraiva@gmail.com

Publisher

Routledge

ISSN

1750984X

Language of Original Document

English

Abbreviated Source Title

Int. Rev.Sport Exerc. Psychol.

Document Type

Article

Publication Stage

Article in press

Source

Scopus

EID

2-s2.0-85192225112

Comparisons of different focuses of attention on children's learning and performance: a systematic review