

**‘Specialization in ICTs and Special Education: Psychopedagogy of Integration’  
Postgraduate Program Studies  
DEMOKRITUS UNIVERSITY OF THRACE Department of Hellenic Philology  
in collaboration with  
NCSR DEMOKRITOS Informatics and Telecommunications Institute**

**A STUDY ON THE VALIDITY OF THE BRUININKS-OSERETSKY TEST OF  
MOTOR PROFICIENCY-2 FOR THE ASSESMENT OF MOTOR  
DIFFICULTIES IN GREEK POPULATION**

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POSTGRADUATE  
THESIS

SUPERVISOR – COMMITTEE

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KOMOTINI / ATHENS 2018

Λέξεις κλειδιά: εγκυρότητα, κινητική επιδεξιότητα, πρωτοσχολική ηλικία, εργαλεία αξιολόγησης, μαθησιακές δυσκολίες.

### **Abstract**

The aim of this study was the examination of the validity of the Bruininks-Oseretsky Test of Motor Proficiency-Second Edition (BOT-2; Bruininks & Bruininks, 2005) for assessing motor difficulties in young Greek children. For this purpose, the following criteria were investigated: a) battery internal consistency, b) the association of gender on the children's performance, c) the differentiation of the performance of participants with specific characteristics (learning difficulties, low motor competence level) d) ceiling/floor effect for each item of the battery. Twenty four children 7-8 years old participated in the study. Among them, six had been characterized by the physical education teacher as having average motor competence, whereas, for five children there were indications of learning difficulties. According to the correlation analysis that was conducted, the majority of the individual items scores were significantly associated with the total subtest scores. Concerning gender, the results of the t-tests and the ANCOVAs applied revealed that boys and girls had similar performances, a result that was in accordance with the existing literature. In addition, statistically significant differences were found in specific battery subtests between a) children with average motor competence and those with high motor competence and b) children with and without learning difficulties. Finally, 12 of 53 tests of the battery, showed a ceiling effect. Taking the aforesaid into consideration, it can be concluded that the validity of using the BOT-2 in Greek children 7-8 year-old is sufficiently supported. However, further research with a greater sample is necessary in order to check more validity criteria.

Key words: validity, motor skills, primary school age, assessment tools, learning difficulties.

## References

- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders (DSM-5®)*. American Psychiatric Pub.
- American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders (DSM-IV-TR)*. Washington, DC: American Psychiatric Association, 75, 78-85.
- Anna, M., Glykeria-Erato, P., Aspasia, D., & Fotini, V. (2016). Effect of a psychomotor program on the motor proficiency and self-perceptions of preschool children. *Journal of Physical Education and Sport*, 16(4), 1365.
- Asunta, P., Viholainen, H., Ahonen, T., Cantell, M., Westerholm, J., Schoemaker, M. M., & Rintala, P. (2017). Reliability and validity of the Finnish version of the Motor Observation Questionnaire for Teachers. *Human movement science*, 53, 63-71.
- Bardid, F., Deconinck, F. J., Descamps, S., Verhoeven, L., De Pooter, G., Lenoir, M., & D'Hondt, E. (2013). The effectiveness of a fundamental motor skill intervention in pre-schoolers with motor problems depends on gender but not environmental context. *Research in developmental disabilities*, 34(12), 4571-4581.
- Bardid, F., Huyben, F., Deconinck, F. J., De Martelaer, K., Seghers, J., & Lenoir, M. (2016). Convergent and divergent validity between the KTK and MOT 4-6 motor tests in early childhood. *Adapted Physical Activity Quarterly*, 33(1), 33-48.
- Bardid, F., Rudd, J. R., Lenoir, M., Polman, R., & Barnett, L. M. (2015). Cross-cultural comparison of motor competence in children from Australia and Belgium. *Frontiers in psychology*, 6, 964.
- Barnett, A. L. (2008). Motor assessment in developmental coordination disorder: From identification to intervention. *International Journal of Disability, Development and Education*, 55(2), 113-129.
- Bonvin, A., Barral, J., Kakebeeke, T. H., Kriemler, S., Longchamp, A., Marques-Vidal, P., & Puder, J. J. (2012). Weight status and gender-related differences in

- motor skills and in child care-based physical activity in young children. *BMC pediatrics*, 12(1), 23.
- Bouchard, C., Shephard, R. J., Stephens, T., Sutton, J. R., & McPherson, B. D. (1990). Exercise, fitness, and health: a consensus of current knowledge: proceedings of the International Conference on Exercise, fitness, and health, May 29-June 3, 1988, Toronto, Canada. In *Exercise, fitness, and health: a consensus of current knowledge: proceedings of the International Conference on Exercise, fitness, and health, May 29-June 3, 1988, Toronto, Canada.*. Human Kinetics Publishers.
- Brahler, C. J., Donahoe-Fillmore, B., Mrowzinski, S., Aebker, S., & Kreill, M. (2012). Numerous Test Items in the Complete and Short Forms of the BOT-2 Do Not Contribute Substantially to Motor Performance Assessments in Typically Developing Children Six to Ten Years Old. *Journal of Occupational Therapy, Schools, & Early Intervention*, 5(1), 73-84.
- Brown, T., & Lane, H. (2014). Comparing a parent-report and a performance-based measure of children's motor skill abilities: are they associated?. *Occupational therapy in health care*, 28(4), 371-381.
- Bruininks, R. H. (2005). *Bruininks-Oseretsky test of motor proficiency* (pp. 27-28). Circle Pines, MN: AGS Publishing.
- Bruininks, R. H., & Bruininks, B. D. (2005). *BOT2: Bruininks-Oseretsky Test of Motor Proficiency: Manual*. Pearson Assessments.
- Bruininks, V. L. (1978). Actual and perceived peer status of learning-disabled students in mainstream programs. *The Journal of Special Education*, 12(1), 51-58.
- Burton, A. W., & Miller, D. E. (1998). *Movement skill assessment*. Human Kinetics.
- Cavill, N., Biddle, S., & Sallis, J. F. (2001). Health enhancing physical activity for young people: Statement of the United Kingdom Expert Consensus Conference. *Pediatric exercise science*, 13(1), 12-25.
- Cermak, S. A., & Larkin, D. (2002). *Developmental coordination disorder*. Cengage Learning.

- Chow, S. M., Chan, L. L., Chan, C. P., & Lau, C. H. (2002). Reliability of the experimental version of the Movement ABC. *British Journal of Therapy and Rehabilitation*, 9(10), 404-407.
- Chow, S. M., Henderson, S. E., & Barnett, A. L. (2001). The Movement Assessment Battery for Children: A comparison of 4-year-old to 6-year-old children from Hong Kong and the United States. *American Journal of Occupational Therapy*, 55(1), 55-61.
- Cintas, H. L. (1995). Cross-cultural similarities and differences in development and the impact of parental expectations on motor behavior. *Pediatric physical therapy*, 7(3), 103-111.
- Cohen, J. (1988). Statistical power analysis for the behavioral sciences (2nd ed.). Mahwah, NJ: Lawrence Erlbaum.
- Coleman, R., Piek, J. P., & Livesey, D. J. (1997). Kinaesthetic acuity in preprimary children at risk of developmental coordination disorder. *The Educational and Developmental Psychologist*, 14(1), 80-86.
- Cools, W., De Martelaer, K., Samaey, C., & Andries, C. (2009). Movement skill assessment of typically developing preschool children: A review of seven movement skill assessment tools. *Journal of sports science & medicine*, 8(2), 154.
- Cramer, D. (1998). *Fundamental statistics for social research*. London, UK: Routledge.
- Cusick, A., Lannin, N. A., & Lowe, K. (2007). Adapting the Canadian Occupational Performance Measure for use in a paediatric clinical trial. *Disability and rehabilitation*, 29(10), 761-766.
- Deitz, J. C., Kartin, D., & Kopp, K. (2007). Review of the Bruininks-Oseretsky test of motor proficiency, (BOT-2). *Physical & occupational therapy in pediatrics*, 27(4), 87-102.
- Denckla, M. B. (1974). Development of motor co-ordination in normal children. *Developmental Medicine & Child Neurology*, 16(6), 729-741.
- D'Hondt, E., Deforche, B., Gentier, I., De Bourdeaudhuij, I., Vaeyens, R., Philippaerts, R., & Lenoir, M. (2013). A longitudinal analysis of gross motor coordination in

- overweight and obese children versus normal-weight peers. *International journal of obesity*, 37(1), 61.
- Dunn, W. W. (1989). Chapter 7: Validity. *Physical & Occupational Therapy in Pediatrics*, 9(1), 149-168.
- Ελληνούδης, Θ. (2007). *Εφαρμογή της δέσμης κινητικής αξιολόγησης" movement assessment battery for children" σε μαθητές ηλικίας 9-12 ετών δημοτικών σχολείων της Ελλάδας* (Doctoral dissertation, Δημοκρίτειο Πανεπιστήμιο Θράκης (ΔΠΘ). Τμήμα Επιστήμης Φυσικής Αγωγής και Αθλητισμού).
- Ellinoudis, T., Evaggelinou, C., Kourtessis, T., Konstantinidou, Z., Venetsanou, F., & Kambas, A. (2011). Reliability and validity of age band 1 of the Movement Assessment Battery for Children–Second Edition. *Research in Developmental Disabilities*, 32(3), 1046-1051.
- Engel-Yeger, B., Rosenblum, S., & Josman, N. (2010). Movement Assessment Battery for Children (M-ABC): establishing construct validity for Israeli children. *Research in Developmental Disabilities*, 31(1), 87-96.
- Fotiadou, E., Christodoulou, P., Soulis, S. G., Tsimaras, V. K., & Mousouli, M. (2014). Motor development and self-esteem of children and adolescents with visual impairment. *Journal of Education and Practice*, 37, 97-106.
- Fransen, J., D'Hondt, E., Bourgois, J., Vaeyens, R., Philippaerts, R. M., & Lenoir, M. (2014). Motor competence assessment in children: Convergent and discriminant validity between the BOT-2 Short Form and KTK testing batteries. *Research in developmental disabilities*, 35(6), 1375-1383.
- Γιαγκάζογλου, Π., Φωτιάδου, Ε., Τσιμάρας, Β., Τσίκουλας, Ι., & Αγγελοπούλου-Σακαντάμη, Ν. (2001). *Στάθμιση των κινητικών κλιμάκων της δοκιμασίας της Griffiths No II, σε παιδιά προσχολικής ηλικίας*. Διδακτορική Διατριβή, Θεσσαλονίκη.
- Gallahue, D. L., & Donnelly, F. C. (2007). *Developmental physical education for all children*. Human Kinetics.
- Gliner, J. A., Morgan, G. A., & Harmon, R. J. (2001). Measurement reliability. *Journal of the American Academy of Child & Adolescent Psychiatry*, 40(4), 486-488.

- Green, D., Baird, G., Sugden, D. (2006). A pilot study of psychopathology in developmental coordination disorder. *Child Care Health Development*, 32, 741 – 750.
- Hands, B., & Larkin, D. (2006). Physical fitness differences in children with and without motor learning difficulties. *European Journal of Special Needs Education*, 21(4), 447-456.
- Hands, B., Larkin, D., & Rose, E. (2013). Reprint of 'The psychometric properties of the McCarron Assessment of Neuromuscular Development as a longitudinal measure with Australian youth'. *Human movement science*, 32(5), 1163-1175.
- Hassan, M. (2016). *Cross-cultural influences on the MABC-2 test for Developmental Coordination Disorder (DCD): A Middle Eastern perspective*.
- Hassan, M. M. (2001). Validity and reliability for the Bruininks-Oseretsky Test of Motor Proficiency-short form as applied in the United Arab Emirates culture. *Perceptual and motor skills*, 92(1), 157-166.
- Haubenstricker, J., & Seefeldt, V. (1986). Acquisition of motor skills during childhood. *Physical activity and well-being*, 41-102.
- Henderson, S. E., & Sugden, D. A. (1992). Movement assessment battery for children. The Psychological Corporation. *San Antonio, TX*.
- Henderson, S. E., Sugden, D. A., & Barnett, A. L. (2007). *Movement assessment battery for children-2*. London: Harcourt Assessment.
- Καμπάς, Α. (2004). *Εισαγωγή στην Κινητική Ανάπτυξη*. Αθήνα: Αθλότυπο.
- Καραμπατζάκη, Ζ. (2002). *Πρώιμη ανίχνευση και αναγνώριση της αναπτυξιακής διαταραχής του ψυχοκινητικού συντονισμού σε παιδιά ηλικίας 4-8 ετών* (Doctoral dissertation, Πανεπιστήμιο Ιωαννίνων. Σχολή Επιστημών Αγωγής. Τμήμα Παιδαγωγικό Νηπιαγωγών).
- Karasik, L. B., Adolph, K. E., Tamis-LeMonda, C. S., & Bornstein, M. H. (2010). WEIRD walking: Cross-cultural research on motor development. *Behavioral and brain sciences*, 33(2-3), 95-96.
- Kiphard, E. J., & Schilling, F. (2007). *Körperkoordinationstest für kinder: KTK*. Beltz-Test.

- Kourtessis, T., Tzetzis, G., Kioumourtzoglou, E., & Mavromatis, G. (2001). The effects of an intensive recreational intervention program on children with movement difficulties. *New Zealand Journal of Disability Studies*, 9, 120-139.
- Λιβέρη-Καντερέ, Α. (2006). *Συνύπαρξη κινητικής αδεξιότητας και μαθησιακών δυσκολιών στο ελληνικό περιβάλλον-μία πρώτη προσέγγιση* (Master's thesis).
- Livesey, D., Coleman, R., & Piek, J. (2007). Performance on the Movement Assessment Battery for Children by Australian 3-to 5-year-old children. *Child: care, health and development*, 33(6), 713-719.
- Lopes, L., Santos, R., Pereira, B., & Lopes, V. P. (2013). Associations between gross motor coordination and academic achievement in elementary school children. *Human Movement Science*, 32(1), 9-20.
- Lucas, B. R., Latimer, J., Doney, R., Ferreira, M. L., Adams, R., Hawkes, G., ... & Elliott, E. J. (2013). The Bruininks-Oseretsky test of motor proficiency-short form is reliable in children living in remote Australian aboriginal communities. *BMC pediatrics*, 13(1), 135.
- Maldonado, S., & Stevenson, K. J. (2005). Influence of nitrogen doping on oxygen reduction electrocatalysis at carbon nanofiber electrodes. *The Journal of Physical Chemistry B*, 109(10), 4707-4716.
- Malina, R. M., Bouchard, C., & Bar-Or, O. (2004). *Growth, maturation, and physical activity*. Human kinetics.
- Mavrovouniotis, F. I., Papaioannou, C. S., Argiriadou, E. A., Mountakis, C. M., Konstantinakis, P. D., Pikoula, I. T., & Mavrovounioti, C. F. (2013). The effect of a combined training program with Greek dances and Pilates on the balance of blind children. *Journal of Physical Education and Sport*, 13(1), 91.
- McCarron, L. (1997). McCarron assessment of neuromotor development: Fine and gross motor abilities. TX.McCarron, L. T. (1982). *MAND: McCarron assessment of neuromuscular development, fine and gross motor abilities*. McCarron-Dial Systems.

- McCarron, D. A., Oparil, S., Chait, A., Haynes, R. B., Kris-Etherton, P., Stern, J. S., ... & Metz, J. A. (1997). Nutritional management of cardiovascular risk factors: a randomized clinical trial. *Archives of internal medicine*, 157(2), 169-177.
- McIntyre, F., Parker, H., Thornton, A., Licari, M., Piek, J., Rigoli, D., & Hands, B. (2017). Assessing motor proficiency in young adults: The Bruininks Oseretsky Test-2 Short Form and the McCarron Assessment of Neuromuscular Development. *Human movement science*, 53, 55-62.
- Missiuna, C., Gaines, R., Soucie, H., & McLean, J. (2006). Parental questions about developmental coordination disorder: A synopsis of current evidence. *Paediatrics & child health*, 11(8), 507-512.
- Missiuna, C., Rivard, L., & Pollock, N. (2011). *Children with Developmental Coordination Disorder: At home, at school, and in the community*. Mc Master University, Hamilton.
- Miyahara, M., Tsujii, M., Hanai, T., Jongmans, M., Barnett, A., Henderson, S. E., ... & Kageyama, H. (1998). The Movement Assessment Battery for Children: A preliminary investigation of its usefulness in Japan. *Human Movement Science*, 17(4-5), 679-697.
- Morgan, G. A., Gliner, J. A., Harmon, R. J., & Harmon, R. J. (2001). Measurement validity. *Journal of the American Academy of Child & Adolescent Psychiatry*, 40(6), 729-731.
- Morrow Jr, J. R., & Jackson, A. W. (1993). How “significant” is your reliability?. *Research quarterly for exercise and sport*, 64(3), 352-355.
- Niemeijer, A. S., van Waelvelde, H., & Smits-Engelsman, B. C. (2015). Crossing the North Sea seems to make DCD disappear: cross-validation of Movement Assessment Battery for Children-2 norms. *Human movement science*, 39, 177-188.
- Ορκόπουλος, Ι. (2013). *Κινητικές δεξιότητες παιδιών ηλικίας 8-9 ετών και η επίδραση των εξωσχολικών δραστηριοτήτων σε αυτές*. Πανεπιστήμιο Θράκης και Θεσσαλίας, Κομοτηνή.
- Ουζούνη, Χ., & Νακάκης, Κ. (2011). 'Η αξιοπιστία και η Εγκυρότητα των εργαλείων Μέτρησης σε Ποσοτικές μελέτες. *Νοσηλευτική*, 50(2), 231-239.

- Piek, J. P., Hands, B., & Licari, M. K. (2012). Assessment of motor functioning in the preschool period. *Neuropsychology review*, 22(4), 402-413.
- Rosenblum, S. (2006). The development and standardization of the Children Activity Scales (ChAS-P/T) for the early identification of children with Developmental Coordination Disorders. *Child: care, health and development*, 32(6), 619-632.
- Ruiz, L. M., Graupera, J. L., Gutiérrez, M., & Miyahara, M. (2003). The Assessment of Motor Coordination in Children with the Movement ABC test: A Comparative Study among Japan, USA and Spain. *International Journal of Applied Sports Sciences*, 15(1).
- Σκούρτη, Κ. (2014). *Δείκτης μάζας σώματος, αθλητική δραστηριότητα και κινητική απόδοση σε παιδιά ηλικίας 5-6 ετών*. Πανεπιστήμιο Θράκης και Θεσσαλίας, Κομοτηνή.
- Σπανάκη, Ε., Σκορδίλης, Ε., & Βενετσάνου, Φ. (2010). Η επίδραση ενός προγράμματος ψυχοκινητικής αγωγής στην κινητική απόδοση παιδιών πρώτης σχολικής ηλικίας. *Αναζητήσεις στη Φυσική Αγωγή και τον Αθλητισμό*, 8(2), 132-141.
- Saraiva, L., Rodrigues, L.P., Cordovil, R. & Barreiros, J. (2013). Motor profile of Portuguese preschool children on the Peapody Developmental Motor Scale-2: A crosscultural study. *Research in Developmental Disabilities*, 34, 1966-1973.
- Schilling, F., & Kiphard, E. J. (1974). *Körperkoordinationstest für Kinder: KTK*. Beltz
- Schlaggar, B. L., & Mink, J. W. (2003). Movement disorders in children. *Pediatrics in Review*, 24(2), 39-51.
- Schoemaker, M. M., Flapper, B. C., Reinders-Messelink, H. A., & de Kloet, A. (2008). Validity of the motor observation questionnaire for teachers as a screening instrument for children at risk for developmental coordination disorder. *Human Movement Science*, 27(2), 190-199.
- Skinner, R. A., & Piek, J. P. (2001). Psychosocial implications of poor motor coordination in children and adolescents. *Human movement science*, 20(1-2), 73-94.
- Smits-Engelsman, B. C., Henderson, S. E., & Michels, C. G. (1998). The assessment of children with Developmental Coordination Disorders in the Netherlands: The

- relationship between the Movement Assessment Battery for Children and the Körperkoordinations Test für Kinder. *Human Movement Science*, 17(4-5), 699-709.
- Smits-Engelsman, B. C., Niemeijer, A. S., & van Galen, G. P. (2001). Fine motor deficiencies in children diagnosed as DCD based on poor grapho-motor ability. *Human movement science*, 20(1-2), 161-182.
- Smyth, M. M., & Anderson, H. I. (2000). Coping with clumsiness in the school playground: Social and physical play in children with coordination impairments. *British Journal of Developmental Psychology*, 18(3), 389-413.
- Soska, K. C., Adolph, K. E., & Johnson, S. P. (2010). Systems in development: motor skill acquisition facilitates three-dimensional object completion. *Developmental psychology*, 46(1), 129.
- Sugden, D. A., & Chambers, M. E. (2003). Intervention in children with developmental coordination disorder: the role of parents and teachers. *British journal of educational psychology*, 73(4), 545-561.
- Thomas, J. R., & French, K. E. (1985). Gender differences across age in motor performance: A meta-analysis. *Psychological bulletin*, 98(2), 260.
- Ulrich, B. D., & Ulrich, D. (1985). The role of balancing ability in performance of fundamental motor skills in 3-, 4-, 5-year-old children. *Motor development: Current selected research*, 1, 87-97.
- Ulrich, D. A. (2000). Test of Gross Motor Development (TGMD-2). Austin, TX: PRO-ED.
- Valentini, N. C. (2012). Validity and reliability of the TGMD-2 for Brazilian children. *Journal of motor behavior*, 44(4), 275-280.
- Valentini, N. C., Ramalho, M. H., & Oliveira, M. A. (2014). Movement Assessment Battery for Children-2: Translation, reliability, and validity for Brazilian children. *Research in Developmental Disabilities*, 35(3), 733-740.
- van Dellen, T., Vaessen, W., & Schoemaker, M. M. (1990). Clumsiness: definition and selection of subjects. *Developmental biopsychology*, 135-152.
- Vandaele, B., Cools, W., de Decker, S., & de Martelaer, K. (2011). Mastery of fundamental movement skills among 6-year-old Flemish pre-school children. *European Physical Education Review*, 17(1), 3-17.

- Vandorpe, B., Vandendriessche, J., Lefèvre, J., Pion, J., Vaeyens, R., Matthys, S. A., ... & Lenoir, M. (2011). The KörperkoordinationsTest für Kinder: reference values and suitability for 6–12-year-old children in Flanders. *Scandinavian journal of medicine & science in sports*, 21(3), 378-388.
- Venetsanou, F., & Kambas, A. (2004). How can a traditional Greek dances programme affect the motor proficiency of pre-school children?. *Research in Dance Education*, 5(2), 127-138.
- Venetsanou, F., & Kambas, A. (2016). Motor proficiency in young children: a closer look at potential gender differences. *Sage Open*, 6(1), 2158244015626226.
- Venetsanou, F., & Kambas, A. (2017). Physical activity promotion in Greek preschools: The gap between theory and practice. *Early Childhood Education Journal*, 45(3), 437-444.
- Venetsanou, F., Kambas, A., Aggeloussis, N., Serbezis, V., & Taxildaris, K. (2007). Use of the Bruininks–Oseretsky Test of Motor Proficiency for identifying children with motor impairment. *Developmental Medicine & Child Neurology*, 49(11), 846-848.
- Venetsanou, F., Kambas, A., Ellinoudis, T., Fatouros, I., Giannakidou, D., & Kourtessis, T. (2011). Can the Movement Assessment Battery for Children-Test be the “gold standard” for the motor assessment of children with Developmental Coordination Disorder?. *Research in developmental disabilities*, 32(1), 1-10.
- Venetsanou F, Voukias K, Zavolas G, Mitsios O, Kambas A. (2016). Aspects of validity and reliability of the Bruininks-Oseretsky Test of Motor Proficiency – Short Form (BOT-SF) in Greek children. In: Baca A (ed.), *Crossing borders through sport science. Proceedings of the 21st Annual Congress of the ECSS*. Vienna: University of Vienna; 2016; 427
- Vinçon, S., Green, D., Blank, R., & Jenetzky, E. (2017). Ecological validity of the German Bruininks-Oseretsky Test of Motor Proficiency–2nd Edition. *Human movement science*, 53, 45-54.
- Visser, J., Geuze, R. H., & Kalverboer, A. F. (1998). The relationship between physical growth, the level of activity and the development of motor skills in

- adolescence: Differences between children with DCD and controls. *Human Movement Science*, 17(4-5), 573-608.
- Wiepert, S. L., & Mercer, V. S. (2002). Effects of an increased number of practice trials on Peabody Developmental Gross Motor Scale scores in children of preschool age with typical development. *Pediatric Physical Therapy*, 14(1), 22-28.
- Wilson, E. O. (2000). *Sociobiology*. Harvard University Press.
- Wuang, Y. P., & Su, C. Y. (2009). Reliability and responsiveness of the Bruininks–Oseretsky Test of Motor Proficiency-in children with intellectual disability. *Research in Developmental Disabilities*, 30(5), 847-855.
- Yun, J., & Ulrich, D. A. (2002). Estimating measurement validity: A tutorial. *Adapted Physical Activity Quarterly*, 19(1), 32-47.
- Ζάραγκας, Χ. (2015). Σχέση μεταξύ φυσικής δραστηριότητας κινητικής απόδοσης και δείκτη μάζας σώματος σε παιδιά πρώιμης παιδικής ηλικίας. *Επιστημονική Επετηρίδα Παιδαγωγικού Τμήματος Νηπιαγωγών Πανεπιστημίου Ιωαννίνων*, 8, 119-162.
- Zimmer, R., & Volkamer, M. (1987). *Motoriktest für vier-bis sechsjährige Kinder*. Beltz Test.
- Zhu, Y. C., Wu, S. K., & Cairney, J. (2011). Obesity and motor coordination ability in Taiwanese children with and without developmental coordination disorder. *Research in developmental disabilities*, 32(2), 801-807.
- Zimmer, R., & Volkamer, M. (1987). *Motoriktest für vier-bis sechsjährige Kinder*. Beltz Test.