



"Just for fun, or just for spending calories?"

Physical activity games, cognitive function and educational achievement"

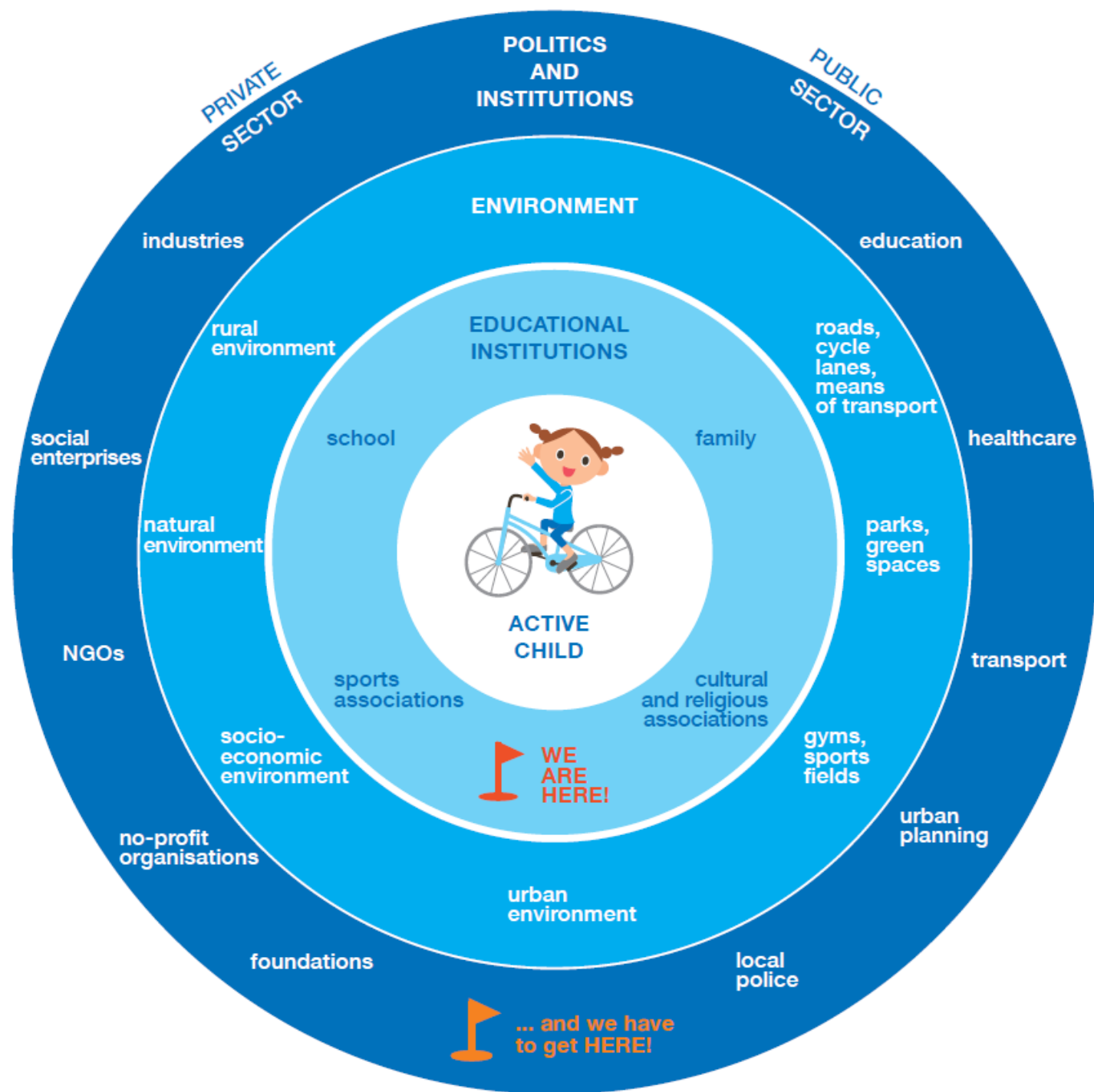
**CEREPS+ Summit – HIPE 2020
International Conference - 18th October 2020**

**Caterina Pesce
University of Rome "Foro Italico"**



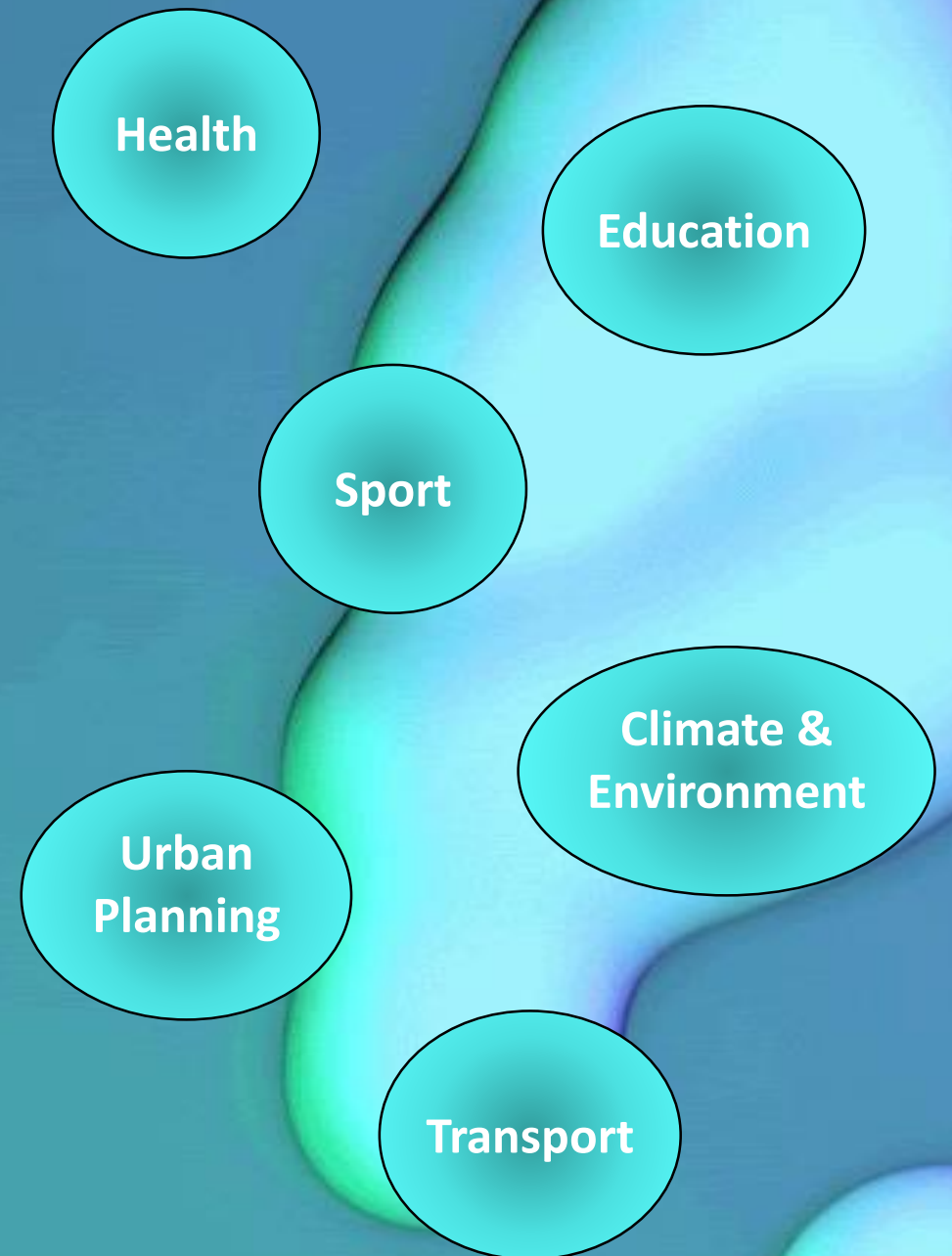
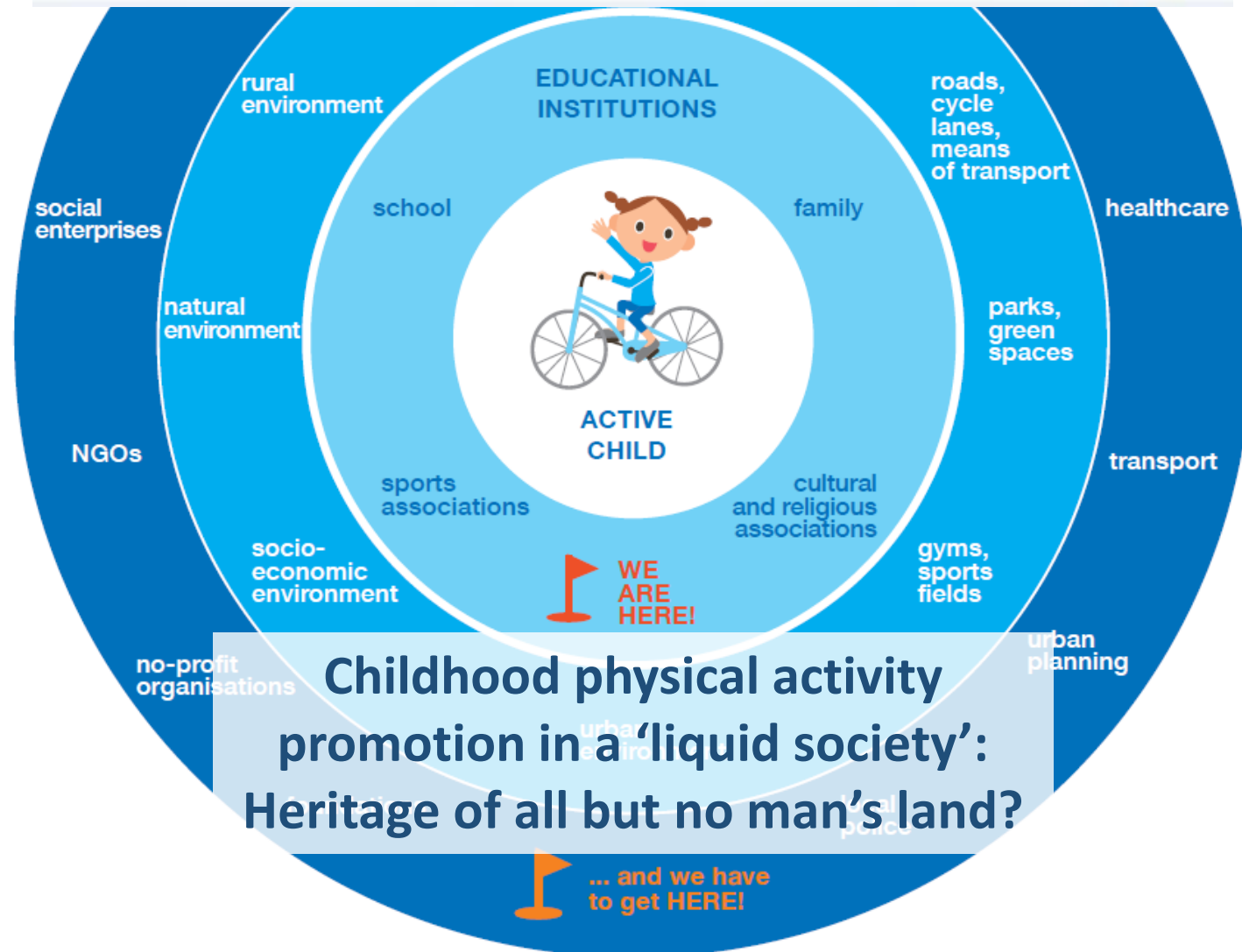
Objectives

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1. Childhood physical activity promotion in a 'liquid society'
 2. Le role of skill acquisition in the relation between exercise and cogniton
 3. Bridging disciplines: from philosophy to multidisciplinary intersections
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 5. Embedding evidence-based designed physical activity into a holistic perspective on child development promotion and scaling-up to whole-community committments



The evolution of physical activity promotion. Are we entering a liquid age?

Karim Abu-Omar, Peter Gelius and Sven Messing 



'Enjoying' the right to play:

a health determinant and
a factor to help meet gaps
in civic engagement

Alexander, Frohlich, & Fusco (2014).
Playing for health? Revisiting health
promotion to examine the emerging
public health position on children's play.
Health Promotion International.

Astuto & Ruck (2017).
Growing up in poverty and
civic engagement: The role of
kindergarten executive function and play
predicting participation in 8th grade
extracurricular activities.
Applied Developmental Science.

Playing just for fun?

**Ginsburg & the Committee on
Communications, and the Committee
on Psychosocial Aspects of Child and
Family Health (2007).** The Importance of
Play in Promoting Healthy Child
Development and Maintaining Strong
Parent-Child Bonds. *Pediatrics.*

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Development and Maintaining Strong
Parent-Child Bond: Focus on Children in
Poverty. *Pediatrics.*



Moving just for spending calories?

The Lancet Commissions

GLOBAL ACTION PLAN ON PHYSICAL ACTIVITY 2018-2030

**MORE ACTIVE
PEOPLE FOR
A HEALTHIER
WORLD**



A future for the world's children? A WHO-UNICEF-Lancet Commission



2018 Placing children at the centre of SDG policies

Childhood obesity: “one of the most serious public health challenges of the 21st century”

2018 Global Action Plan on Physical Activity 2018–2030

Emancipation of physical activity promotion: from ‘junior partner’ to nutrition to complementary, yet stand-alone topic



PA promotion:
only a negatively framed “battle”
and “fight” against obesity,
or also an investment in
the development of the
multifaceted human capital?

JOURNAL OF
Physical Activity & Health

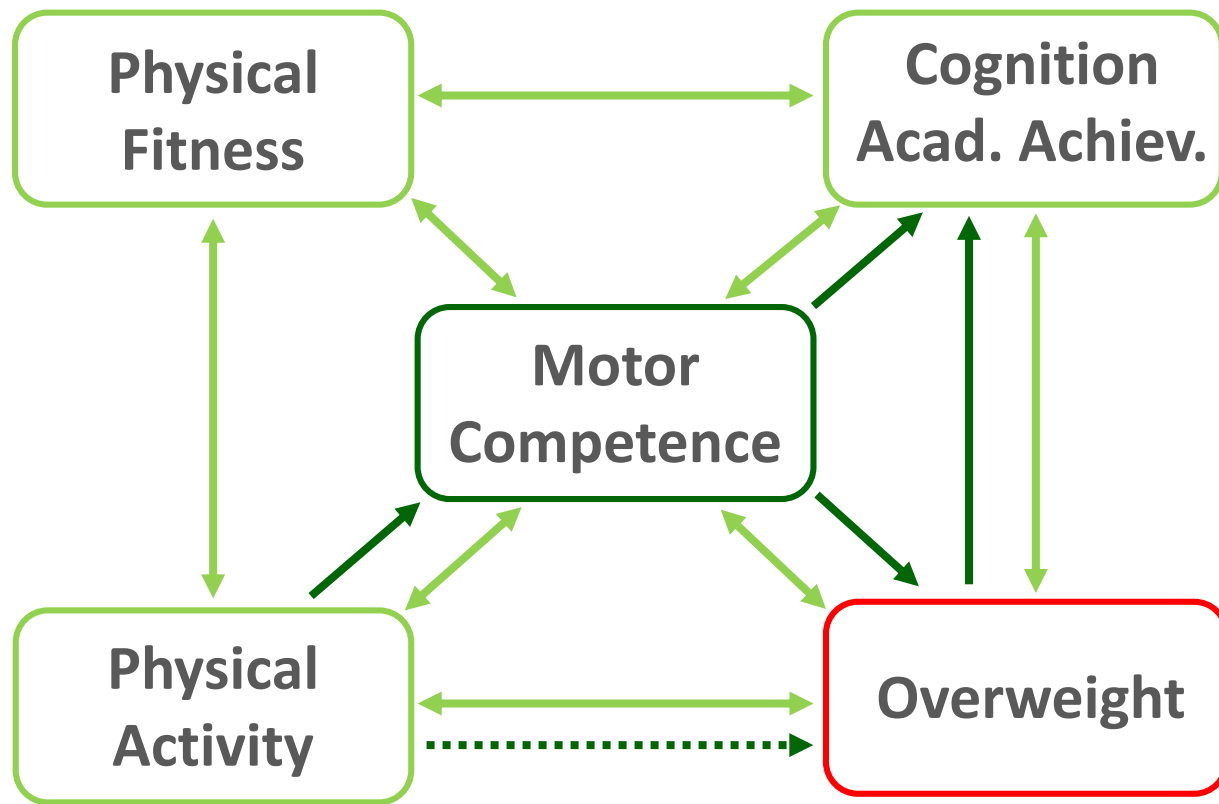
Official Journal of ISPAH

www.JPAH-Journal.com

SPECIAL REPORT

Physical Activity: An Underestimated Investment in Human Capital?

Richard Bailey, Charles Hillman, Shawn Arent, and Albert Petitpas



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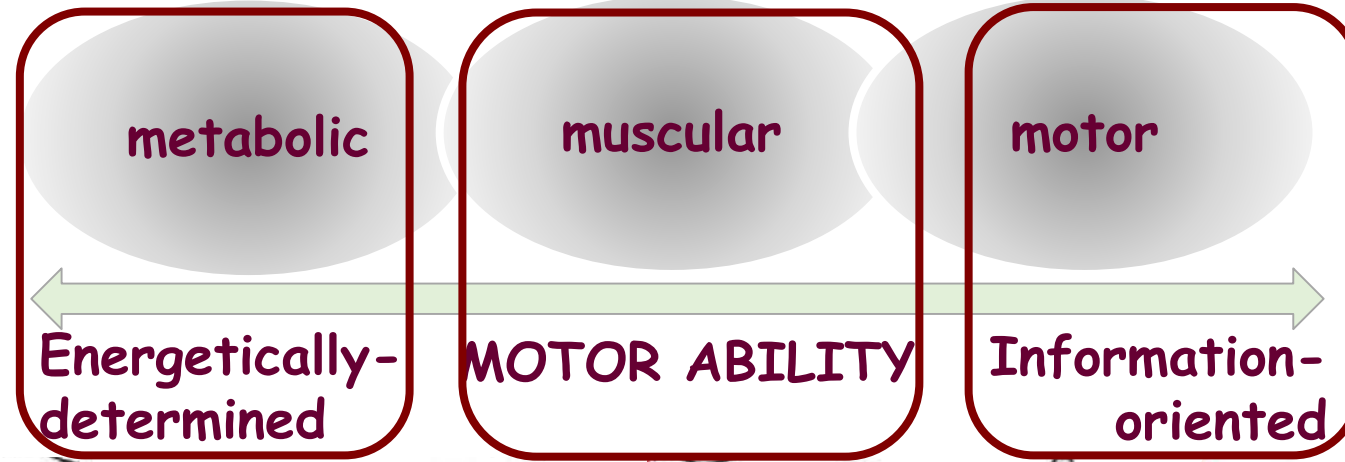
2. Le role of skill acquisition in the relation between exercise and cognition

3. Bridging disciplines: from philosophy to multidisciplinary intersections

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holistic perspective on child development promotion and
scaling-up to whole-community commitments

FITNESS



The
«nuances» stage in PA
and cognition research



Moderators:

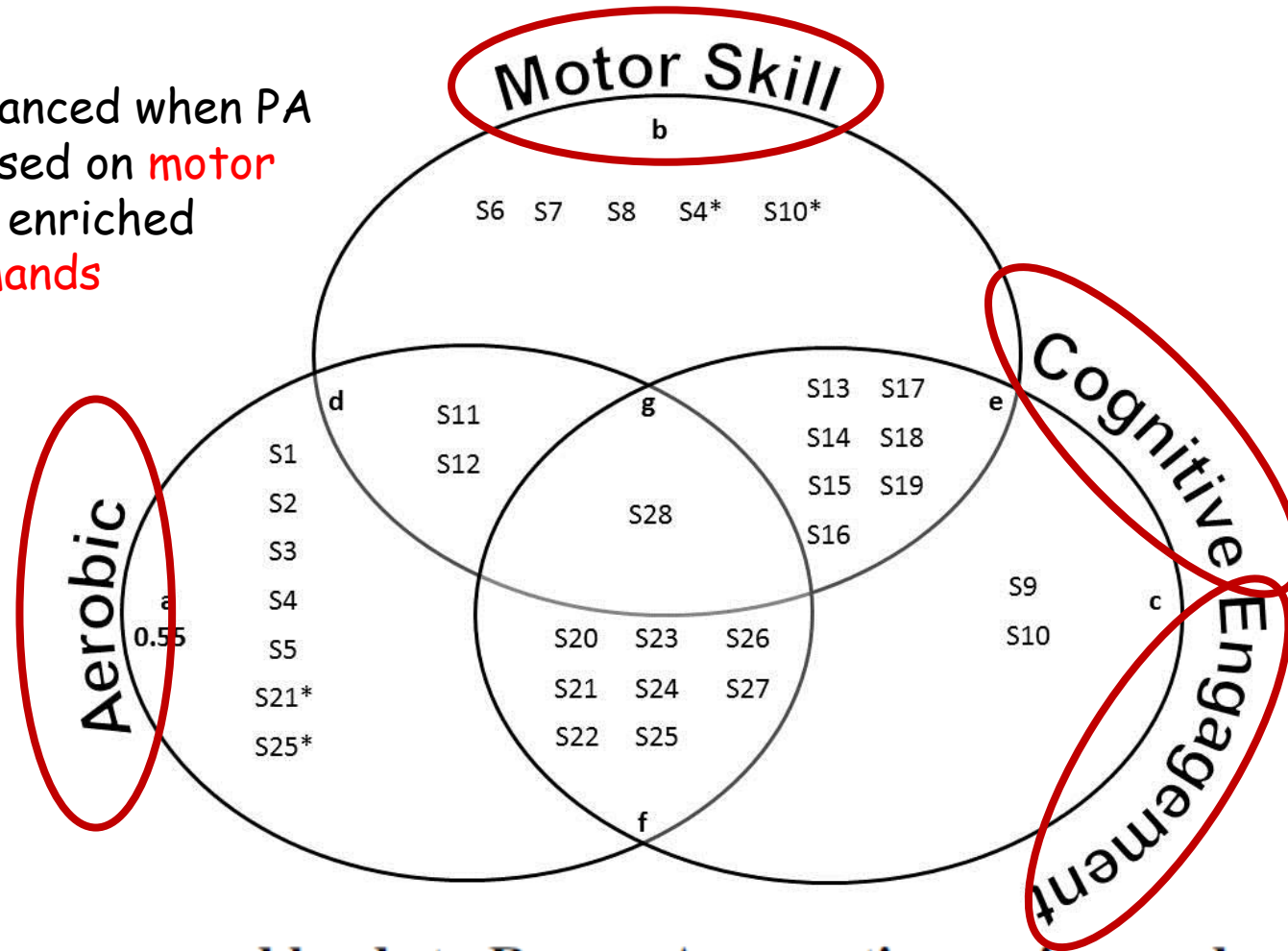
What type of
exercise training influences
what type of
cognitive function?

Mediators:

Through which mechanisms?

What are key features of efficacious interventions to aid cognition?

Inhibition was enhanced when PA interventions focused on **motor skills** coupled with enriched cognitive task demands



More than one road leads to Rome: A narrative review and meta-analysis of physical activity intervention effects on cognition in youth

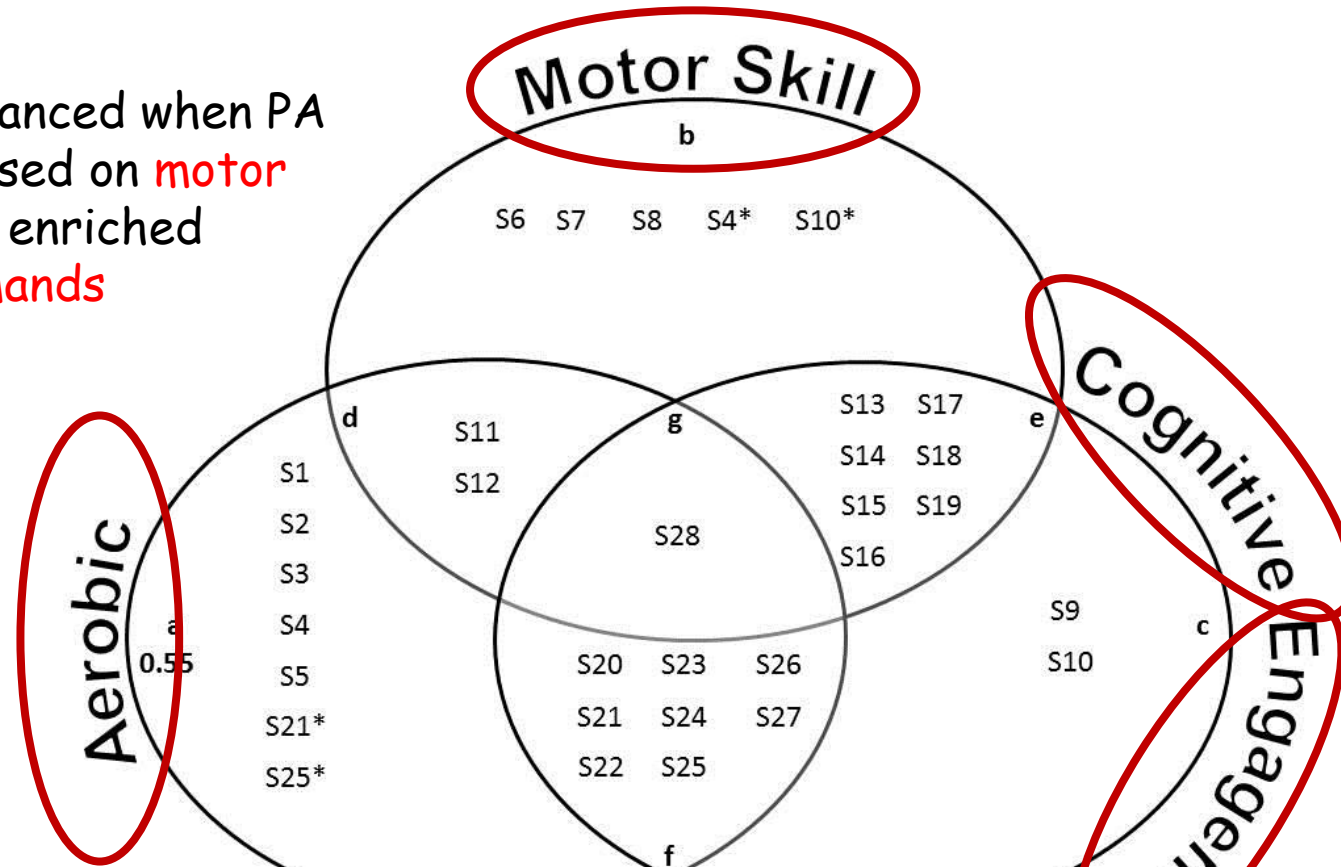
Spyridoula Vazou^{a*}, Caterina Pesce^b, Kimberley Lakes^c and Ann Smiley-Oyen^a

International Journal of Sport and Exercise Psychology, 2016

<http://dx.doi.org/10.1080/1612197X.2016.1223423>

What are key features of efficacious interventions to aid cognition?

Inhibition was enhanced when PA interventions focused on **motor skills** coupled with enriched cognitive task demands



REVIEW

The Effect of Physical Activity Interventions on Children's Cognition and Metacognition: A Systematic Review and Meta-Analysis

Celia Álvarez-Bueno, MSc, Caterina Pesce, PhD, Iván Caverro-Redondo, MSc, Mairena Sánchez-López, PhD, José Alberto Martínez-Hortelano, MSc, Vicente Martínez-Vizcaíno, MD

S
J Am Acad Child
Adolesc Psychiatry
2017

The first Position Stand of the ACSM on exercise and cognition in children:



**AMERICAN COLLEGE
of SPORTS MEDICINE®**

POSITION STAND

Med Sci Sport Exerc 2016

Physical Activity, Fitness, Cognitive Function, and Academic Achievement in Children: A Systematic Review

This pronouncement was written for the American College of Sports Medicine by Joseph E. Donnelly, Ed.D, FACSM (Co-Chair); Charles H. Hillman, Ph.D. Co-Chair; Darla Castelli, Ph.D.; Jennifer L. Etnier, Ph.D., FACSM; Sarah Lee, Ph.D.; Phillip Tomporowski, Ph.D., FACSM; Kate Lambourne, Ph.D.; and Amanda N. Szabo-Reed, Ph.D.

Positive conclusions: "On the basis of the evidence available, the authors concluded that PA has a positive influence on cognition as well as brain structure and function"

Outlook: "More research is necessary to determine mechanisms and long-term effect as well as strategies to transition into practice"

Effects of physical activity interventions on cognitive and academic performance in children and adolescents: a novel combination of a systematic review and recommendations from an expert panel

Amika S Singh,¹ Emi Saliasi,¹ Vera van den Berg,¹ Léonie Uijtdewilligen,² Renate H M de Groot,³ Jelle Jolles,⁴ Lars B Andersen,⁵ Richard Bailey,⁶ Yu-Kai Chang,⁷ Adele Diamond,⁸ Ingegerd Ericsson,⁹ Jennifer L Etnier,¹⁰ Alicia L Fedewa,¹¹ Charles H Hillman,¹² Terry McMorris,¹³ Caterina Pesce,¹⁴ Uwe Pühse,¹⁵ Phillip D Tomporowski,¹⁶ Mai J M Chinapaw¹

Inconclusive conclusions! "There is currently inconclusive evidence for the beneficial effects of PA interventions on cognitive and overall academic performance in children."

Expert panel priorities: investigating the effects of different types of interventions and understanding **mediating mechanisms.**

Exercise, Sports, and Performance Arts Benefit Cognition Via a Common Process

Phillip D. Tomporowski
University of Georgia

Caterina Pesce
University of Rome "Foro Italico"

Alvarez- Bueno et al. (2017)	Children and adolescents (age range = 4-14 yrs)	SLR + MA	de Greeff et al. (2018)	Children (age range = 6-12 yrs)	MA	Vazou et al. (2016)	Children and adolescents (4-16 yrs)	MA
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Advantage for qualitative enrichment.

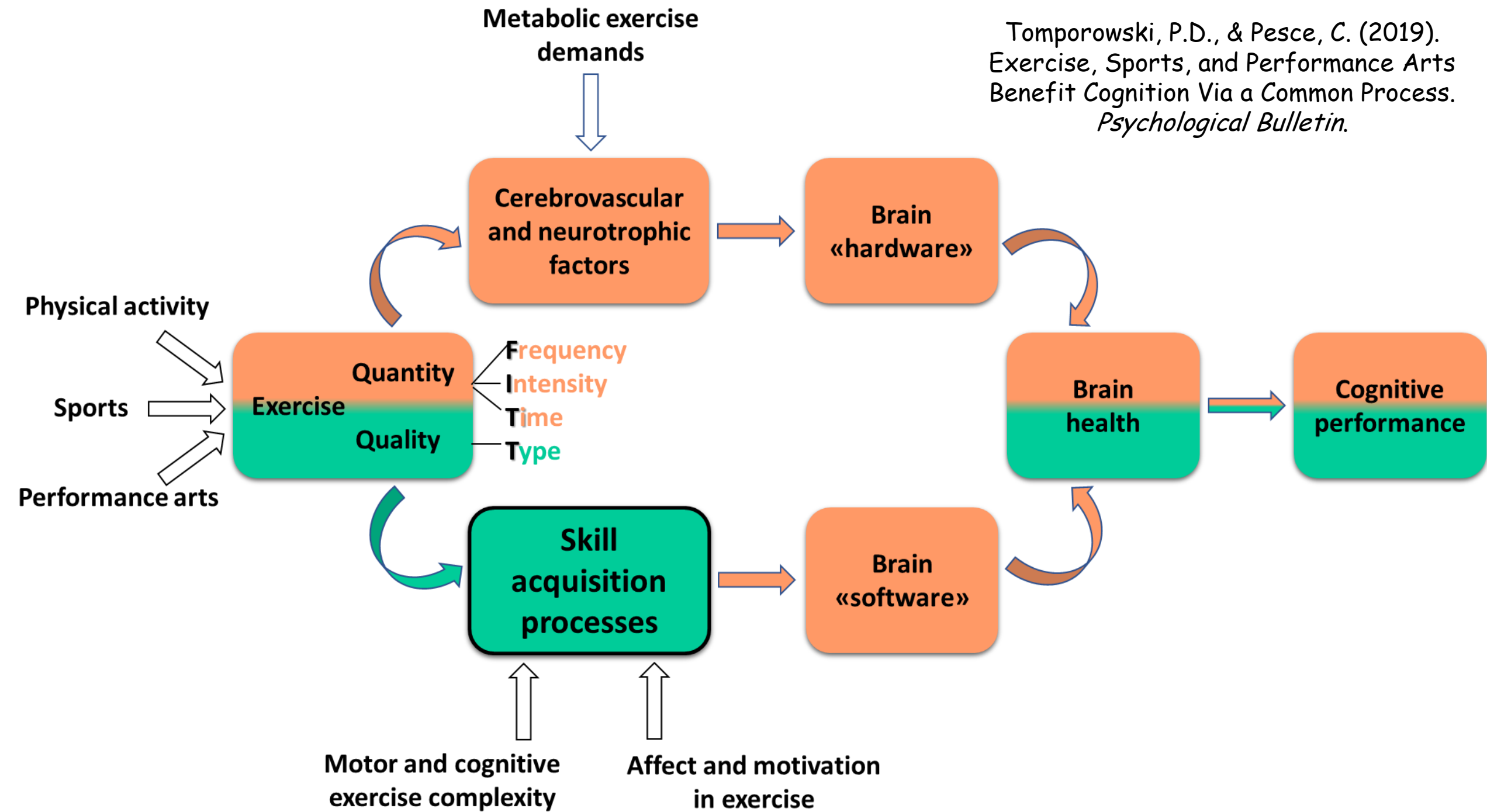
The benefits of different types of physical activity interventions are moderated by the type of cognitive outcome. Largest effect of qualitatively enriched physical activity on selective attention/inhibition.

Advantage for cognitively engaging physical activity.

Physical activity interventions that include cognitively challenging motor coordination and skill acquisition demands are more effective in improving cognitive performance (moderate to large effect)

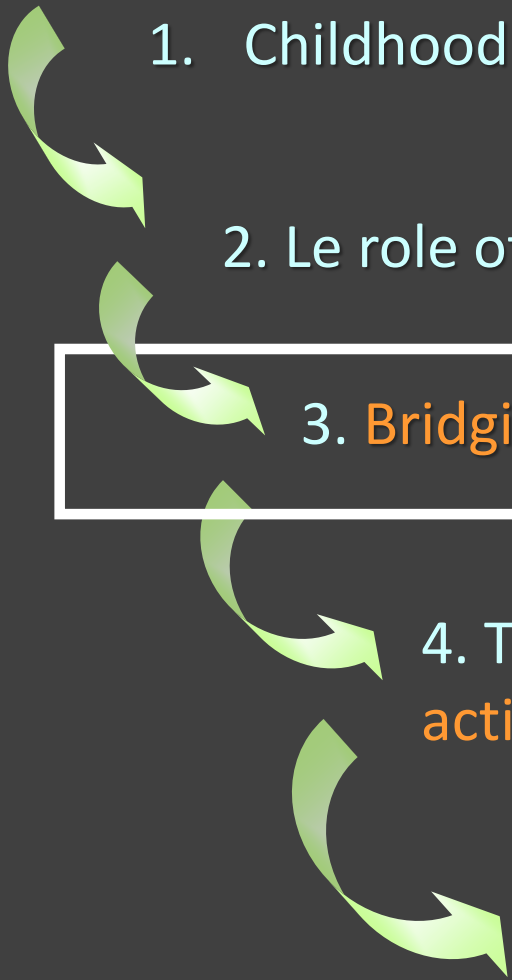
Advantage for combined aerobic exercise and cognitive training.

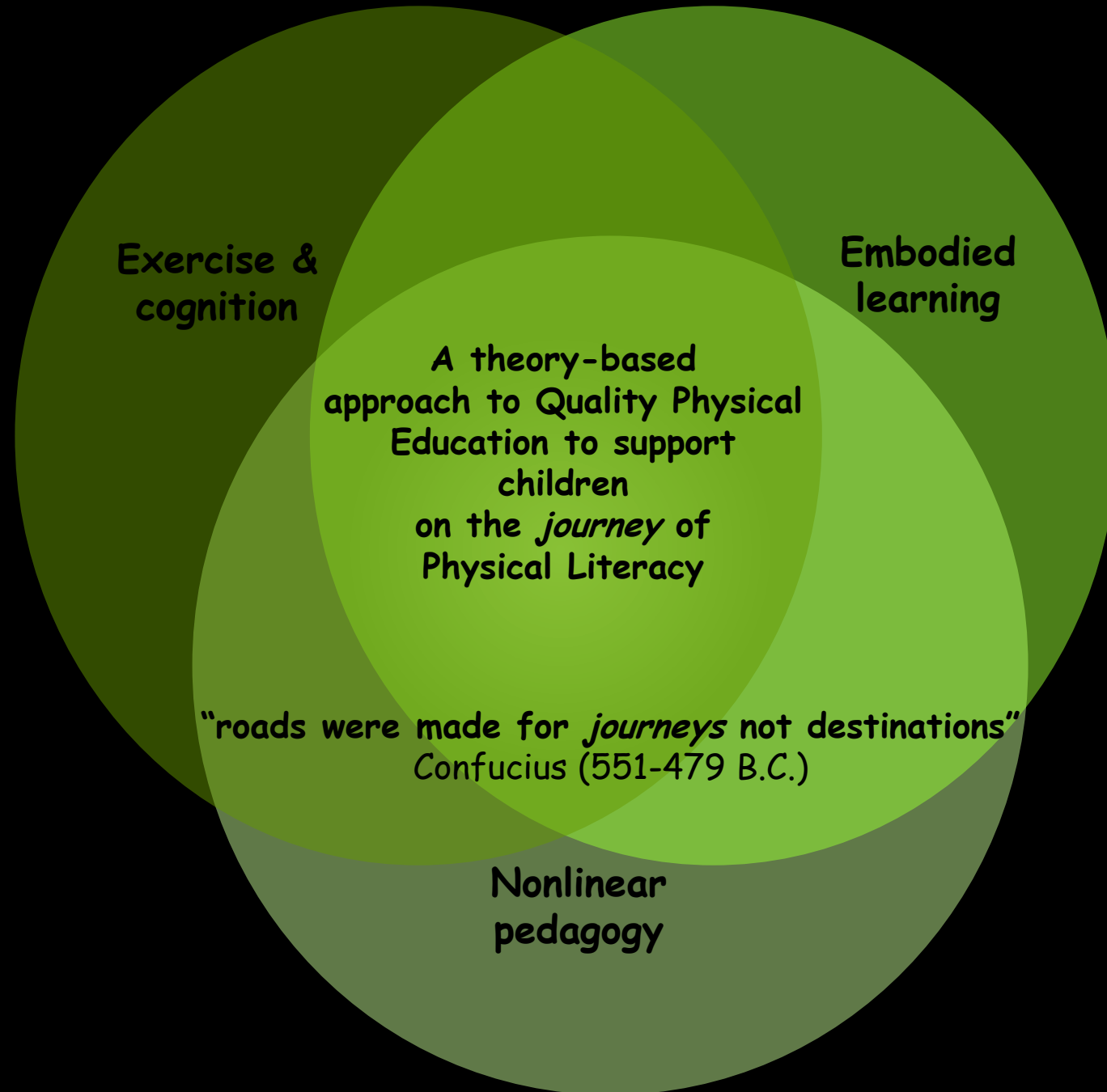
As compared to nonactive academics, aerobic exercise interventions benefit cognition, but more pronouncedly when combined with cognitive challenges.

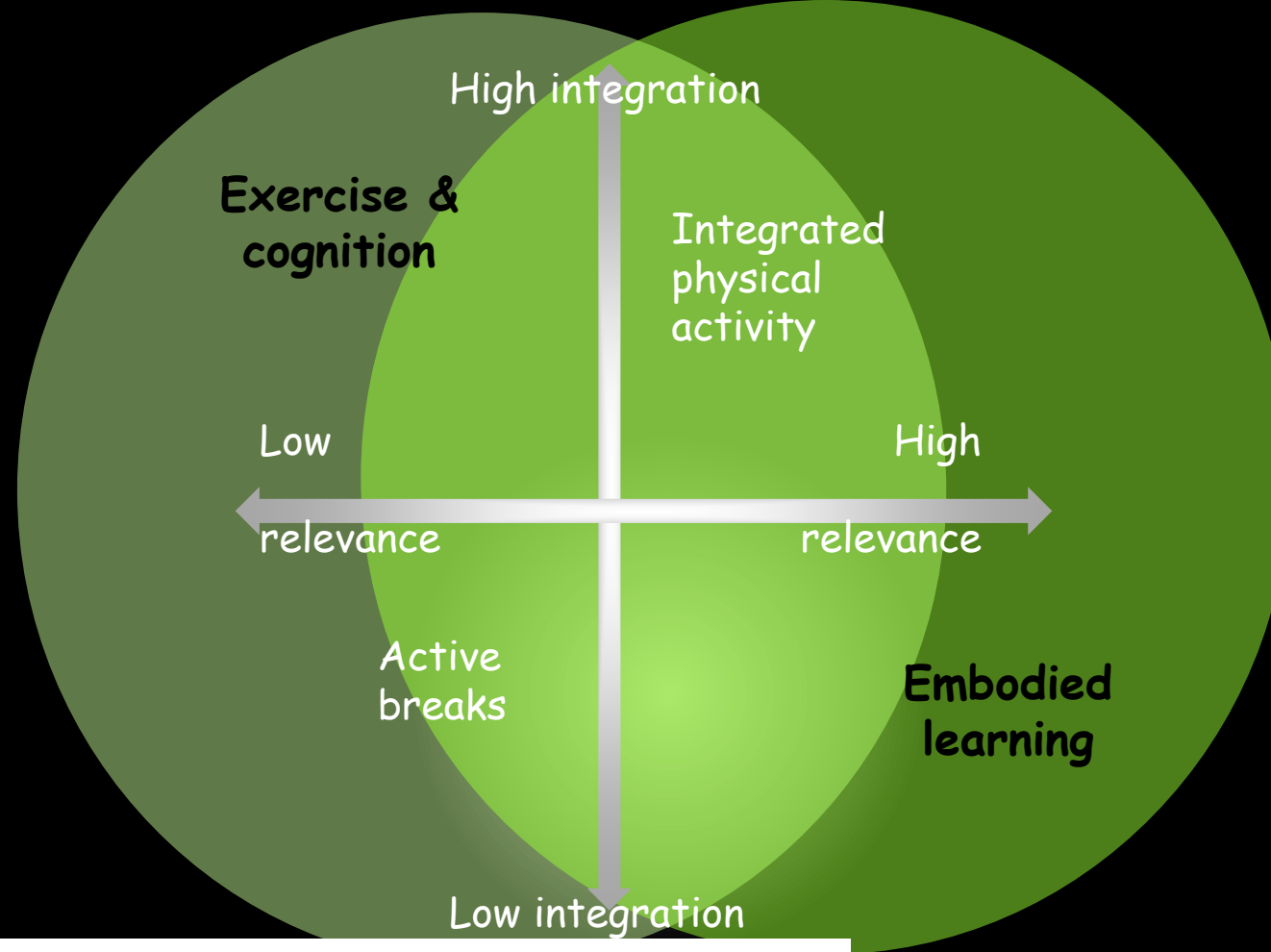


Tomporowski, P.D., & Pesce, C. (2019).
Exercise, Sports, and Performance Arts
Benefit Cognition Via a Common Process.
Psychological Bulletin.

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A Narrative Review of School-Based Physical Activity for Enhancing Cognition and Learning: The Importance of Relevancy and Integration

Myrto Foteini Mavilidi^{1,2†}, Margina Ruiter^{3†}, Mirko Schmidt⁴, Anthony D. Okely², Sofie Loyens⁵, Paul Chandler² and Fred Paas^{2,3*}



frontiers 2018
in Psychology

Exercise &
cognition



Contents lists available at SciVerse ScienceDirect

Mental Health and Physical Activity

journal homepage: www.elsevier.com/locate/menpa

Mental Health and Physical Activity 6 (2013) 172–180

Searching for cognitively optimal challenge point in physical activity
for children with typical and atypical motor development[☆]

Caterina Pesce*, Claudia Crova, Rosalba Marchetti, Ilaria Struzzolino, Ilaria Masci,
Giuseppe Vannozzi, Roberta Forte

Nonlinear
pedagogy

Capitalizing on the
cognitive
'side effects'
of movement

Annual Review of Psychology

Motor Development: Embodied, Embedded, Enculturated, and Enabling

Karen E. Adolph and Justine E. Hoch

Department of Psychology, New York University, New York, New York 10003, USA;
email: karen.adolph@nyu.edu

Annu. Rev. Psychol. 2019. 70:26.1–26.24

Embodied
learning

Motor development is

(a) “**Embodied**”:

Opportunities for action depend on
the current status of the body.

(b) “**Embedded**”:

Variations in the environment create
and constrain possibilities for action.

(c) “**Enculturated**”:

Social and cultural influences
shape motor behaviors.

(d) “**Enabling**”:

New motor skills create new
opportunities for exploration and learning
that instigate cascades of development
across diverse psychological domains.

Nonlinear
pedagogy

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A constraint-led approach to sport and physical education pedagogy

Ian Renshaw ^a and J-Y Chow ^b

PHYSICAL EDUCATION AND SPORT PEDAGOGY
<https://doi.org/10.1080/17408989.2018.1552675>

 **Routledge**
Taylor & Francis Group



Application of a constraints-led approach to pedagogy in schools: embarking on a journey to nurture physical literacy in primary physical education

William M. Roberts ^{a,b}, Daniel J. Newcombe ^a and Keith Davids ^c



Physical Literacy - A Journey of Individual Enrichment: An Ecological Dynamics Rationale for Enhancing Performance and Physical Activity in All

James R. Rudd^{1,2}, Caterina Pesce³, Ben William Strafford⁴ and Keith Davids⁴*

Variation and variability ("key words in motor development", Hadders-Algra, 2010; 2018)

Variation: means that a child has and can every time use a broad repertoire of motor behaviors for a specific function

Variability: means that the child is able to select from the repertoire the motor strategy that fits the situation best



Salient characteristics of motor learning to improve cognition are:

Complexity, Novelty, Diversity, and learning Success

(Moreau & Conway, 2013, Moreau, 2015)

Creative Motor Actions As Emerging from Movement Variability

PERSPECTIVE

published: 31 October 2017

doi: 10.3389/fpsyg.2017.01903

Dominic Orth^{1,2}, John van der Kamp^{1,2}, Daniel Memmert³ and Geert J. P. Savelsbergh¹*

The Effects of Variety and Novelty on Physical Activity and Healthy Nutritional Behaviors

Benjamin D. Sylvester^{*,1}, Ben Jackson[†], Mark R. Beauchamp[‡]

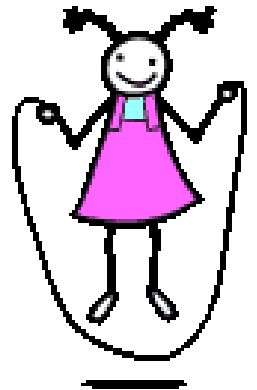
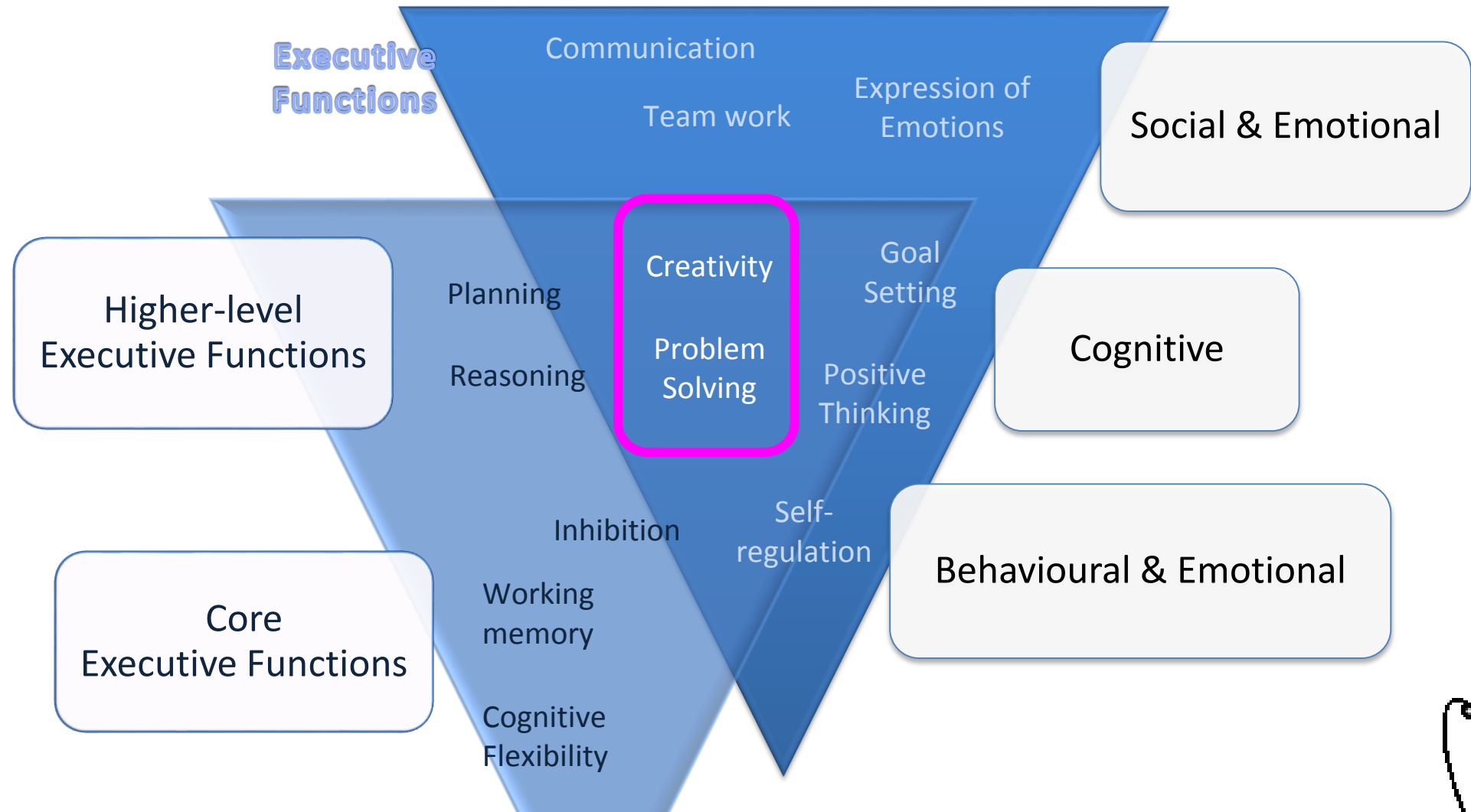
Is Variety a Spice of (an Active) Life?: Perceived **Variety**, Exercise Behavior, and the Mediating Role of Autonomous Motivation

Benjamin D. Sylvester,¹ Martyn Standage,² Tavinder K. Ark,¹ Shane N. Sweet,³
Peter R.E. Crocker,¹ Bruno D. Zumbo,¹ and Mark R. Beauchamp¹

The Effects of **Variety and Novelty** on Physical Activity and Healthy Nutritional Behaviors

Benjamin D. Sylvester^{*,1}, Ben Jackson[†], Mark R. Beauchamp[‡]

Life Skills



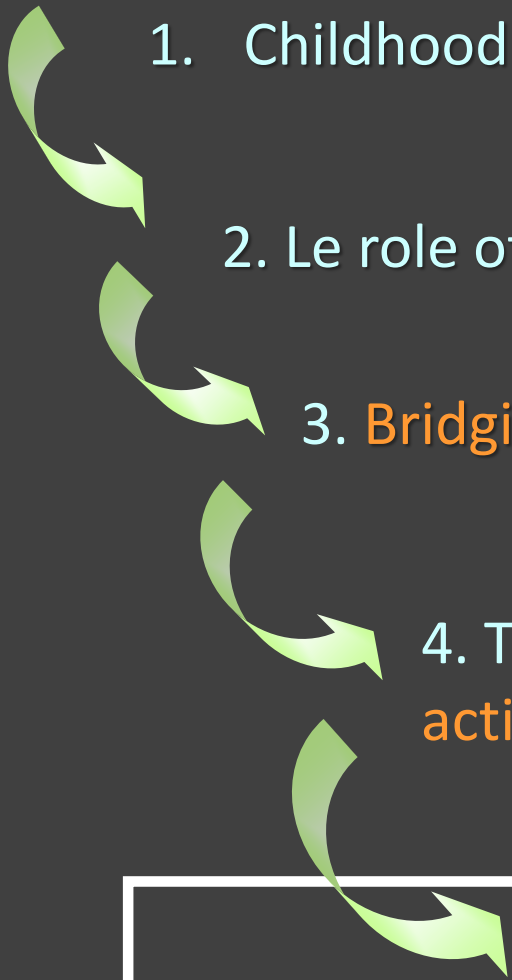
Pesce C., Faigenbaum, A., Goudas, M., & Tomporowski, P.D. (2017).

Coupling our plough of thoughtful moving at the star of children's right to play:

from neuroscience to multisectoral promotion. In R. Bailey, R. Meeusen, S. Kubesch, & P. Tomporowski (eds.),

Physical activity and educational achievement: insights from exercise neuroscience. Routledge.

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UNESCO
Publishing

United Nations
Educational, Scientific and
Cultural Organization

QUALITY PHYSICAL EDUCATION

Guidelines for
Policy-Makers
2015

Besides the health concerns related to inactivity and obesity, why invest in Physical Education?

Physical Education and sport are essential to children and youths, to healthy lives, to resilient societies, to the fight against violence.

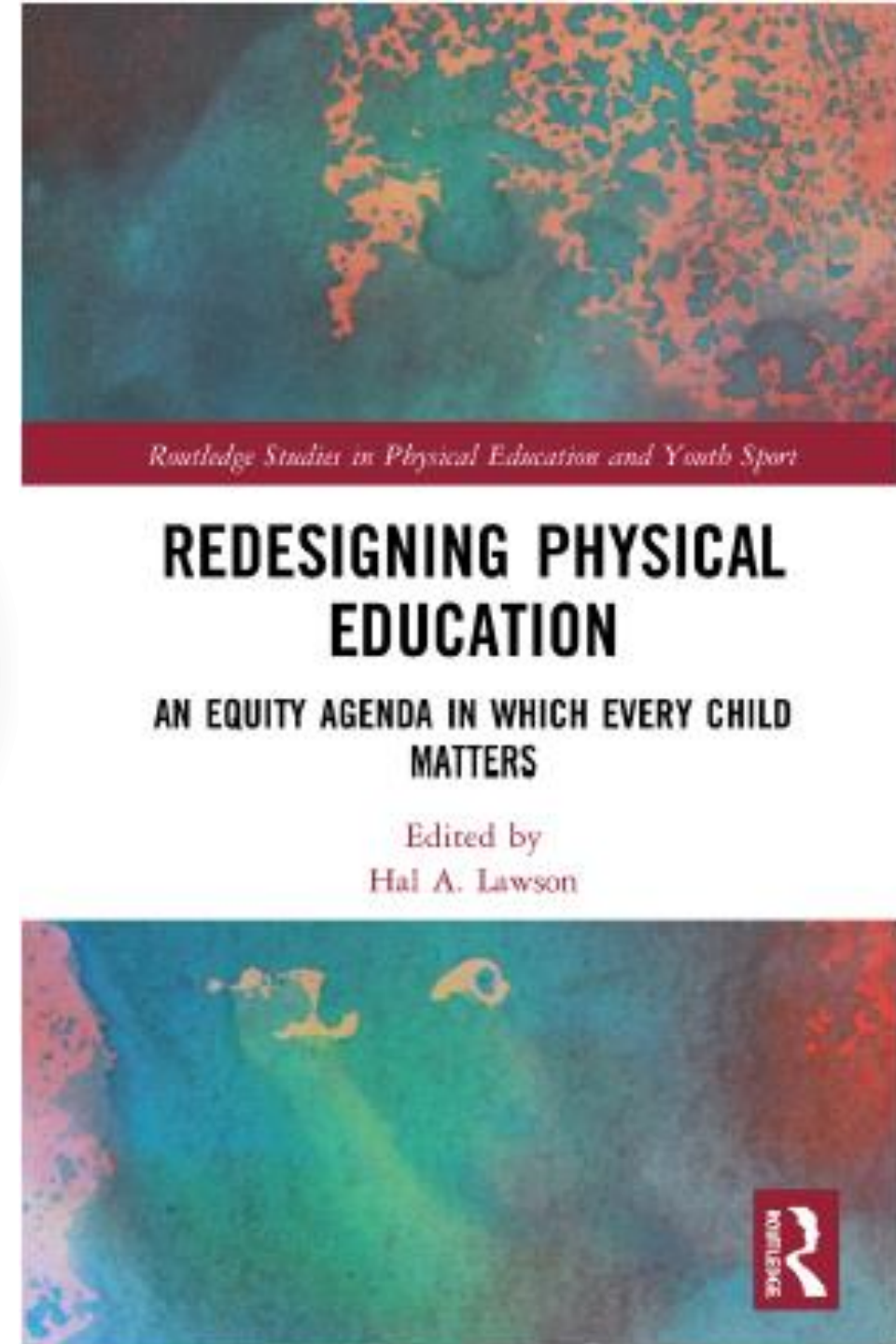
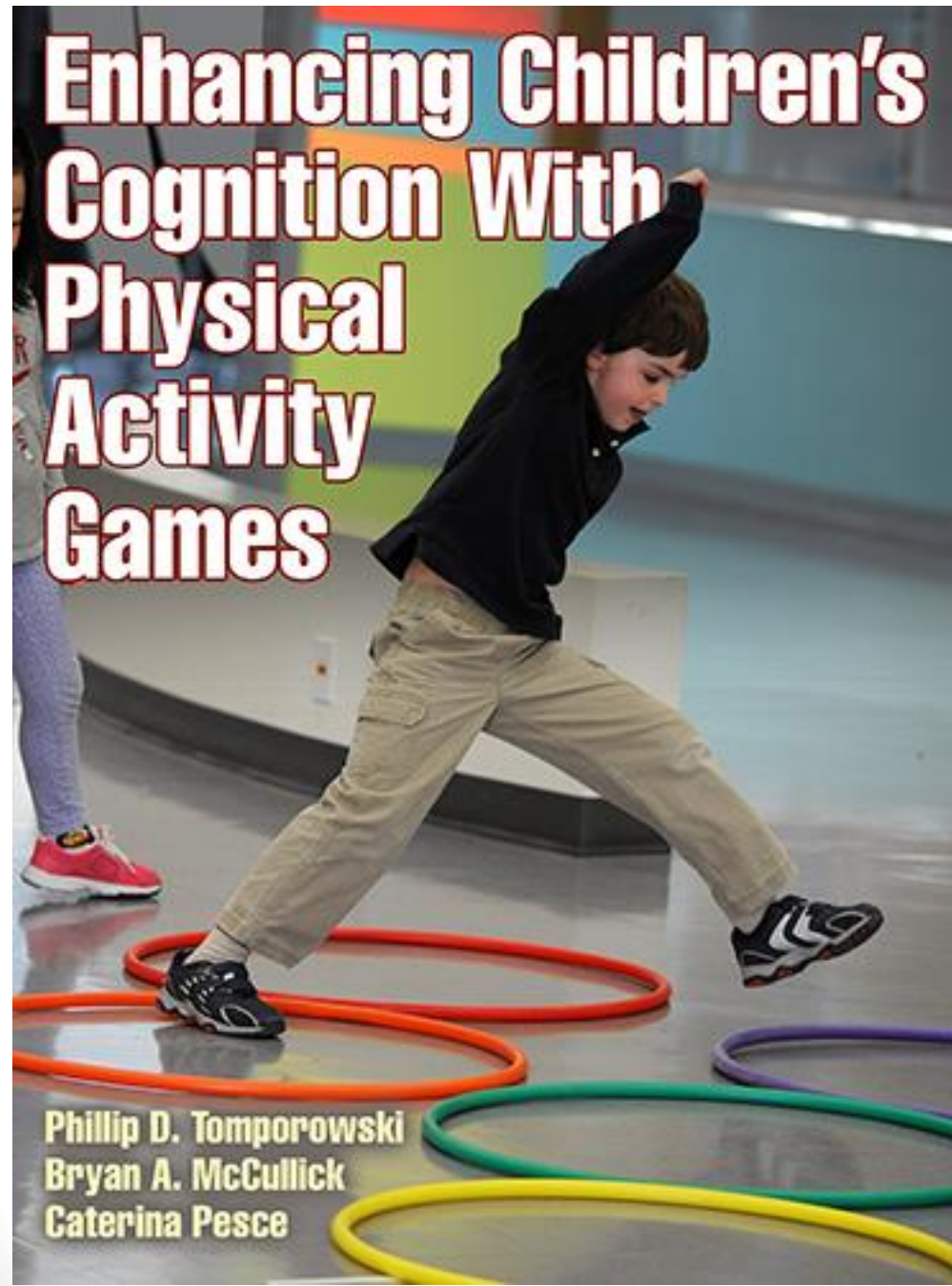
UNESCO identifies four key domains:

- Health
- Inclusion
- Academic achievement
- “Physical literacy” and civic engagement

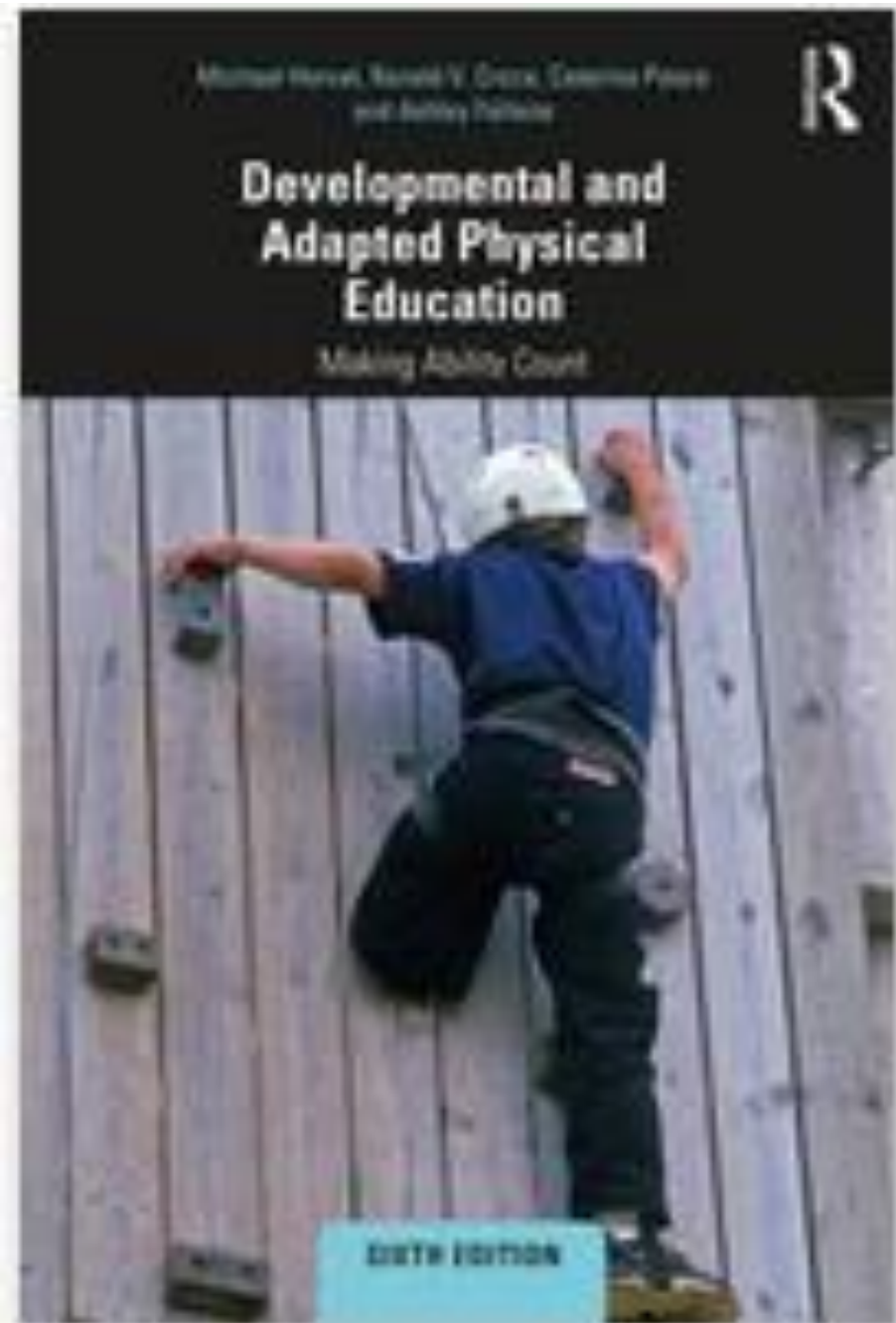
To reap benefits in the above domains, it is necessary to develop:

- Quality Physical Education (PE)
- Quality PE teacher education (PETE)

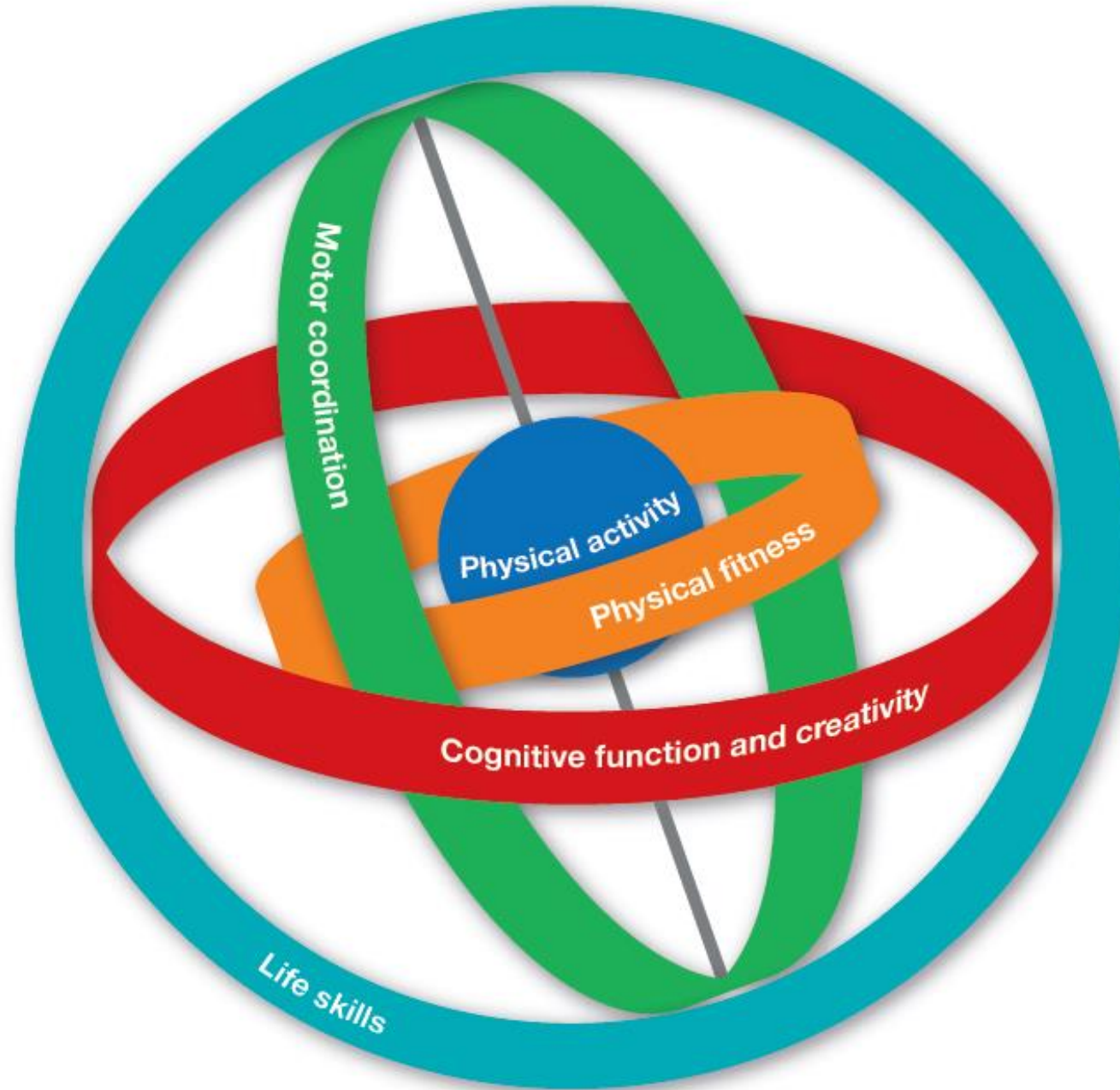
Getting more holistic in intervention design and translational research



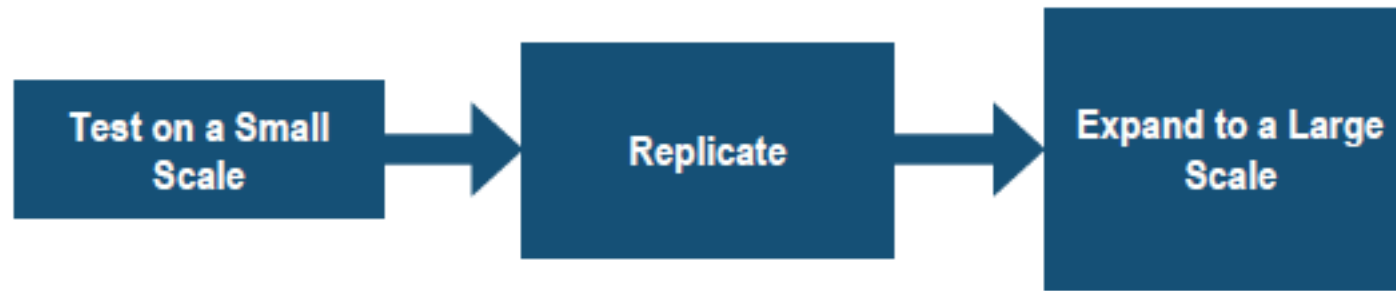
Getting more holistic in intervention design and translational research



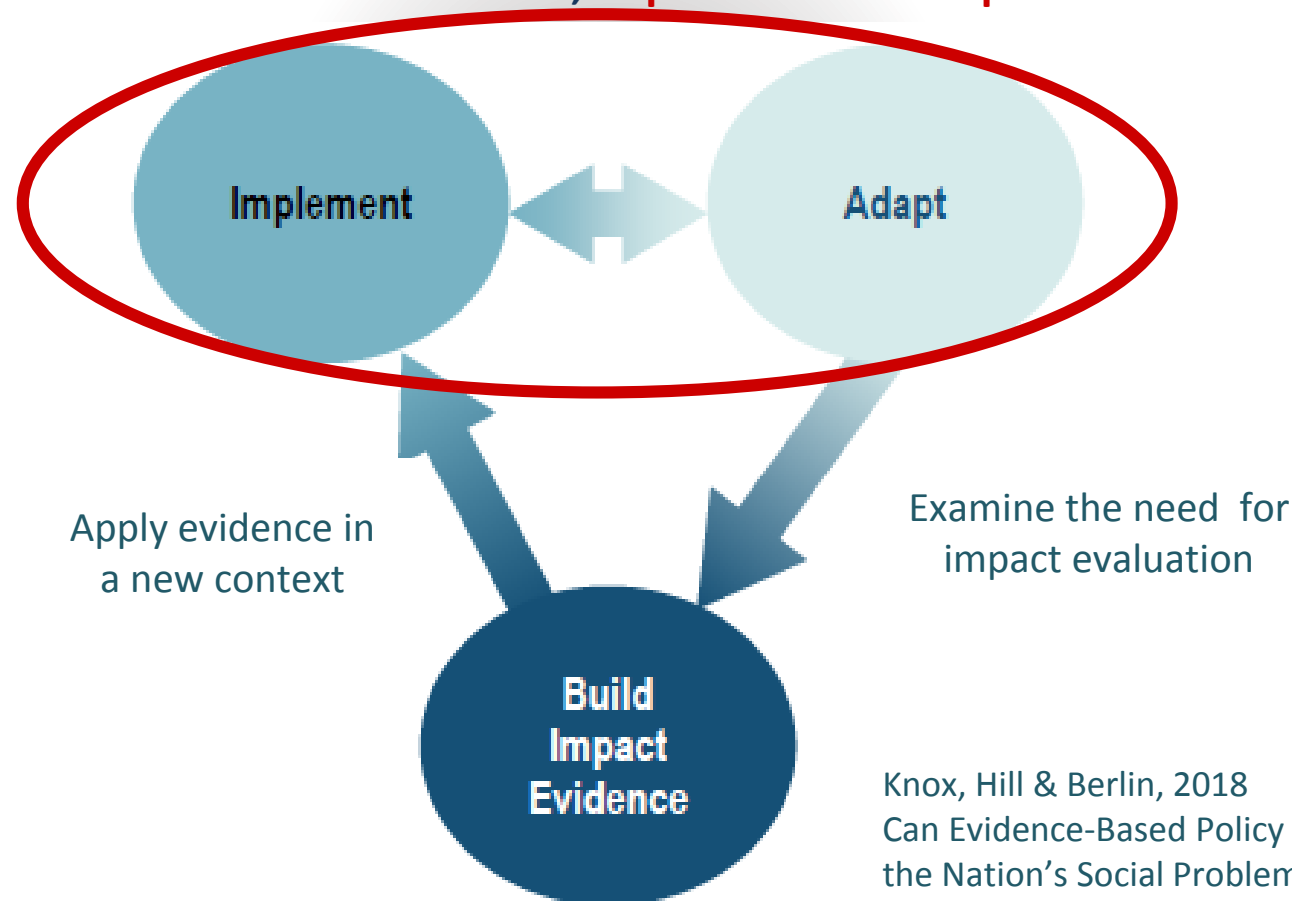
Getting more holistic in intervention design and translational research



The most common paradigm



An advanced paradigm to build evidence, **implement** and **adapt**



Knox, Hill & Berlin, 2018
Can Evidence-Based Policy Ameliorate
the Nation's Social Problems?

Starting locally (Alba, Piedmont) to spread globally

Promoted by the Italian Ministry of Education since 2018

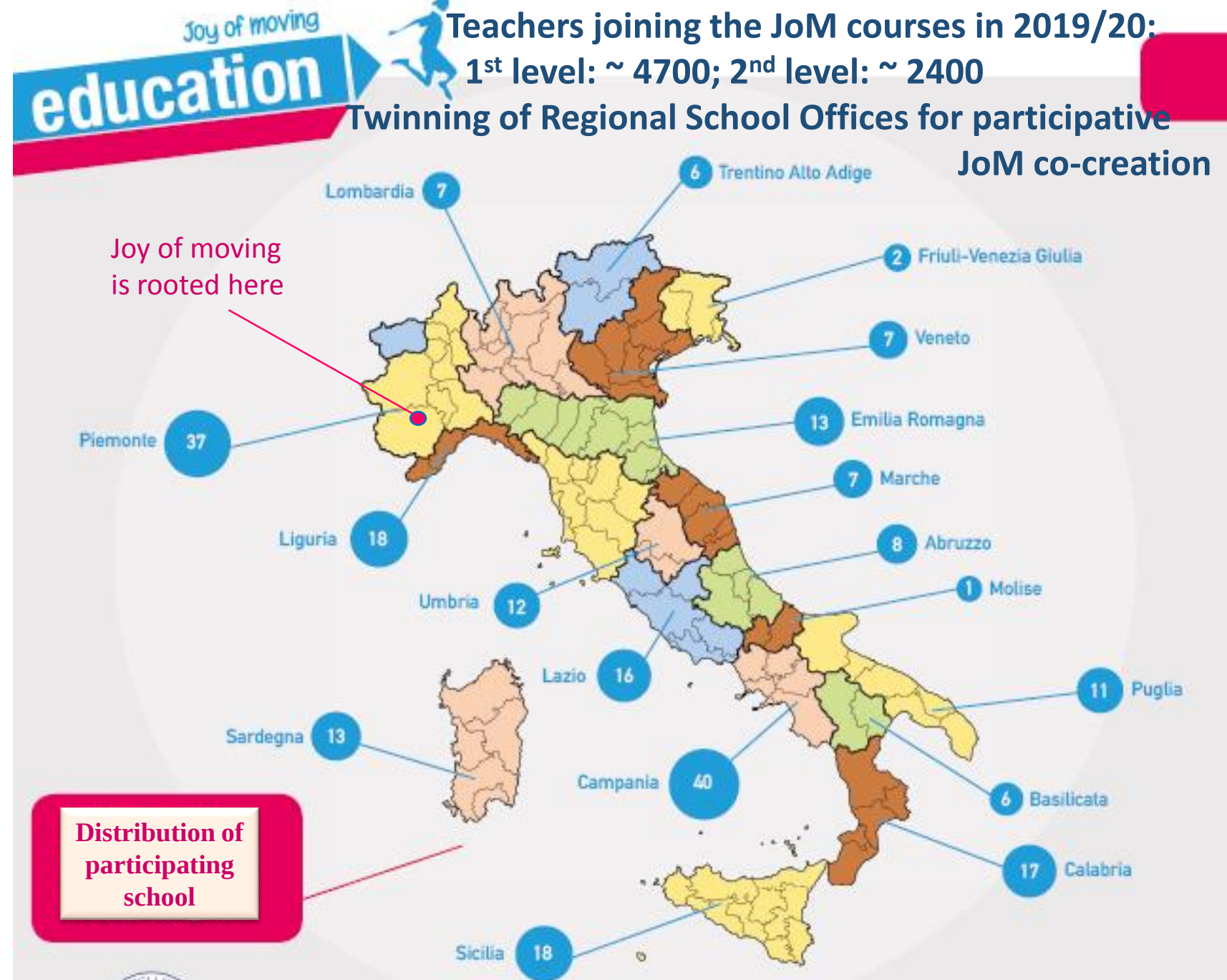
Indicated as good practice in the 2019 physical activity recommendations of the Italian Ministry of Health

School teachers who joined the JoM Education platform since 2018: ~ 10.000

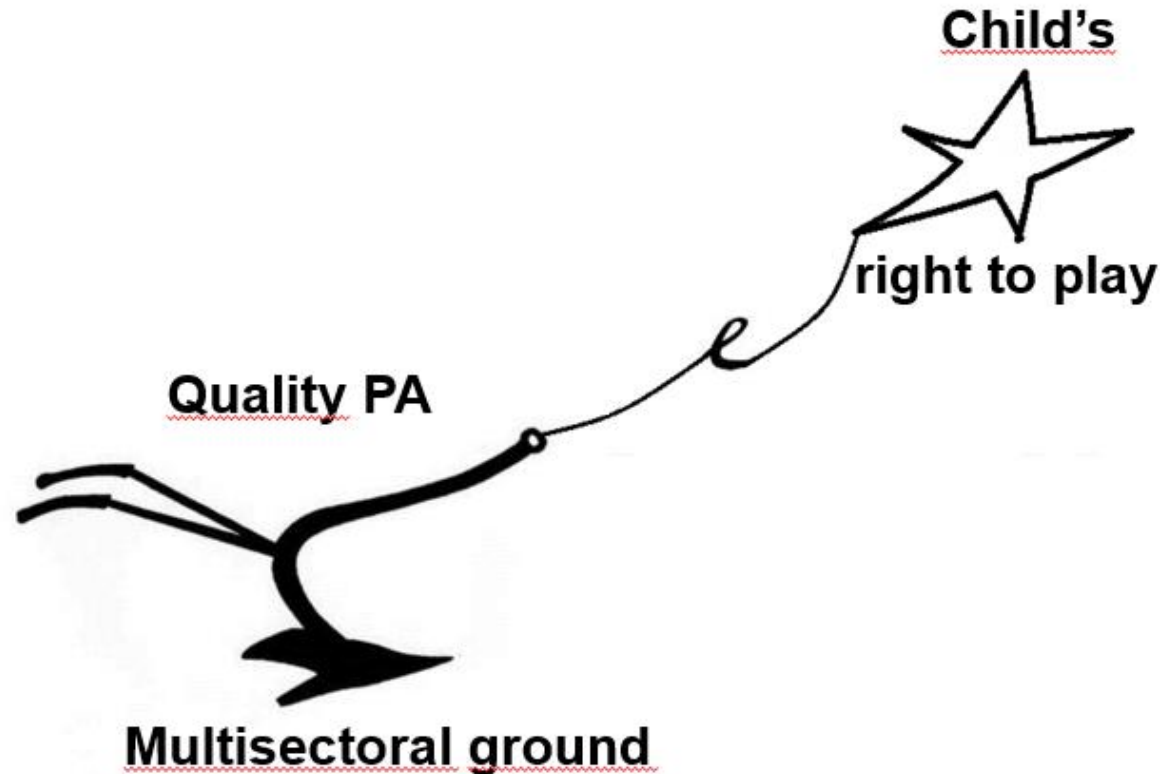
Teachers joining the JoM courses in 2019/20:

1st level: ~ 4700; 2nd level: ~ 2400

Twinning of Regional School Offices for participative JoM co-creation



Coupling our plough of thoughtful moving to the star of children's right to play:
moving for improving, not merely for expending calories



*Thank you
for your attention*

“We should hitch our plough to a star” (Swahili proverb). The child's right to play can enlighten our efforts to promote quality PA, transitioning neuroscientific evidence stepwise into multisectoral policies and practices.