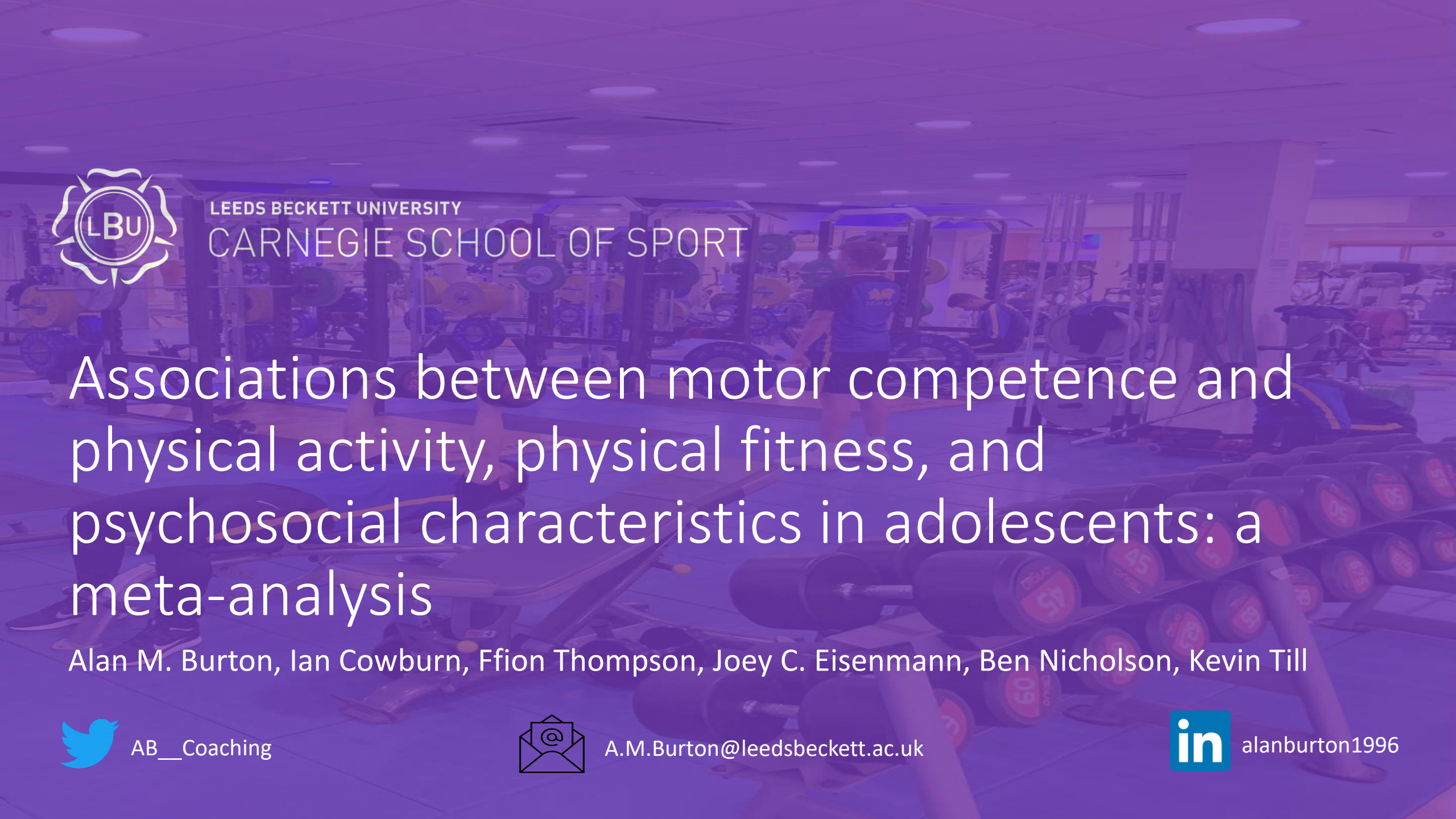

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Associations between motor competence and physical activity, physical fitness, and psychosocial characteristics in adolescents: a meta-analysis

Alan M. Burton, Ian Cowburn, Ffion Thompson, Joey C. Eisenmann, Ben Nicholson, Kevin Till

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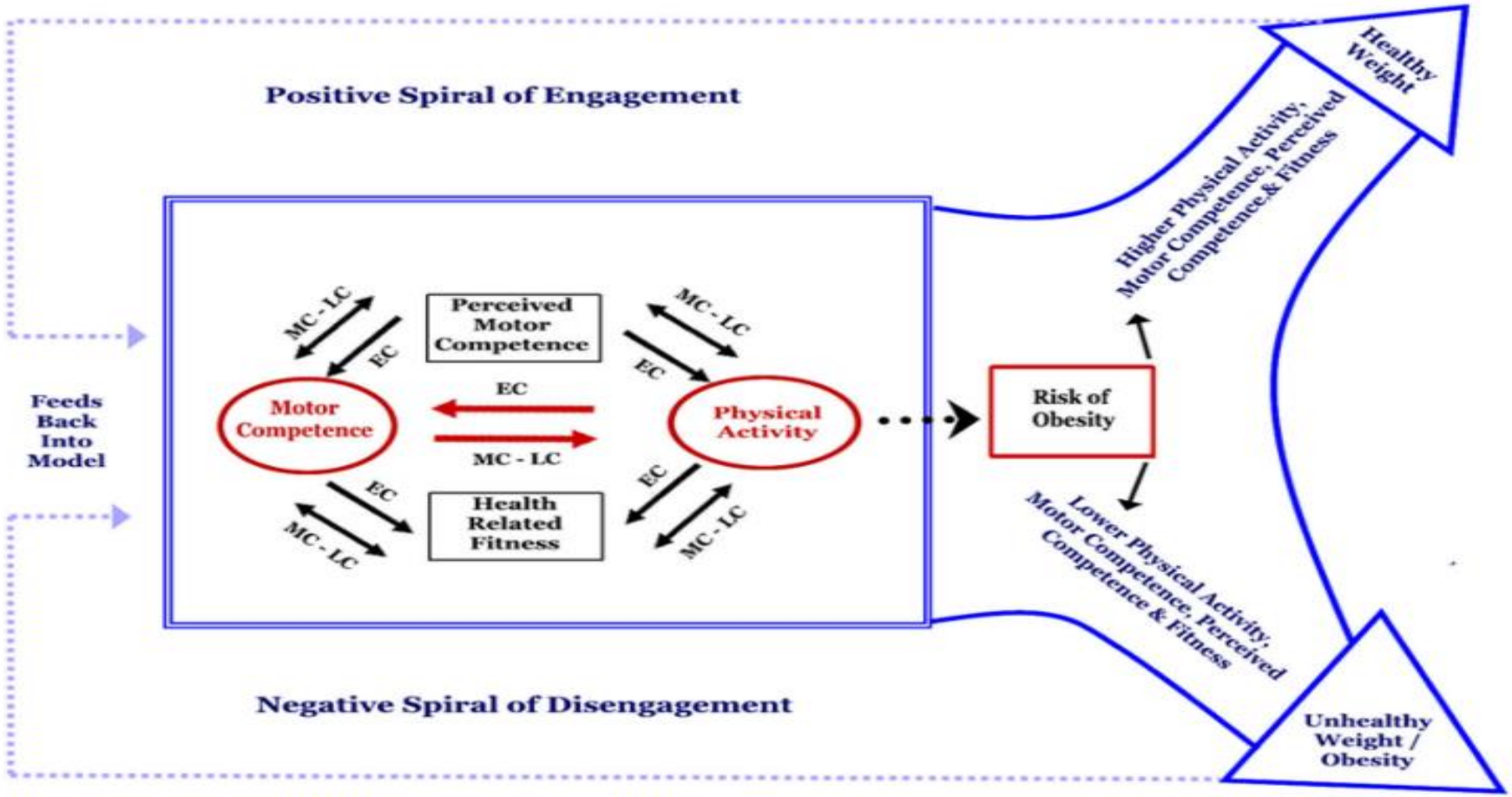
Background



Stodden et al., 2008

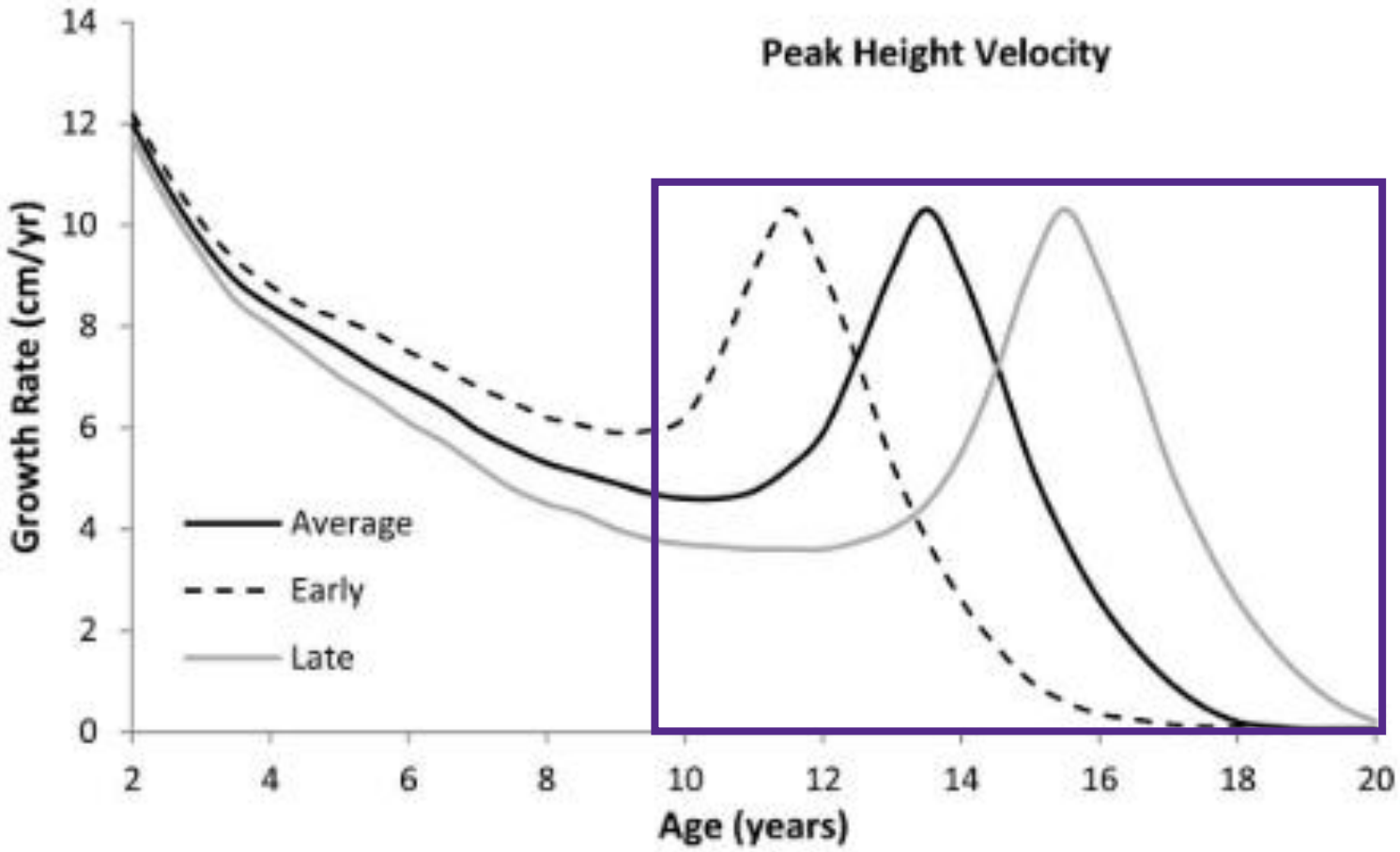
Background

Sports Med (2016) 46:1663–168
DOI 10.1007/s40279-016-0495-z

SYSTEMATIC REVIEW

**Correlates of Gr
and Adolescents:**

Lisa M. Barnett[1] · Samuel
Dylan P. Cliff[2] · Philip J.
Sarah P. Shultz[8] · Nicola I
Anthony D. Okely[2]



Lloyd et al., 2014 (adapted from Stratton and Oliver 2013)

An De Meester[1,2] · Lisa M. Barnett[3] · Ali Brian[1] · Steven J. Bowe[4] · Judith Jiménez-Díaz[5] · Femke Van Duyse[2] · J. Megan Irwin[1,6] · David F. Stodden[1] · Eva D'Hondt[7] · Matthieu Lenoir[2] · Leen Haerens[2]

Research aims

1. Analyse the scientific literature.

2. Evaluate the associations between motor competence and physical activity, physical fitness characteristics, and/or psychosocial characteristics amongst adolescents.

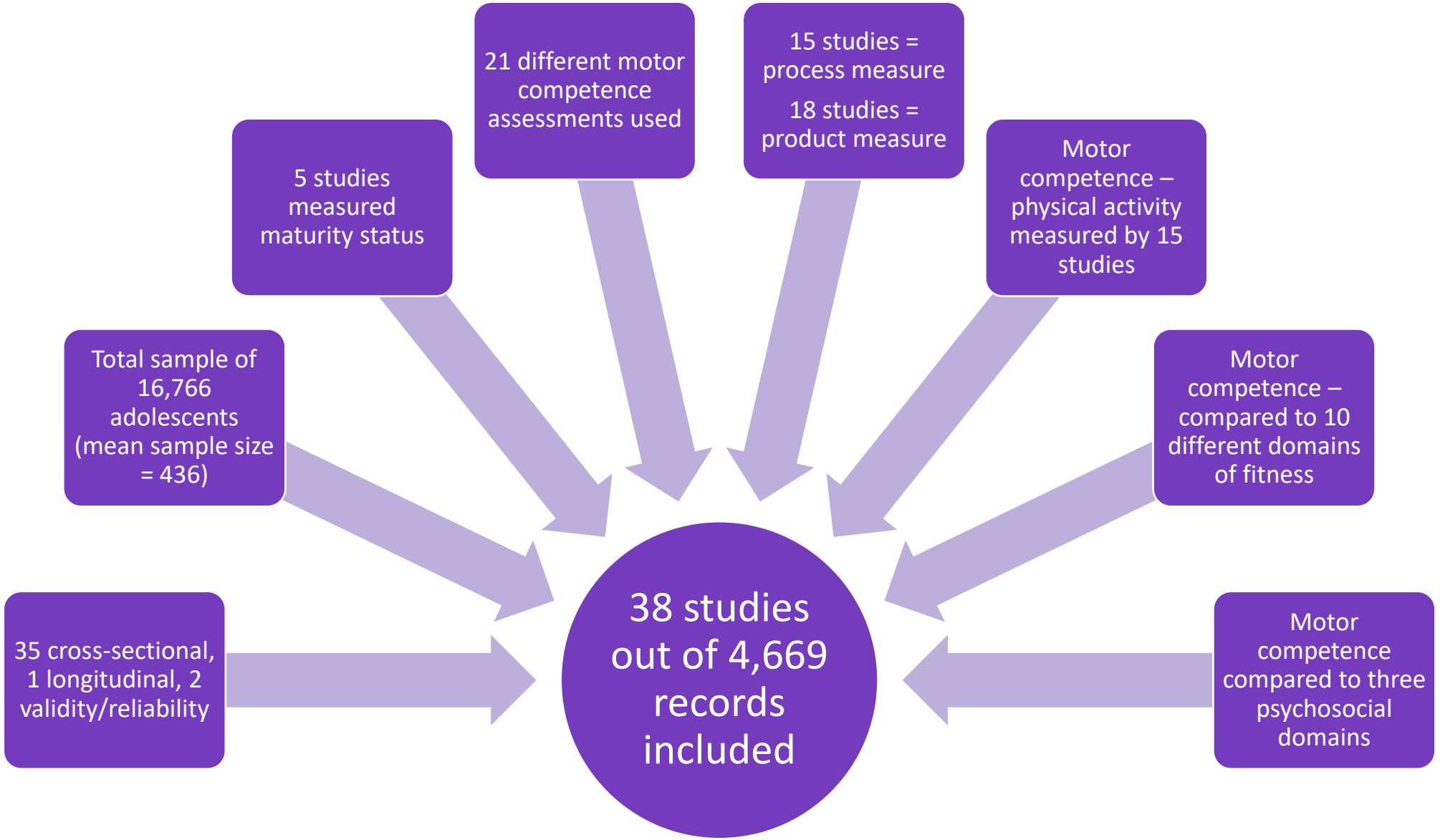
3. Investigate the impact of moderator variables (i.e., age, sex, type of motor competence assessment) on associations.

Methods

- **Protocol registration** — PROSPERO ref: CRD42021233441
- **Search** — Pilot searches; Initial search of 8 databases for relevant; Citation searches; Follow-up search after initial data extraction
- **Study Bias** — STROBE and CONSORT); against 6 criteria; **?** = unclear description.; reviewers (AMB, FT, JCE)
- **Systematic review** — Qualitative synthesis and interpretation; 38 studies included
- **Meta-analysis** — Random effects meta-analysis; 28 studies included; Moderators: Age, sex, type of motor competence measure

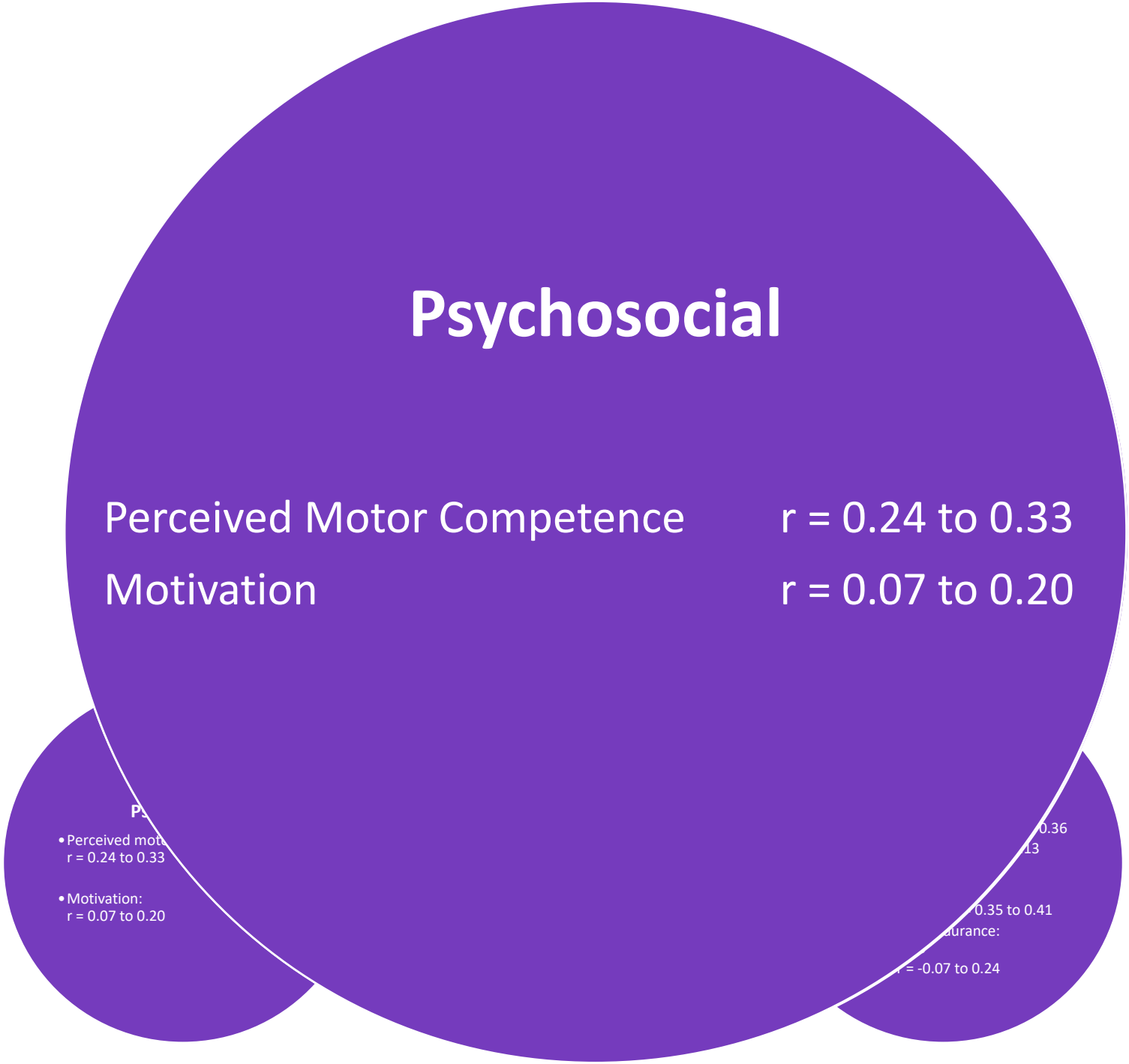
Haugen et al., [78]	Cross-sectional study of 9th graders in 2005 and 2008	**Sample** 1839 students (females n = 889; males n = 950). **Age** 15 years.	**Stability/balance competence** One subset (side-to-side jump) of the Körperkoordinationstest Für Kinder [KTK]) [91].	Product	**Self-reported physical activity** Unreferenced self-reported physical activity questionnaire.	**Weight status** BMI. **Muscular power** Standing broad jump. **Muscular strength** Push-up test. **Cardiovascular endurance** Multi-stage fitness test. **Flexibility** sit and reach.	**Perceived motor competence** Norwegian version of Harter's Self-Perception Profile for Adolescents [141, 142].	**Stability/balance competence (females)** Self-reported PA: r = 0.26, p <0.01. Weight status: r = -0.25, p <0.01. Muscular strength: r = 0.40, p <0.01. Muscular power: r = 0.50, p <0.01. Cardiovascular endurance: r = 0.48, p <0.01. Flexibility: r = 0.23, p <0.01. Perceived motor competence: r = 0.34, p <0.01. **Stability/balance competence (males)** Self-reported PA: r = 0.09, p <0.01. Weight status: r = -0.25, p <0.01. Muscular strength: r = 0.37, p <0.01. Muscular power: r = 0.38, p <0.01. Cardiovascular endurance: r = 0.37, p <0.01. Flexibility: r = 0.10, p <0.05. Perceived motor competence: r = 0.28, p <0.01.

Results (systematic review)



Psychosocial

Perceived Motor Competence	r = 0.24 to 0.33
Motivation	r = 0.07 to 0.20



Model	Studies (n)	Study samples (n)	Sample size (n)	Pooled correlation coefficients ($r \pm 95\%$ CI)	p value
Locomotor competence	3	4	616	0.10 (0.02, 0.18)	**0.01**
Object control competence	4	8	4,254	0.25 (0.14, 0.35)	**<0.01**
Overall competence	5	10	4,688	0.21 (0.09, 0.32)	**<0.01**
Stability/balance competence	4	9	5,878		

Motor competence and composite fitness score	Sex	**Overall competence** Females vs. males $p = 0.43$	**Overall competence** Females (Studies n = 3; sample size n = 120; $r = 0.40$; 95% CI [0.24, 0.55]; **p <0.01**) Males (Studies n = 4; sample size n = 175; $r = 0.49$; 95% CI [0.30, 0.64]; **p <0.01**)
	Age	**Overall competence** 11-12 years vs. 13-15 years **p = 0.01**	**Overall competence** 11-12 (Studies n = 3; sample size n = 107; $r = 0.60$; 95% CI [0.46, 0.71]; **p <0.01**) 13-15 (Studies n = 5; sample size n = 251; $r = 0.37$; 95% CI [0.25, 0.47]; **p <0.01**) 16+ (N/A)
	Assessment type	**Overall competence** [a]Process vs. Product	**Overall competence** Combined (N/A) [a]Process (Studies n = 1; sample size n = 63; $r = 0.40$; 95% CI [0.17, 0.59]; **p <0.01**) Product (Studies n = 7; sample size n = 295; $r = 0.46$; 95% CI [0.34, 0.56]; **p <0.01**)

Heterogeneity (stability/balance competence): $I^2 = 78.83$; $Q = 18.89$; $t^2 = 0.01$ and $df = 4$

Figure 14. Forest plots showing the pooled correlation coefficients between motor competence and perceived motor competence ($r \pm 95\%$ CI). Bold font = p <0.05, r = pooled correlation coefficient, and CI = confidence interval.

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Conclusion

→Findings support the hypothesised interactions of motor competence with physical activity, physical fitness and psychosocial characteristics in adolescence.

→Methodological approaches vary considerably across studies…

→Limitations of the current literature:

- → Inadequate assessment of motor competence.
- → A lack of longitudinal observations.
- → Failure to account for biological maturation within data analysis.

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Practical applications

Research

→ **Longitudinal assessments** are required.

→ **Utilise combined tools** (i.e., process and product) to assess motor competence.

→ **Implement better field-based measures** across all characteristics (e.g., body composition over BMI).

→ **Consider** how different **moderators** (especially stage of maturity) effects any associations.

Practice

→ Adolescent health-related interventions should focus on **synergistic development** of **motor competence, physical activity engagement, physical fitness, and psychosocial characteristics**.

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What's next?

→ Holistic measurement of motor competence, physical activity, physical fitness, and psychosocial characteristics amongst adolescents.

→ Initial cross-sectional with a later follow up (start and end of the school year).

→ Dragon's challenge (Tyler et al., 2018) – process AND product assessment.

→ Influence of maturity status on associations.

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Thank you

Open to discussions in this area (and others)...

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