



Parental Attention and Self Control among Student Athletes and Non Athletes: A Metacognitive Perspective

Purnama Yusti Herasakti^{1*}, Nopem Kusumaningtyas Sumitro², Ahmad Lani¹

¹Master of Physical Education, Universitas Insan Budi Utomo, Indonesia

²Mathematics Education, Universitas Insan Budi Utomo, Indonesia

^aherasakti1014@gmail.com, ^bnopem_kusuma@uibu.ac.id, ^cahmad_lani@uibu.ac.id

Article History:

Received:

21-06-2026

Revised:

30-07-2026

Accepted:

17-08-2026

Keywords:

Metacognitive Regulation; Non Athlete Students; Parental Attention; Self Control; Student Athletes

*Correspondence Address:

herasakti1014@gmail.com

Abstract:

Self control is essential for elementary students' academic participation, social adjustment, and responsible engagement with digital media. This qualitative comparative case study explored how parental attention relates to self control among student athletes and non athletes at SDN Summersari I Beji and interpreted the findings through a metacognitive regulation perspective. Ten informants participated, comprising students, parents, a classroom teacher, and a physical education teacher. Data were generated through semi structured in depth interviews, passive participatory observation, and document analysis, then analyzed using data reduction, comparative matrix display, and conclusion verification. Student athletes tended to display more structured autonomy and sustained focus; club routines, rules, and feedback provided an additional external regulatory structure, while parents primarily facilitated participation and buffered emotional strain. Non athlete students showed more variable self control and relied more heavily on parental communication, scheduling, and monitoring to manage free time and digital distraction. Metacognition was not measured directly; it is used cautiously as an interpretive lens. The findings suggest that parental attention and structured sport may scaffold planning, monitoring, behavioral adjustment, and self evaluation through different pathways. Longitudinal research using direct metacognitive measures is required to test this proposition.



Introduction (مقدمة)

Self control enables children to inhibit impulsive responses, sustain goal directed behavior, regulate emotion, and delay immediate gratification. During the later elementary school years, these capacities are increasingly important because students must coordinate academic responsibilities, peer relationships, leisure activities, and digital media use with less continuous adult supervision. Self control, however, should not be reduced to obedience. It involves the active alignment of behavior with goals, standards, and anticipated consequences. Contemporary

research also cautions against treating self control as a fixed reservoir that is simply exhausted by use; motivation, task meaning, beliefs, context, and available regulatory supports all shape whether a child persists or disengages. For this reason, the present study interprets self control as a context sensitive regulatory accomplishment rather than as a stable personal trait.

Metacognition offers a useful but distinct lens for understanding this accomplishment. Metacognition concerns knowledge and awareness of one's cognition, whereas metacognitive regulation refers to planning, monitoring, controlling, and evaluating cognitive activity. Self control is broader in its behavioral and emotional expression, yet it can be supported by metacognitive processes. A child who identifies a goal, anticipates distraction, checks progress, changes an ineffective response, and evaluates the outcome is doing more than suppressing an impulse: the child is regulating behavior through reflective awareness. A systematic review by Dörrenbächer Ulrich et al. (2024) shows that metacognition, executive functions, and self regulated learning are closely related while remaining conceptually distinguishable. Eberhart et al. (2025) likewise found that metacognitive interventions in young children can benefit self regulation, executive functioning, and learning outcomes. These findings justify using metacognition as an interpretive mechanism, but not as a substitute label for self control.

Parents are central providers of early external regulation. Their attention may take the form of emotional availability, two way communication, modeling, monitoring, schedule coordination, and provision of learning or activity resources. These practices can either keep regulation outside the child or gradually transfer responsibility to the child. Reflective questions such as what the child plans to do, what may interfere, whether the chosen strategy is working, and what should be improved invite the child to articulate regulatory knowledge. Geurten and Léonard (2023) found that parents' metacognitive talk predicted children's metacognitive accuracy and memory performance. Gardier et al. (2024) further showed that parent child metacognitive talk during reminiscence and play is relevant to children's memory performance. Thus, parental attention may become metacognitive scaffolding when it helps children understand and manage their own regulatory process rather than producing compliance only in the adult's presence.

Supportive involvement must also be distinguished from psychologically controlling supervision. Monitoring device use or enforcing schedules may be necessary, particularly for younger children, but directive control alone can leave the child dependent on external reminders. Evidence synthesized by Martínez López et al. (2023) indicates a positive relationship between perceived social support and self regulated learning, including strategic and metacognitive dimensions. In digital learning contexts, Wang et al. (2025) similarly emphasize that parental mediation and support can cultivate children's online self regulated learning. These studies imply that the quality and function of parental attention matter: effective attention combines clear boundaries with explanation, choice, feedback, and gradual transfer of agency.

Organized sport provides another possible regulatory environment. Training schedules, rules, performance targets, corrective feedback, repeated practice, and competitive consequences require children to coordinate attention, emotion, and action. Meta analytic evidence indicates that cognitively engaging physical activity can improve children's and adolescents' executive functions, especially when movement requires decision making, rule switching, inhibition, and strategic adaptation (Mao et al., 2024). Related reviews and trials report benefits from cognitively demanding physical activity for executive functioning and self control (Bulten et al., 2022; Song et al., 2022; Xu et al., 2025). These effects are not produced automatically by physical exertion. The cognitive challenge, instructional quality, reflective feedback, developmental appropriateness, and continuity of participation are decisive.

This qualification is important for interpreting student athletes. A training routine may

externally organize planning through schedules and targets, monitoring through coach observation and feedback, control through tactical or emotional adjustment, and evaluation through performance review. Price and Collins (2024) argue that developing understanding in high level youth sport entails interpreting situations, evaluating decisions, and adapting future action. In this sense, club training may function as a repeated regulatory scaffold. Parents do not become irrelevant; their role may shift toward coordinating school and training, providing resources, discussing performance, and protecting the child from excessive pressure or burnout.

Sumitro et al. (2019) provide a conceptually relevant account of how scaffolding interactions can elicit metacognitive activity. More recent work by Sumitro et al. (2026) extends this line of inquiry through a PBL scaffolding model designed to strengthen the metacognitive activity of slow learners. Although both studies concern mathematics learning rather than parenting or sport, their shared principle is pertinent here: external support becomes developmentally valuable when it is responsive to difficulty, encourages reflection, and progressively transfers regulatory responsibility to the learner. These self citations therefore support the proposed mechanism of internalization rather than serving as direct evidence about the participants in the present study.

The Indonesian family context also requires attention to sedentary routines and digital distraction. Sumitro's recent collaborative work identifies sedentary parenting as a growing concern in young families (Rusdiawan et al., 2025). Although that publication addresses childhood obesity rather than metacognition, it is relevant to the present study because parental routines shape opportunities for movement, device use, and self regulation. This self citation is used as contextual evidence and is not counted among the verified Scopus indexed metacognition sources. For children who do not participate in organized sport, family and school may therefore provide the most consistent structures for scheduling, monitoring, and evaluating daily behavior.

Initial observations at SDN Summersari I Beji indicated different behavioral patterns between students participating in official sports clubs and students without formal sport routines. Student athletes appeared more regular in time use and more tolerant of pressure, while non athletes had more flexible daily structures and were more exposed to unstructured free time and digital distraction. Previous studies have commonly examined parenting, physical activity, executive function, and self regulation separately. Less is known about how parental attention may perform different functions when children do or do not have an additional organized regulatory environment. The novelty of this study lies in comparing these two pathways and interpreting them cautiously through metacognitive regulation, not in claiming that metacognition was directly measured.

Accordingly, this study aims to explore and compare forms of parental attention and manifestations of self control among student athletes and non athletes at SDN Summersari I Beji. It also uses metacognitive regulation as an interpretive perspective to explain how parental supervision and structured sport may support the internalization of planning, monitoring, behavioral control, and self evaluation. The research addresses four questions: (1) What forms of parental attention are evident in the two groups? (2) How is self control manifested at school? (3) How do parental influence pathways differ between the groups? and (4) How can those differences be interpreted through metacognitive regulation



Method (منهج)

Research Design

This study employed a qualitative approach with a comparative case study design. The design was selected to capture meanings, experiences, and behavioral patterns in their natural

context and to compare regulatory processes across two bounded groups. The cases were defined by participation or non participation in organized sport. The design does not support statistical generalization or causal estimation; instead, it enables an analytic comparison of how parental attention operates within different daily activity structures.

Participants and Setting

The study was conducted at SDN Summersari I Beji. Participants were selected purposively and comprised 10 key informants distributed across two clusters. The athlete cluster included three upper grade students who trained in official sports clubs at least three to four times per week and had competition experience, together with relevant parents, the classroom teacher, and the physical education teacher. The non athlete cluster included two students whose daily routines were not tied to formal sport clubs, together with their parents and the classroom teacher. The informant composition allowed student accounts to be compared with adult observations and documentary evidence. No additional participants or measurements were introduced in the metacognitive interpretation.

Data Collection

The researcher served as the primary instrument. Data were collected through three techniques. First, semi structured in depth interviews explored verbal, emotional, and material support from parents; schedule management; responses to fatigue or distraction; and students' daily behavior. Second, passive participatory observation focused on emotional control, sustained attention, classroom focus, compliance, independence, and responses to correction. Third, document analysis examined extracurricular attendance, student conduct records, and academic progress. Using multiple sources enabled the study to compare what participants reported with observed behavior and available records.

Data Analysis and Trustworthiness

Analysis followed the Miles and Huberman interactive logic of data reduction, data display, and conclusion drawing with ongoing verification. Relevant statements and observations were condensed into themes concerning parental attention, daily activity structure, manifestations of self control, regulatory stimuli, and risk. Within case analysis was conducted before cross case comparison. A comparative matrix was then used to identify similarities and differences between athlete and non athlete pathways. Source triangulation compared students, parents, teachers, and the physical education teacher, while method triangulation compared interviews, observations, and documents. Metacognitive regulation was introduced after the empirical themes had been established and functioned as a sensitizing interpretive framework rather than a predetermined coding scheme.

Ethical Considerations

The study protected the anonymity and confidentiality of child participants and their families. School and parental permission and the children's willingness to participate were treated as essential safeguards. Identifying details were omitted from the reporting. Because the participants were children, interview and observation procedures were conducted in an age appropriate manner and focused on routine educational experiences rather than sensitive disclosure.

Result (نتائج)

Forms of Parental Attention

The data revealed two distinct typologies of parental attention. In the athlete group, parental attention centered on active facilitation and schedule synchronization. Parents provided physical

and logistical needs, coordinated time between school and club training, and offered emotional support when children experienced fatigue or competitive pressure. Attention was therefore not absent or reduced; rather, it was directed toward enabling participation and maintaining emotional stability within an already structured routine.

In the non athlete group, parental attention appeared primarily as verbal directive supervision and control over free time activities. Parents monitored gadget use, reminded children about school responsibilities, and organized daily discipline in the absence of an external club schedule. This form of attention functioned as the principal structure guiding when children studied, rested, or used digital devices. The difference between groups concerned the function of attention rather than its importance.

Manifestations of Self Control at School

Behavioral observations indicated that student athletes tended to display greater autonomy and more structured self control in class. They maintained academic focus despite physical fatigue and appeared accustomed to delaying immediate comfort in order to meet training and school expectations. The term ‘tended’ is used deliberately because the small qualitative sample does not establish that all athletes possess stronger self control.

Non athlete students showed more variable manifestations of self control and greater dependence on the physical presence or reminders of parents. They were more susceptible to impulsive and digital distraction when external monitoring weakened. This finding does not mean that non athletes lacked self control or metacognition. It indicates that their observable regulation was more closely tied to immediate family and school supervision.

Comparative Pathways of Parental Influence

Table 1 summarizes the empirical comparison. The table retains the dimensions and findings of the original study and does not add a measured metacognitive level.

Dimension	Student athlete pathway	Non athlete student pathway
Activity characteristics	Structured, club regulated, high physical intensity	Flexible, loose, prone to sedentary habits
Primary role of parents	Emotional buffer and facilitator	Primary regulator of daily activities
Self control stimulus	Dual: club discipline and intrinsic motivation	Direct parental and school supervision
Risk or obstacle	Physical fatigue and mental burnout	Impulsive behavior and digital distraction



Discussion (مناقشة)

Parental Attention as External Metacognitive Scaffolding

The findings suggest that parental attention can be understood as external regulatory scaffolding whose form changes with the child’s activity ecology. This interpretation does not convert parental attention into a metacognitive variable. Instead, it explains how everyday parental practices may invite or constrain planning, monitoring, control, and evaluation. When parents coordinate a schedule with the child, discuss possible obstacles, ask the child to check progress, and review consequences, they model a regulatory sequence that can gradually become internal. Geurten and Léonard’s (2023) evidence on parental metacognitive talk supports this mechanism: children benefit when adult communication makes thinking and uncertainty discussable. Gardier et al. (2024) similarly demonstrate that metacognitive language shared in parent–child activity is associated with children’s performance.

The distinction between scaffolding and control is central. A directive reminder can be necessary, but repeated commands without explanation may produce behavior that lasts only while the parent is present. Supportive scaffolding combines boundaries with reasons, prompts, feedback, and an intentional reduction of help as competence develops. The meta analysis by Martínez López et al. (2023) supports the broader importance of social support for self regulated learning, while Eberhart et al. (2025) demonstrate that metacognitive interventions can improve regulatory outcomes in young children. The present findings extend these insights to family attention by proposing that the developmental value of attention depends partly on whether it transfers regulatory responsibility.

This interpretation is consistent with Sumitro et al. (2019), who showed that contingent scaffolding can bring previously absent metacognitive activities into observable problem solving, and with Sumitro et al. (2026), whose PBL scaffolding model explicitly integrates structured problem phases with metacognitive support for slow learners. Transposed cautiously to the present context, parental questions, coach feedback, and gradually reduced assistance may perform functions analogous to explanation, review, restructuring, and transfer of responsibility. The analogy concerns the regulatory function of support; it does not imply that findings from mathematics interventions can be generalized directly to family self control or sport participation.

Metacognitive Interpretation of the Athlete Pathway

For student athletes, organized sport supplied a second regulatory structure alongside the family. Training schedules and performance targets scaffolded planning; coaches' corrections and performance cues scaffolded monitoring; tactical adjustment and emotional management scaffolded control; and post performance feedback scaffolded evaluation. This pattern is consistent with research showing that cognitively engaging physical activity is particularly beneficial when children must make decisions, follow changing rules, inhibit habitual responses, and adapt strategies (Bulten et al., 2022; Mao et al., 2024; Song et al., 2022). Mavilidi et al. (2023) also show that cognitively engaging movement can contribute to children's cognitive outcomes, indicating that the learning value of activity lies in the integration of movement and thought.

The results should not be read as evidence that sport participation automatically creates superior metacognition. The study did not administer a metacognitive instrument, conduct think aloud protocols, or observe private cognitive processes. Moreover, physical intensity without cognitive engagement or reflective feedback may not produce the same regulatory benefits. Price and Collins (2024) emphasize that understanding in youth sport develops through interpretation and adaptation, which reinforces the importance of coaching quality. Thus, the most defensible explanation is that repeated exposure to targets, rules, feedback, and adjustment created opportunities for regulatory practice that were visible in students' classroom behavior.

The altered parental role in the athlete group also has theoretical significance. Because the club already organized part of the child's daily regulation, parents functioned more as facilitators and emotional buffers. They coordinated school and training demands, supplied resources, and helped children recover from pressure. This role may protect the motivational and emotional conditions needed for regulation. Excessive demands, by contrast, could turn structured activity into fatigue or burnout. Parental attention therefore remains necessary, but its optimal form is responsive support rather than duplication of the coach's control.

Metacognitive Interpretation of the Non Athlete Pathway

For non athlete students, family attention constituted the dominant source of external planning and monitoring. Parent created schedules represented planning that had not yet been fully transferred to the child. Monitoring gadget use functioned as external checking; reminders or reprimands represented external control; and discussions of consequences provided opportunities for evaluation. The students' greater dependence on parental presence suggests that regulation was more situationally supported. This interpretation is compatible with Wang et

al. (2025), who show that parental mediation and support are important in children's online self regulated learning.

The finding must not be interpreted as a deficit inherent to non athlete status. Children can develop regulation through music, arts, religious activities, household responsibilities, clubs, project learning, and structured family routines. The relevant contrast is therefore organized regulatory opportunity, not sport versus personal weakness. Rusdiawan et al. (2025) draw attention to sedentary parenting patterns in young families; in the present context, that concern helps explain why unstructured time and device centered routines may reduce occasions for children to practice goal setting, progress checking, and reflective evaluation. Parents and schools can respond by creating consistent but participatory routines that make children co authors of goals and rules.

Comparison of the Two Internalization Pathways

The two pathways can be synthesized as follows. In the athlete group, parental attention, club structure, and coach feedback formed layered external regulation that supported the internalization of self control. In the non athlete group, parental attention and school supervision formed a narrower regulatory system, so observable self control depended more strongly on the availability and consistency of those adults. The difference was not whether parents mattered; it was what parents had to do. Athlete parents mainly facilitated participation and stabilized emotion, while non athlete parents more often initiated schedules, monitored behavior, and interrupted distraction.

This comparison advances a contextual proposition: the function of parental attention in children's self control varies according to the availability of other external regulatory structures. Organized sport may add recurring opportunities to plan, monitor, adjust, and evaluate, while children without such structures rely more strongly on family regulation. The proposition is consistent with the broader evidence that executive and self regulatory benefits of physical activity depend on cognitive engagement (Mao et al., 2024; Wei et al., 2024) and that metacognitive supports can improve children's regulation (Eberhart et al., 2025). It nevertheless remains a proposition requiring direct testing.

Theoretical and Practical Implications

Theoretically, the study connects three literatures that are often treated separately: parental attention, organized sport, and metacognitive regulation. It proposes external regulatory structure as the contextual condition that changes how parental attention operates. Metacognition clarifies the internalization process by identifying four potential mechanisms planning, monitoring, control, and evaluation without claiming that these mechanisms were measured in this dataset. This careful positioning protects construct validity while making the qualitative findings theoretically generative.

Practically, parents of student athletes should coordinate training with academic responsibilities, monitor fatigue and emotional pressure, and invite reflection after both success and failure. Parents of non athletes should establish predictable routines, clear device boundaries, and regular non screen activities while gradually shifting decisions to the child. Useful prompts include: 'What is your goal today?', 'What may interrupt your plan?', 'How will you know you are making progress?', 'Is your strategy working?', and 'What will you change tomorrow?' Teachers and coaches can reinforce the same cycle through goal cards, brief self checks, reflective journals, and post activity discussion.

Limitations and Future Research

The study involved a small number of cases from one school, and the athlete and non athlete student groups were unequal in size. The findings cannot be generalized statistically. Metacognition was not directly measured, so claims about planning, monitoring, control, and

evaluation are interpretive rather than empirical scores. The data also do not isolate sport participation from family background, motivation, coaching quality, or prior self control. Future research should combine interviews and observation with age appropriate metacognitive measures, think aloud tasks, reflective journals, and reports from parents, teachers, and coaches. Longitudinal designs could examine whether external regulation is progressively internalized. Comparative studies should also include children participating in structured non sport activities to test whether the decisive factor is sport itself or the availability of consistent goals, rules, feedback, and reflection.



Conclusion (خاتمة)

Parental attention played an important role in the self control of both student athletes and non athletes at SDN Summersari I Beji, but its function differed according to the structure of children's daily activities. In the athlete group, organized club routines provided an additional regulatory environment, allowing parents to focus on facilitation, schedule coordination, and emotional buffering. In the non athlete group, parents more often acted as the primary organizers and monitors of daily behavior, particularly in relation to free time and digital distraction. From a metacognitive perspective, these patterns can be interpreted as different forms of external scaffolding for planning, monitoring, behavioral adjustment, and evaluation. The interpretation does not establish that athletes have higher metacognition or that sport causes self control. It instead identifies a testable pathway through which family attention and structured activities may help children internalize regulation. Parents, teachers, and coaches should therefore combine clear structure with reflective dialogue and gradually transfer responsibility to the child.

Acknowledgment (شكر وتقدير)

The authors express sincere gratitude to the principal, teachers, students, and parents at SDN Summersari I Beji for their cooperation and participation in this research.



Bibliography (مراجع)

- Bulten, R., Bedard, C., Graham, J. D., & Cairney, J. (2022). Effect of cognitively engaging physical activity on executive functions in children. *Frontiers in Psychology*, 13, 841192. <https://doi.org/10.3389/fpsyg.2022.841192>
- Dörrenbächer Ulrich, L., Dilhuit, S., & Perels, F. (2024). Investigating the relationship between self regulated learning, metacognition, and executive functions by focusing on academic transition phases: A systematic review. *Current Psychology*, 43, 16045–16072. <https://doi.org/10.1007/s12144-023-05551-8>
- Eberhart, J., Ingendahl, F., & Bryce, D. (2025). Are metacognition interventions in young children effective? Evidence from a series of meta analyses. *Metacognition and Learning*, 20, Article 7. <https://doi.org/10.1007/s11409-024-09405-x>
- Gardier, M., Léonard, C., & Geurten, M. (2024). Examining children's memory performance: The role of parents' and children's metacognitive talk during reminiscence and play. *Journal of Cognition and Development*, 25(4), 602–618. <https://doi.org/10.1080/15248372.2024.2351405>
- Geurten, M., & Léonard, C. (2023). Relations between parental metacognitive talk and children's early metacognition and memory. *Journal of Experimental Child Psychology*, 226, 105577. <https://doi.org/10.1016/j.jecp.2022.105577>
- Mao, F., Huang, F., Zhao, S., & Fang, Q. (2024). Effects of cognitively engaging physical activity interventions on executive function in children and adolescents: A systematic review and meta analysis. *Frontiers in Psychology*, 15, 1454447. <https://doi.org/10.3389/fpsyg.2024.1454447>
- Martínez López, Z., Nouws, S., Villar, E., Mayo, M. E., & Tinajero, C. (2023). Perceived social support and self regulated learning: A systematic review and meta analysis. *International Journal of Educational*

- Research Open, 5, 100291. <https://doi.org/10.1016/j.ijedro.2023.100291>
- Masini, A., Ceciliani, A., Dallolio, L., Gori, D., & Marini, S. (2022). Evaluation of feasibility, effectiveness, and sustainability of school based physical activity 'active break' interventions in pre adolescent and adolescent students: A systematic review. *Canadian Journal of Public Health*, 113, 713–725. <https://doi.org/10.17269/s41997-022-00652-6>
- Mavilidi, M. F., Pesce, C., Mazzoli, E., Bennett, S., Paas, F., Okely, A. D., & Howard, S. J. (2023). Effects of cognitively engaging physical activity on preschool children's cognitive outcomes. *Research Quarterly for Exercise and Sport*, 94(3), 839–852. <https://doi.org/10.1080/02701367.2022.2059435>
- Price, A., & Collins, D. (2024). Exploring the development of 'understanding' in high level youth soccer players. *Physical Education and Sport Pedagogy*. Advance online publication. <https://doi.org/10.1080/17408989.2024.2352828>
- Rusdiawan, A., Mardikaningsih, A., Sumitro, N. K., Kurniasari, P., Pamungkas, H., et al. (2025). Sedentary parenting: A growing cause of childhood obesity in young families. *Journal of Public Health*, 47(3), e440–e441.
- Song, W., Feng, L., Wang, J., Ma, F., Chen, J., Qu, S., & Yu, Q. (2022). Play smart, be smart? Effect of cognitively engaging physical activity interventions on executive function among children 4–12 years old: A systematic review and meta analysis. *Brain Sciences*, 12(6), 762. <https://doi.org/10.3390/brainsci12060762>
- Sumitro, N. K., Kartika, E. D., & Mubarakah, L. (2026). Model PBL scaffolding untuk meningkatkan aktivitas metakognisi siswa slow learner. *Social Science Academic*, 4(1), 409–418. <https://doi.org/10.37680/ssa.9862>
- Sumitro, N. K., Sa'dijah, C., Raharjo, S., & Rahardi, R. (2019). The emergence of metacognitive activities through the scaffolding interaction. *International Journal of Recent Technology and Engineering*, 8(1C2), 665–671.
- Vabø, K. B., Aadland, K. N., Howard, S. J., & Aadland, E. (2022). The multivariate physical activity signatures associated with self regulation, executive function, and early academic learning in 3–5 year old children. *Frontiers in Psychology*, 13, 842271. <https://doi.org/10.3389/fpsyg.2022.842271>
- Vazou, S., & Mavilidi, M. F. (2021). Cognitively engaging physical activity for targeting motor, cognitive, social, and emotional skills in the preschool classroom: The Move for Thought preK K program. *Frontiers in Psychology*, 12, 729272. <https://doi.org/10.3389/fpsyg.2021.729272>
- Wang, J., Chen, S. Y., & Bai, B. (2025). Cultivating children's online self regulated learning: The role of parental mediation and support. *Education and Information Technologies*. Advance online publication. <https://doi.org/10.1007/s10639-025-13555-z>
- Wei, Y., Wang, L., Tang, Y., Deng, H., Su, J., & Li, Q. (2024). Enhancing young children's executive function through physical activities: A three level meta analysis. *Mental Health and Physical Activity*, 26, 100592. <https://doi.org/10.1016/j.mhpa.2024.100592>
- Wollesen, B., Janssen, T. I., Müller, H., & Voelcker Rehage, C. (2022). Effects of cognitive motor dual task training on cognitive and physical performance in healthy children and adolescents: A scoping review. *Acta Psychologica*, 224, 103498. <https://doi.org/10.1016/j.actpsy.2022.103498>
- Xu, Y., Qi, K., Białas, M., Xu, Q., Guo, X., & Chen, A. (2025). Time course effects of cognitively engaging physical activity on executive function and self control in younger school aged children: A randomized controlled trial. *Frontiers in Psychology*, 16, 1628814. <https://doi.org/10.3389/fpsyg.2025.1628814>
- Yin, R. K. (2018). *Case study research and applications: Design and methods* (6th ed.). SAGE Publications.