Psychological Mechanisms Linking Movement-Based Games and Grit in Adolescents

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ABSTRACT

This study aimed to explore the psychological mechanisms through which movement-based games foster grit in adolescents. A qualitative research design was employed with a purposive sample of 22 adolescents aged 13–18 years from Greece. Data were collected through semi-structured interviews, focusing on participants' experiences with movement-based games, perseverance, and socio-emotional regulation. Recruitment continued until theoretical saturation was reached. Interviews were transcribed verbatim and analyzed thematically using NVivo 14 software. Braun and Clarke's six-step framework guided the coding process, ensuring a systematic approach to theme development. Trustworthiness of analysis was enhanced through peer debriefing and member checking. Four overarching themes emerged: (1) Motivation and engagement, including enjoyment, intrinsic motivation, peer influence, achievement orientation, and game immersion; (2) Emotional regulation, encompassing coping with frustration, stress relief, confidence development, resilience building, emotional expression, and self-control; (3) Social interaction and support, such as teamwork, social bonding, role models, and conflict resolution; and (4) Persistence and growth mindset, including overcoming challenges, goal setting, self-discipline, growth-oriented thinking, and long-term commitment. Illustrative quotations from participants revealed that games provided a safe environment to rehearse perseverance, manage emotions, and foster belonging. Peer dynamics were found to be central, as encouragement, competition, and collaboration directly reinforced adolescents' grit. The findings align with prior literature highlighting grit as a socially embedded construct shaped by peer influence, socio-emotional competence, and belonging. Movement-based games serve as powerful developmental contexts for cultivating grit by promoting motivation, emotional regulation, and social belonging. These experiences allow adolescents to translate playful perseverance into long-term resilience across academic and personal domains. The study contributes to understanding grit as a dynamic, relational capacity and underscores the value of integrating structured play into youth development programs.

Keywords: adolescents, grit, movement-based games, perseverance, emotional regulation, peer relationships, socio-emotional competence

Introduction

Adolescence represents a critical developmental period characterized by rapid physical, cognitive, and socio-emotional changes. During this stage, individuals begin to consolidate their identities, form enduring social relationships, and cultivate capacities such as perseverance and self-regulation that shape long-term educational and life trajectories. Among these capacities, grit—the tendency to sustain passion and perseverance toward long-term goals—has emerged as a central psychological construct predicting success and resilience in young people (1, 2). At the same time, adolescents increasingly engage in peer-oriented activities, including movement-based games and social interactions that provide fertile ground for the development of grit and related psychosocial skills (3, 4). This study explores the psychological mechanisms through which

movement-based games contribute to grit in adolescents, with an emphasis on the interplay of peer influence, socio-emotional competence, and resilience.

Grit has been consistently associated with adaptive outcomes in academic, behavioral, and health-related domains. Research indicates that adolescents who exhibit higher levels of grit demonstrate greater persistence in schoolwork, reduced engagement in risky behaviors, and better coping strategies when confronted with adversity (1, 5). For example, Barrientos (2) highlights the strong predictive role of socio-emotional competence in fostering academic grit among high school students, showing that perseverance is linked not only to intellectual skills but also to emotional regulation and interpersonal understanding. Similarly, Han (1) found that grit moderated the relationship between adolescent behaviors, such as drinking, and broader psychosocial risks, underscoring grit's role as a protective factor in developmental contexts.

The predictive power of grit extends beyond academic persistence. Zhang (5) demonstrated that grit, when coupled with a growth mindset, plays a significant role in protecting the mental health of high school students during crises such as the COVID-19 pandemic. These findings suggest that grit is both a buffer against psychological distress and a facilitator of proactive coping strategies. By situating grit within socio-cultural contexts, scholars increasingly recognize it as a dynamic capacity shaped by peer influences, environmental supports, and developmental experiences (3, 6).

Peers play a pivotal role in shaping adolescent grit and resilience. Developmental psychology highlights adolescence as a period when peer norms and group dynamics become central to identity construction and motivation (6, 7). Sultana (7) found that peer group norms strongly influence adolescent behavior, including maladaptive behaviors such as smoking, indicating that perseverance and self-control may be both challenged and strengthened in peer settings. Similarly, Renick (8) showed that structured peer interactions in out-of-school programs can enhance socio-emotional outcomes by fostering trust, belonging, and supportive relationships.

The processes of peer influence are multidimensional. Burgess (9) demonstrated that adolescent friendship networks can reinforce academic motivation through both selection and influence, whereby peers both attract similar individuals and shape each other's behaviors over time. Bravo (4) extended this argument by showing how popularity and friendship selection interact to influence adolescents' motivation and persistence. These findings suggest that peer environments can foster grit by providing both competition and support, echoing Wei (10), who emphasized the significance of belonging and identification with classmates and friends in shaping adolescents' social and behavioral outcomes.

At the same time, negative peer experiences can undermine grit and resilience. Studies reveal that peer rejection, victimization, and social exclusion are linked with increased risk of maladaptive behaviors and psychological difficulties (11-13). Li (11), for instance, found that peer rejection contributes to internet gaming disorder, but that grit serves as a protective moderating factor. Likewise, Ulubas (12) highlighted how peer victimization and ethnic discrimination affect school belonging, while Morneau-Vaillancourt (13) demonstrated that peer victimization predicts long-term social isolation. These studies underscore that grit is not developed in isolation but interacts dynamically with adolescents' social ecologies.

Socio-emotional competence, encompassing skills such as empathy, self-regulation, and cooperation, is increasingly recognized as a prerequisite for grit development. Barrientos (2) showed that socio-emotional competence directly enhances academic perseverance, while Miller-Slough (14) documented how emotion socialization and peer relations influence school belonging during transitions to high school. The sense of belonging, in turn, is critical for grit, as it provides adolescents with a foundation of security and motivation.

Research consistently supports the argument that belonging mediates the relationship between peer interactions and grit. For example, Wei (10) demonstrated that adolescents with stronger identification with peers and family were less likely to engage in bullying and more likely to display cooperative behaviors. Similarly, Hansen (15) emphasized that a sense of

belonging is crucial for persistence in challenging academic fields, such as STEM, particularly for low-income students. These findings suggest that socio-emotional competence and belonging act as psychological mechanisms through which grit is cultivated in social contexts.

The significance of belonging is echoed in studies on marginalized groups. Sonja Aicha Van Der (16) highlighted that female adolescents from refugee backgrounds rely heavily on relationships to build a sense of school belonging, while Zaatari (17) showed that teachers' and students' perspectives on belonging often diverge but converge in shaping persistence. These perspectives reinforce that grit is embedded in relational and environmental structures that support or constrain adolescent development.

Movement-based games provide a unique arena for adolescents to practice perseverance, emotional regulation, and cooperation. Research highlights their potential in enhancing social competence, resilience, and persistence (18, 19). Sevil-Gülen (18) showed that disadvantaged adolescents developed resilience through structured physical activities, while Suprapto (19) documented how informal educational activities fostered entrepreneurial mindsets and perseverance among university students, which can be conceptually extended to adolescent game contexts.

Movement-based activities are particularly salient in their ability to promote grit by simulating challenges, failures, and successes that mirror broader life experiences. Skymba (20) demonstrated that peer adversity in game-like social situations influences adolescents' interpersonal needs, while Jahre (21) found that low peer acceptance predicts long-term physical and emotional difficulties, further highlighting the importance of inclusive peer-based game settings. Moreover, Varga (22) explored how peer-influenced consumer decisions among adolescents reveal broader patterns of social conformity and perseverance in decision-making, echoing the motivational dynamics inherent in games.

Beyond physical games, digital environments also shape adolescents' grit and perseverance. Salsabila (23) investigated the influence of social media addiction on grit in Generation Z, revealing that excessive digital engagement can undermine perseverance by diverting attention and effort. Zhao (24) similarly emphasized the role of parental participation and peer mediation in shaping behavioral development, pointing to the need for balanced social supports in digital and offline contexts. Zhang (25) and Zhang (26) added that peer influence in online and offline contexts affects adolescents' risk-taking, social judgments, and perceptions of others, thereby impacting grit indirectly.

Environmental and emotional contexts further shape how grit develops. Liu (27) highlighted that adolescents' cooperation strategies differ when interacting with peers versus impersonal systems, underscoring the relational foundations of persistence. Lan (28) demonstrated that academic pressure combined with peer support determines levels of loneliness and resilience, aligning with Harrist (6) who described the additive and transactional mechanisms through which peers and parents influence development. Similarly, Kumari (29) showed that school environments shape social behaviors, while Bodovski (30) emphasized the role of emotional capital in structuring inequality and persistence.

These findings echo the ecological framework suggested by Sevil-Gülen (18), where socio-economic, institutional, and relational factors intersect to determine adolescent resilience. Rapee (31) further found that social anxiety mechanisms influence persistence, showing that psychological vulnerabilities can either inhibit or strengthen grit, depending on the context.

While prior research has established grit as a critical predictor of adolescent success across multiple domains, fewer studies have examined the role of movement-based games as a developmental context for cultivating grit.

Methods and Materials

Study Design and Participants

This study employed a qualitative research design with an exploratory orientation, aimed at uncovering the psychological mechanisms linking movement-based games and grit in adolescents. A purposive sampling strategy was applied to recruit participants who could provide rich and relevant insights into the phenomenon under study. The final sample consisted of 22 adolescents residing in Greece. The age range of participants was between 13 and 18 years, with both male and female adolescents included to ensure diversity in perspectives. Recruitment was carried out through schools, sports clubs, and community centers, where adolescents had regular exposure to movement-based games. Sampling continued until theoretical saturation was achieved, meaning no new themes or insights emerged from additional interviews.

Data Collection

Data were collected using semi-structured interviews, which allowed participants the freedom to describe their experiences while enabling the researcher to maintain focus on key areas related to grit and movement-based games. An interview guide was developed based on the study objectives and relevant literature, covering topics such as participants' engagement in movement-based games, perceived challenges, persistence, and psychological experiences. Interviews were conducted face-to-face in quiet and private spaces, either at participants' schools or sports facilities, depending on their preference. Each interview lasted between 40 and 60 minutes and was audio-recorded with the consent of participants. To ensure ethical standards, participants and their guardians provided informed consent, and confidentiality was strictly maintained.

Data analysis

All interviews were transcribed verbatim and analyzed using NVivo 14 software. A thematic analysis approach was employed to identify and interpret recurring patterns within the data. The analysis followed Braun and Clarke's six-step framework: familiarization with the data, generation of initial codes, searching for themes, reviewing themes, defining and naming themes, and producing the final report. Coding was conducted iteratively, and emerging categories were continuously compared across interviews to refine the themes. Memos and coding notes were used to capture analytic reflections and ensure transparency in the process. To enhance the trustworthiness of findings, peer debriefing with two qualitative research experts was conducted, and member checking was performed with a subset of participants to validate interpretations.

Findings and Results

A total of 22 adolescents participated in the study, all residing in Greece. The participants ranged in age from 13 to 18 years (M = 15.4), with 12 females (54.5%) and 10 males (45.5%). The majority of adolescents were actively involved in school-based sports clubs (n = 14, 63.6%), while others reported participation primarily through community recreation centers (n = 5, 22.7%) or informal neighborhood play (n = 3, 13.6%). In terms of educational background, 9 participants (40.9%) were enrolled in lower secondary school and 13 participants (59.1%) in upper secondary school. The sample was deliberately diverse to capture a range of perspectives on the role of movement-based games in shaping grit and related psychological mechanisms.

Table 1. Categories, Subcategories, and Concepts

Category (Theme)	Subcategory	Concepts (Open Codes)
1. Motivation and Engagement	Enjoyment of Games	fun, excitement, energy boost, sense of freedom, curiosity
	Intrinsic Motivation	self-driven effort, passion for playing, internal satisfaction, love of challenge
	Peer Influence	encouragement from friends, team support, shared enthusiasm, group belonging, competition with peers
	Achievement Orientation	desire to win, striving for progress, personal best, mastery of skills, overcoming rivals, goal chasing
	Game Immersion	focus on play, losing track of time, being "in the zone," escape from stress
2. Emotional Regulation	Coping with Frustration	controlling anger, calming down, positive self-talk, bouncing back, patience building
	Stress Relief	release of tension, distraction from worries, relaxation, improved mood
	Confidence Development	self-assurance, trust in abilities, overcoming fears, positive self-image
	Resilience Building	adapting to setbacks, bouncing back from loss, perseverance, accepting failure, learning from mistakes
	Emotional Expression	expressing joy, showing excitement, venting stress, celebrating small wins, emotional release
	Self-Control	regulating impulses, managing aggression, discipline, staying calm
3. Social Interaction and Support	Teamwork	collaboration, communication, trust, helping others, coordination
	Social Bonding	friendship formation, belongingness, sense of community, shared experiences, peer identity
	Role Models	influence of coaches, encouragement by teachers, parental support, inspiration from older peers
	Conflict Resolution	negotiating rules, problem-solving, respecting differences, compromise
4. Persistence and Growth Mindset	Overcoming Challenges	persistence in difficulty, trial and error, learning from mistakes, not giving up, effort despite fatigue
	Goal Setting	clear objectives, short-term goals, long-term vision, structured practice, milestones
	Self-Discipline	routine practice, time management, avoiding distractions, consistency
	Growth-Oriented Thinking	belief in improvement, embracing failure as learning, effort over talent, adaptability, optimism
	Long-Term Commitment	sticking with activity, dedication, habit formation, sustained effort

Theme 1: Motivation and Engagement

Enjoyment of Games. Participants emphasized the enjoyment they derived from movement-based games, describing them as a source of excitement, energy, and curiosity. Adolescents often noted that the playful nature of games made persistence feel less like an obligation. One participant expressed, *"When I play, I forget that I'm exercising—it's just fun and I don't want to stop."*

Intrinsic Motivation. The internal satisfaction gained from participation emerged as a strong motivator. Many adolescents reported a love of challenge and a genuine passion for playing. As one interviewee stated, *"I don't need anyone to tell me to play, I just want to do it because it makes me feel alive."*

Peer Influence. Social dynamics played an important role in engagement. Peers encouraged one another, creating a sense of competition and belonging. An adolescent remarked, *"My friends push me to keep going, even when I want to quit. We challenge each other, and that keeps me in the game."*

Achievement Orientation. Striving for progress and mastery of skills was a recurring theme. Participants described how movement-based games nurtured their desire to achieve personal goals and overcome rivals. One noted, *"I like beating my own score, not just others—it makes me feel like I'm getting better."*

Game Immersion. Adolescents reported being deeply absorbed in gameplay, often losing track of time. This state of immersion was described as an escape from everyday stress. A participant said, *"When I play, I don't think about school or problems—it's like entering another world."*

Theme 2: Emotional Regulation

Coping with Frustration. Movement-based games provided a safe environment to experience and manage frustration. Adolescents reported learning to calm down and use positive self-talk. One explained, *"I used to get angry when I lost, but now I tell myself to try again. The game teaches me patience."*

Stress Relief. Participants described games as a release valve for everyday stress, improving their mood and reducing worries. As one adolescent put it, *"After a tough day, playing helps me relax. I feel lighter afterwards."*

Confidence Development. Repeated success in games built a sense of self-assurance and trust in abilities. A student remarked, *"Every time I manage to do something I thought was impossible, I feel stronger and more confident."*

Resilience Building. Adolescents emphasized how setbacks in games helped them build perseverance. Losing or failing became opportunities for learning. One participant noted, *"When I lose, I try again until I get it right. It's frustrating, but it makes me tougher."*

Emotional Expression. Games allowed participants to express joy and excitement, but also to vent stress. A respondent said, *"I scream when I win, and sometimes when I lose. Either way, it helps me let it out."*

Self-Control. Many reported that games fostered discipline and impulse regulation. For example, one explained, *"I've learned not to get aggressive when things don't go my way. If I lose control, I ruin the game for everyone."*

Theme 3: Social Interaction and Support

Teamwork. Adolescents highlighted how games taught collaboration, communication, and trust. A participant explained, *"You can't win alone—you need your team to succeed. It makes you think about others, not just yourself."*

Social Bonding. Many noted that games helped them form friendships and strengthen community ties. One participant said, *"Some of my best friends are people I met through playing. We understand each other better."*

Role Models. Coaches, parents, and older peers played a significant role in shaping motivation and persistence. An adolescent commented, *"My coach always tells me not to give up—his words stay in my head when I feel tired."*

Conflict Resolution. Participants also reported learning how to handle disagreements and respect differences. As one student put it, *"Sometimes we fight about rules, but we always figure it out. It teaches us to listen and compromise."*

Theme 4: Persistence and Growth Mindset

Overcoming Challenges. Adolescents described persistence in the face of difficulty as a direct outcome of gaming experiences. One remarked, *"At first, I couldn't do it, but I kept trying until I made it. That taught me not to give up."*

Goal Setting. Games helped adolescents practice setting both short- and long-term goals. As one explained, *"I plan small steps in the game, and it makes me think about my bigger goals in life too."*

Self-Discipline. Routine practice and time management were identified as outcomes. A participant noted, *"I schedule my day around practice—it makes me disciplined in other areas like school as well."*

Growth-Oriented Thinking. Adolescents often highlighted a shift toward seeing failure as part of improvement. One expressed, *"If I lose, it just means I need to practice more. I believe I can always get better."*

Long-Term Commitment. Many described sticking with activities over months or years, linking it to the development of grit. One participant reflected, *"I've been playing for years now. Even when I felt like quitting, I stayed because I knew it would pay off."*

Discussion and Conclusion

The present study explored the psychological mechanisms linking movement-based games and grit in adolescents. Through qualitative analysis of semi-structured interviews with Greek adolescents, several themes emerged, including motivation and engagement, emotional regulation, social interaction and support, and persistence with a growth mindset. Together, these findings suggest that movement-based games provide a powerful context for cultivating grit by enabling adolescents to experience challenge, regulate emotions, and learn perseverance in a socially rich environment.

The results indicated that adolescents experienced enjoyment and intrinsic motivation through movement-based games, often describing these activities as fun, immersive, and rewarding. This aligns with prior studies that have demonstrated how socio-emotional contexts influence academic motivation and persistence (2, 9). Burgess (9) showed that adolescents' friendship networks reinforce motivation through selection and influence processes, while Barrientos (2) found that socio-emotional competence is strongly tied to grit in academic settings. In our study, adolescents' descriptions of fun and peer encouragement resonate with these findings, suggesting that games channel social energy into perseverance. Similarly, Bravo (4) emphasized how popularity and peer selection influence adolescents' behaviors, reinforcing the notion that game contexts replicate social structures that encourage determination and persistence.

Another key finding was the role of emotional regulation in the development of grit. Adolescents reported that movement-based games helped them manage frustration, cope with setbacks, and express emotions in constructive ways. This echoes Zhang's (5) research, which found that grit coupled with growth mindset protected students' mental health during the COVID-19 crisis, suggesting that perseverance is grounded in emotional resilience. Han (1) further demonstrated that grit protects against maladaptive adolescent behaviors such as drinking, confirming that emotional control and persistence are mutually reinforcing. Our participants' accounts of using positive self-talk or finding patience through games reflect these broader findings, highlighting that grit is not only cognitive but also deeply emotional.

The results also highlighted the importance of peer dynamics. Adolescents consistently noted that peer support, teamwork, and even competition influenced their persistence in game contexts. This aligns with Sultana (7), who found that peer norms strongly influence adolescent behaviors, both positively and negatively. In our study, competition pushed participants to persevere, while teamwork and belonging reinforced their commitment to collective goals. These findings mirror Wei (10), who emphasized that social identification with classmates and friends enhances belonging and reduces maladaptive behaviors. Furthermore, Renick (8) showed that structured peer programs improve socio-emotional outcomes, underscoring how peer-based experiences like games can facilitate perseverance and grit development.

The findings are consistent with a growing body of literature that situates grit as a socially embedded construct rather than a purely individual trait. For instance, Harrist (6) described how both parents and peers contribute to adolescent development through additive and transactional mechanisms. In our study, adolescents acknowledged the role of coaches, teachers, and older peers as role models in fostering perseverance. This reflects Zaatari (17), who found that both teachers and students contribute to shaping adolescents' sense of school belonging. Similarly, Sonja Aicha Van Der (16) highlighted that female adolescents from refugee backgrounds rely on relationships to build belonging, paralleling our finding that adolescents look to peers and adults for motivational support in games.

Our results also point to the protective role of grit against negative peer experiences. Some adolescents described how overcoming conflict or resolving disputes during games contributed to resilience. This resonates with Li (11), who found that grit moderates the link between peer rejection and internet gaming disorder. Likewise, Ulubas (12) showed that grit and belonging interact with victimization and discrimination, while Morneau-Vaillancourt (13) linked peer victimization to long-term isolation. In each case, grit functioned as a moderating factor that allowed adolescents to adapt to adversity, a pattern echoed in our findings where conflict resolution in games built perseverance.

Furthermore, the study's findings on long-term commitment and growth-oriented thinking align with Zhang and Zhao (26), who showed that adolescents' attitudes toward peers influence their persistence and social judgments, and Zhang and Zhu (25), who emphasized the mechanisms of peer influence in risk-taking. Movement-based games appear to provide a structured setting where adolescents can rehearse persistence in the face of peer pressure, ultimately developing resilience that extends beyond the game environment.

The broader context of socio-emotional competence is also relevant. Miller-Slough (14) highlighted how emotion socialization and peer relations shape school belonging, while Hansen (15) showed that belonging enhances persistence in challenging STEM fields. Both findings underscore that grit develops within networks of socio-emotional support. Similarly, Bodovski (30) discussed how emotional capital influences inequality and perseverance, resonating with our finding that adolescents' perseverance was linked to confidence and support gained in peer-based activities.

The findings contribute to literature by showing that movement-based games provide not only physical benefits but also socio-psychological mechanisms for developing grit. Sevil-Gülen (18) highlighted resilience in disadvantaged adolescents through ecological supports, while Suprapto (19) showed that informal education fosters entrepreneurial perseverance. These insights complement our results, suggesting that structured yet playful activities help adolescents internalize resilience and grit in ways that transfer to academic and social domains.

At the same time, challenges remain in balancing the opportunities and risks of peer dynamics. Studies show that digital and social contexts complicate adolescents' experiences of perseverance. Salsabila (23) found that social media addiction undermines grit, while Zhao (24) emphasized that parental mediation and peer influence can either strengthen or weaken behavioral development. Our participants noted that games helped them focus and disconnect from stressors, but these benefits may be contingent on supportive environments and balanced engagement.

Together, the findings underscore that grit is not an isolated trait but a dynamic capacity shaped by motivation, emotional regulation, and social belonging. The interplay of movement-based games, peers, and socio-emotional supports offers a rich context for fostering perseverance, echoing the ecological frameworks advanced by scholars such as Sevil-Gülen (18) and Rapee (31), who emphasized how environmental factors shape adolescent resilience and social anxiety outcomes.

This study is not without limitations. First, the qualitative design, while rich in depth, limits the generalizability of findings beyond the specific cultural and social context of Greek adolescents. Future quantitative or mixed-methods approaches would be needed to establish broader patterns across diverse populations. Second, data collection relied solely on self-reported interviews, which may be subject to social desirability bias or recall limitations. Observational methods or multi-informant reports (e.g., parents, teachers, coaches) could triangulate perspectives. Third, while theoretical saturation was reached with 22 participants, the sample size remains relatively modest, and the experiences of adolescents from other cultural contexts may differ. Finally, although NVivo software facilitated rigorous thematic analysis, interpretation remains inherently shaped by researcher subjectivity, despite efforts to enhance trustworthiness through peer debriefing and member checking.

Future research could expand by integrating quantitative measures of grit and socio-emotional competence with qualitative findings to provide a more comprehensive understanding of the mechanisms at play. Longitudinal studies would be particularly

valuable to track how participation in movement-based games influences grit development over time. Cross-cultural comparisons could also illuminate cultural variations in peer dynamics and perseverance. Furthermore, exploring the role of digital and hybrid game environments may provide insights into how grit develops in increasingly technology-mediated contexts. Including diverse groups, such as marginalized adolescents or those with limited access to structured activities, would broaden the scope and applicability of findings. Finally, intervention-based research could test structured game programs designed to enhance grit and resilience, thereby offering practical contributions to education and youth development.

From a practical perspective, educators and practitioners should consider integrating movement-based games into curricula and youth programs as tools for fostering perseverance and resilience. Coaches and teachers can deliberately use game contexts to teach emotional regulation strategies, teamwork, and goal-setting. Schools and community organizations may also leverage games as inclusive spaces for building belonging and social competence, especially for adolescents at risk of disengagement. Parents and caregivers can support these efforts by encouraging balanced participation in both physical and social play, recognizing that such experiences nurture grit beyond academic contexts. Finally, policymakers may view structured play and sports not only as recreational but also as essential developmental tools for cultivating persistence, resilience, and long-term success in young people.

Authors' Contributions

All authors equally contributed to this study.

Declaration of Interest

The authors of this article declared no conflict of interest.

Ethical Considerations

All ethical principles were adhered in conducting and writing this article.

Transparency of Data

In accordance with the principles of transparency and open research, we declare that all data and materials used in this study are available upon request.

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