

Celmar, C. J., Magallanes, C. y Bagayas, J. C. (2026). Perfiles psicológicos en pickleball: habilidades mentales y salud mental positiva en jugadores adolescentes y de mediana edad. *Cuadernos de Psicología del Deporte*, 26(3), 16-29

Perfiles psicológicos en pickleball: habilidades mentales y salud mental positiva en jugadores adolescentes y de mediana edad

Psychological Profiles in Pickleball: Mental Skills and Positive Mental Health in Adolescent and Middle-Adulthood Players

Perfis Psicológicos no Pickleball: Competências Mentais e Saúde Mental Positiva em Jogadores Adolescentes e de Meia-Idade

Celmar, Christian Jose¹, Magallanes, Charyl¹, Bagayas, Jay Carlo¹

¹*Mindanao State University – General Santos, General Santos City, Philippines*

RESUMEN

El pickleball se ha expandido rápidamente entre distintos grupos de edad, pero sus dimensiones psicológicas siguen siendo poco estudiadas. Este estudio comparó las habilidades mentales percibidas y la salud mental positiva entre jugadores de pickleball adolescentes y de mediana edad, y examinó si ambos constructos estaban relacionados dentro de cada grupo de edad. Se empleó un diseño descriptivo-comparativo de corte transversal con 102 jugadores recreativos (46 adolescentes; 56 adultos de mediana edad) reclutados en clubes de General Santos (Filipinas). Los datos se recogieron con el Unified Mental Skills Assessment Tool (UMSAT-6) y un instrumento de salud mental positiva, y se analizaron mediante estadística descriptiva, pruebas t para muestras independientes y correlaciones de Pearson, y tamaños del efecto. Ambos grupos mostraron niveles altos a muy altos de habilidades mentales percibidas y niveles uniformemente altos de salud mental positiva. Se hallaron diferencias significativas a favor de los jugadores de mediana edad en habilidades mentales percibidas, $t(100) = -2,613$, $p = ,010$, $d = 0,52$, IC 95% [0,12; 0,92], y en salud mental positiva, $t(100) = -3,239$, $p = ,002$, $d = 0,64$, IC 95% [0,24; 1,04]. Sin embargo, ambos constructos no se relacionaron significativamente ni en adolescentes, $r(44) = -,014$, $p = ,927$, IC 95% [-,303; ,277], ni en adultos de mediana edad, $r(54) = -,042$, $p = ,760$, IC 95% [-,302; ,223], lo que indica que funcionaron como dimensiones relativamente independientes en esta muestra recreativa. Estos hallazgos sugieren que, aunque la participación en pickleball se asocia con perfiles psicológicos favorables a lo largo de la vida, el desarrollo de habilidades mentales y la promoción del bienestar pueden requerir estrategias diferenciadas y adaptadas al desarrollo.

Palabras clave: adolescentes, adultez media, bienestar, regulación emocional, deportes de raqueta.

ABSTRACT

Pickleball has rapidly expanded across age groups, yet its psychological dimensions remain underexamined. This study compared perceived mental skills and positive mental health between adolescent and middle-adulthood pickleball players and tested whether the two constructs were related within each age group. A cross-sectional descriptive-comparative design was employed with 102 recreational players (46 adolescents; 56 middle adults) recruited from clubs in General Santos City, Philippines. Data were collected with the Unified Mental Skills Assessment Tool (UMSAT-6) and a positive mental health instrument and analyzed using descriptive statistics,

independent-samples t-tests, and Pearson correlations, and effect sizes. Both groups showed high to very high perceived mental skills and uniformly high positive mental health. Significant differences favoring middle-adulthood players emerged for perceived mental skills, $t(100) = -2.613$, $p = .010$, $d = 0.52$, 95% CI [0.12, 0.92], and in positive mental health, $t(100) = -3.239$, $p = .002$, $d = 0.64$, 95% CI [0.24, 1.04]. However, the two constructs were not significantly related among adolescents, $r(44) = -.014$, $p = .927$, 95% CI [-.303, .277], or middle-adulthood players, $r(54) = -.042$, $p = .760$, 95% CI [-.302, .223], indicating that they operated as relatively independent dimensions in this recreational sample. These findings suggest that, although pickleball participation is associated with favorable psychological profiles across the lifespan, mental skills development and well-being promotion may require distinct, developmentally informed strategies.

Keywords: adolescents, middle adulthood, well-being, emotional regulation, racket sports.

RESUMO

O pickleball tem-se expandido rapidamente entre diferentes faixas etárias, mas as suas dimensões psicológicas permanecem pouco exploradas. Este estudo comparou as competências mentais percebidas e a saúde mental positiva entre jogadores de pickleball adolescentes e de meia-idade, bem como investigou se esses dois construtos estavam relacionados dentro de cada grupo etário. Foi utilizado um delineamento transversal descritivo-comparativo com 102 jogadores recreativos (46 adolescentes e 56 adultos de meia-idade) recrutados em clubes da cidade de General Santos, Filipinas. Os dados foram recolhidos através do Unified Mental Skills Assessment Tool (UMSAT-6) e de um instrumento de avaliação da saúde mental positiva, sendo posteriormente analisados por meio de estatísticas descritivas, testes t para amostras independentes, correlações de Pearson e medidas de tamanho do efeito. Ambos os grupos apresentaram níveis elevados a muito elevados de competências mentais percebidas e níveis uniformemente elevados de saúde mental positiva. Foram observadas diferenças significativas a favor dos jogadores de meia-idade nas competências mentais percebidas, $t(100) = -2,613$, $p = 0,010$, $d = 0,52$, IC 95% [0,12; 0,92], bem como na saúde mental positiva, $t(100) = -3,239$, $p = 0,002$, $d = 0,64$, IC 95% [0,24; 1,04]. No entanto, os dois construtos não apresentaram relação significativa entre os adolescentes, $r(44) = -0,014$, $p = 0,927$, IC 95% [-0,303; 0,277], nem entre os jogadores de meia-idade, $r(54) = -0,042$, $p = 0,760$, IC 95% [-0,302; 0,223], indicando que funcionaram como dimensões relativamente independentes nesta amostra recreativa. Estes resultados sugerem que, embora a participação no pickleball esteja associada a perfis psicológicos favoráveis ao longo da vida, o desenvolvimento das competências mentais e a promoção do bem-estar poderão exigir estratégias distintas e adaptadas às características de cada fase do desenvolvimento.

Palavras-chave: adolescentes, meia-idade, bem-estar, regulação emocional, desportos de raquete.

INTRODUCTION

Participation in racket and paddle sports has gained substantial global attention due to their accessibility, health benefits, and social appeal. Among these, pickleball has emerged as one of the fastest-growing sports across diverse age groups, attracting both younger and older participants (Buzzelli & Draper, 2020; Vitale & Liu, 2020). Its rapid global expansion and inclusive nature have positioned it as a relevant context for examining multidimensional aspects of sport participation. Its unique combination of physical demands, strategic play, and social interaction positions pickleball as an ideal context for examining not only physical performance but also psychological attributes associated with sport engagement (Stroesser et al., 2024; Huang et al., 2026).

Within the field of sport and exercise psychology, mental skills are recognized as critical components associated with sport performance and functioning (Ayranci & Aydin, 2025; Bagayas et al., 2025). These include psychological competencies such as goal setting, emotional regulation, concentration, self-confidence, and imagery, which are commonly examined in relation to how athletes manage sport-related demands (Lange-Smith et al., 2023; Reinebo et al., 2023). Profiling these competencies within specific sports has proven informative for both

Psychological profiles in pickleball across two age groups

theory and practice, as shown in recent profile-based studies of figure skaters (López et al., 2026), master open-water swimmers (Pérez-García, 2025), and emerging-sport players (Reyes-Bossio & Vásquez-Cruz, 2024). Alongside these skills, positive mental health, characterized by emotional well-being, life satisfaction, and effective psychological functioning, has become an increasingly important construct in understanding holistic athlete development (Reyes-Bossio et al., 2022; Ayranci & Aydin, 2025); recent work using eudaimonic frameworks has further underlined that athlete well-being is not reducible to the absence of distress (Monteiro-Araujo et al., 2025; Rodríguez et al., 2026). Contemporary perspectives in sports science highlight athletic participation alongside physical capacity, psychological resilience, and overall well-being (Veliz-Salinas et al., 2026). Developmental stage is a key factor influencing both mental skills and mental health. Adolescence represents a critical period marked by rapid psychological, emotional, and social changes, often accompanied by heightened vulnerability to stress and fluctuations in well-being (Favini et al., 2025; Herd et al., 2020); adolescent sport participation is itself increasingly framed as a lever for broader psychosocial and educational outcomes (Esen & Senturk, 2026; Zarazaga-Peláez et al., 2024). In contrast, individuals in middle adulthood typically exhibit greater emotional stability, accumulated life experience, and more refined coping-related tendencies (Kurth et al., 2024). These distinctions suggest potential variation in psychological characteristics across age groups within sport contexts, influencing how athletes perceive and utilize mental skills, as well as how they experience mental health outcomes.

Despite the growing popularity of pickleball, research examining its psychological dimensions remains limited, particularly in relation to age-related differences (Cerezuela et al., 2023). Most existing studies in sport psychology have focused on traditional sports contexts or elite athlete populations, with comparatively less attention given to recreational and emerging sports such as pickleball (Lauxtermann & Stubbs, 2025; Prior et al., 2022). Current evidence suggests that pickleball research remains in its early stages, with limited representation in major academic databases and a concentration on injury, participation, and older adult populations (Stroesser et al., 2024). Moreover, limited empirical work has explored the intersection of perceived mental skills and positive mental health across different developmental stages within the same sporting context. The present study makes three specific contributions. First, it provides the first empirical profile of perceived mental skills and positive mental health in pickleball players, a sport whose psychological literature to date is dominated by injury and participation research rather than psychological functioning (Stroesser et al., 2024). Second, by sampling adolescents and middle-adulthood players from the same clubs and administering the same instruments, it isolates age-group differences within a single sporting context, whereas most lifespan comparisons in sport psychology confound age with sport, competitive level, or setting. Third, and most consequentially for theory, it supplies a direct empirical test of whether performance-oriented mental skills and mental health behave as one dimension or two in a recreational population, a question that dual-continua models raise (Keyes, 2002, 2005; Lundqvist, 2011) but that is rarely tested outside clinical or elite samples. Establishing this distinction has practical consequences: if the constructs are independent, screening for one cannot substitute for screening for the other. Accordingly, this study compares perceived mental skills and positive mental health between adolescent and middle-adulthood pickleball players and tests their association within each age group.

MATERIAL AND METHODS

Research design

A descriptive-comparative research design was employed to examine differences and associations between perceived mental skills and positive mental health among adolescent and middle-adulthood pickleball players. This design is appropriate for identifying patterns of variation across groups while exploring relationships among variables within a natural setting is consistent with the classification of nonexperimental comparative studies (Ato et al., 2013). Quantitative data were collected using two standardized instruments: the Positive Mental Health Instrument and the Unified Mental Skills Assessment Tool (UMSAT-6), both of which were adopted for use in the present study (Vaingankar et al., 2011; Huyghe, 2022). This approach enabled a systematic assessment of psychological constructs across developmental stages.

Participants

A total of 102 pickleball players participated in this study, consisting of 46 adolescents and 56 individuals in middle adulthood, recruited from various pickleball clubs in General Santos City, Philippines. Inclusion criteria were: (a) active membership in a registered pickleball club in General Santos City; (b) regular participation in pickleball during the period of data collection; (c) falling within one of the two target developmental bands (adolescence and middle adulthood); and (d) provision of informed consent, together with parental or guardian consent for participants under 18 years of age. Exclusion criteria were: (a) competitive registration at national or international level, so as to retain a recreational sample; (b) any self-reported injury or medical condition preventing play at the time of data collection; and (c) incomplete questionnaire responses. The sample was drawn from a target population of 135 players, with the required sample size determined using the Raosoft sample size calculator to ensure adequate representation based on an appropriate confidence level and margin of error (Raosoft, Inc., 2004). Specifying a 95% confidence level, a 5% margin of error and a 50% response distribution for a population of 135 returns a minimum required sample of 101 participants; the 102 participants obtained therefore satisfy this requirement. Participants were selected through simple random sampling, whereby each individual in the population had an equal probability of inclusion, thereby minimizing selection bias. This sampling strategy facilitated the inclusion of a representative cross-section of participants across developmental stages, enabling meaningful comparisons of perceived mental skills and positive mental health within a recreational sport context.

Instruments

The Positive Mental Health Instrument (PMHI) assessed players' positive mental health across the dimensions of general coping, emotional support, spirituality, and interpersonal skills, with items rated on a five-point Likert scale. The instrument was developed and validated in a multi-ethnic Asian population and has demonstrated sound psychometric properties, including high internal consistency across its subscales, with Cronbach's alpha coefficients ranging from .89 to .94 in the original validation study (Vaingankar et al., 2011). The Unified Mental Skills Assessment Tool (UMSAT-6) is a self-report questionnaire developed by the Institut Neurosport that measures six core mental skills, namely concentration, imagery, goal setting, activation, competitive anxiety management, and recovery (Huyghe, 2022). The reliability of both instruments was examined using data from the present sample. The UMSAT-6 composite yielded an acceptable Cronbach's alpha of .74, while the positive mental health composite yielded a moderate alpha of .63. The lower coefficient is largely attributable to the restricted variance produced by the uniformly high, negatively skewed responses observed in this recreational sample, a measurement condition known to attenuate internal-consistency estimates.

To strengthen the psychometric evidence beyond Cronbach's alpha, McDonald's omega and stratified alpha were computed considering that alpha assumes tau-equivalence and unidimensionality, assumptions that may not hold for composites derived from heterogeneous subscales, and which have led recent validation studies to report several reliability coefficients in parallel (McDonald, 1999; Diaz-Milanes et al., 2024; Tannoubi et al., 2023). Results showed comparable reliability estimates across indices (UMSAT-6: $\omega = .74$, stratified $\alpha = .76$; PMHI: $\omega = .60$, stratified $\alpha = .66$), with 95% confidence intervals for alpha of [.66, .81] and [.51, .72], respectively, indicating that the reliability findings were not dependent on a single measurement model. Furthermore, the explanation for the relatively low PMHI alpha ($\alpha = .63$) was empirically supported by pronounced ceiling effects, as 63.5% of UMSAT-6 responses and 52.0% of PMHI responses were at the maximum score, while 91.2% and 83.2%, respectively, were rated 4 or higher. This restricted variance reduced item variability and produced negatively skewed distributions, suggesting that the moderate PMHI reliability coefficient is attributable to range restriction rather than poor scale functioning. Collectively, the convergence of reliability estimates and evidence of ceiling effects strengthens the psychometric justification for using the composite scores in subsequent inferential analyses.

Procedure

Data was collected over a six-week period during the regular club season. Questionnaires were administered on site at the participating pickleball clubs, immediately before or after regular scheduled play sessions, in a quiet area

Psychological profiles in pickleball across two age groups

away from the courts. Administration was conducted by the research team, who remained present throughout to clarify procedural questions without influencing responses. Both instruments were completed in a single session lasting approximately 15–20 minutes, and participants completed the questionnaires individually. This study complied with standard ethical guidelines in human research, conducted in accordance with the ethical principles for medical research involving human subjects set out in the Declaration of Helsinki (World Medical Association, 2013; Bošnjak, 2001; Tyebkhan, 2003), and complied with the ethical standards for sport and exercise science research specified by Harriss, MacSween and Atkinson (2019). Prior to implementation, ethical clearance and protocol approval were obtained from the Institutional Ethics Review Committee (Approval No. 352-2024; Mindanao State University – General Santos). Written informed consent was obtained from all participants before data collection. Informed consent was obtained through an in-person process conducted by the research team to ensure that participants fully understood the study's purpose, procedures, voluntary nature, time requirements, data management practices, and the absence of foreseeable risks or direct benefits. Participants were informed of their rights to refuse participation, withdraw at any stage without penalty, and request data deletion after submission. For participants younger than 18 years, written assent and parental or guardian consent were secured. To protect confidentiality, signed consent forms were collected and stored separately from the survey responses. Confidentiality and anonymity were maintained throughout the study by using coded identifiers rather than player names, and all data were stored securely and exclusively for research purposes. Personal data were processed in compliance with Organic Law 3/2018 of 5 December on the Protection of Personal Data and the guarantee of digital rights (Ley Orgánica 3/2018). As the study relied entirely on self-administered questionnaires completed with explicit individual consent and involved no observation or recording of behavior in public spaces, provisions governing unobtrusive observation in public settings were not applicable to this protocol.

Statistical analysis

Prior to the main analyses, the assumptions underlying the planned parametric procedures were evaluated. Normality was assessed for each variable within each age group using the Shapiro–Wilk test, supplemented by the examination of skewness and kurtosis coefficients and their standard errors. Descriptive statistics (means and standard deviations) were then computed to determine the levels of perceived mental skills and positive mental health for each age group. Independent-samples *t*-tests were used to examine differences between teenage and middle-adulthood players on the two composite variables, with the assumption of homogeneity of variances evaluated prior to interpretation. Pearson product–moment correlation coefficients were calculated separately for each age group to determine whether perceived mental skills were significantly related to positive mental health. Because the normality assessment indicated departures from normality in the adolescent group, non-parametric counterparts, the Mann–Whitney *U* test for between-group comparisons and Spearman's rho for associations were also computed and reported alongside the corresponding parametric analyses to evaluate the robustness of the findings. Effect sizes were calculated for all comparisons, including Cohen's *d* with 95% confidence intervals and Hedges' *g* (bias-corrected) for group differences, the rank-biserial correlation for the Mann–Whitney tests, and 95% confidence intervals for the Pearson correlations. All statistical analyses were two-tailed and evaluated at the .05 level of significance.

RESULTS

Prior to interpreting the parametric analyses, the distributional assumptions underlying them were examined. Table 1 reports the skewness and kurtosis coefficients with their standard errors, together with the Shapiro-Wilk test, for both composite variables in each age group.

Table 1

Skewness, kurtosis and Shapiro-Wilk tests of normality by age group

Variable	Group	n	Skewness (SE)	Kurtosis (SE)	W	p
Perceived mental skills	Teenagers	46	-1.382 (0.350)	2.248 (0.688)	.873	<.001
Perceived mental skills	Middle adulthood	56	-0.300 (0.319)	-0.218 (0.628)	.969	.158
Positive mental health	Teenagers	46	0.886 (0.350)	3.023 (0.688)	.927	.007
Positive mental health	Middle adulthood	56	-0.399 (0.319)	-0.052 (0.628)	.980	.470

Normality was rejected in the teenage group for both perceived mental skills, $W(46) = .873$, $p < .001$, and positive mental health, $W(46) = .927$, $p = .007$, whereas the middle-adulthood distributions did not depart significantly from normality ($W = .969$, $p = .158$ and $W = .980$, $p = .470$, respectively). The teenage distributions were negatively skewed and leptokurtic for perceived mental skills (standardized skewness = -3.95 ; standardized kurtosis = 3.27) and positively skewed with marked excess kurtosis for positive mental health (standardized kurtosis = 4.40), a pattern consistent with the ceiling effect documented in the Materials section. Given the normality assumption was not met in one of the two groups, the parametric analyses reported below were subsequently repeated using non-parametric procedures, which are presented in Tables 5 and 6.

Figura 1

Levels of perceived mental skills and positive mental health of teenage and middle-adulthood pickleball players.

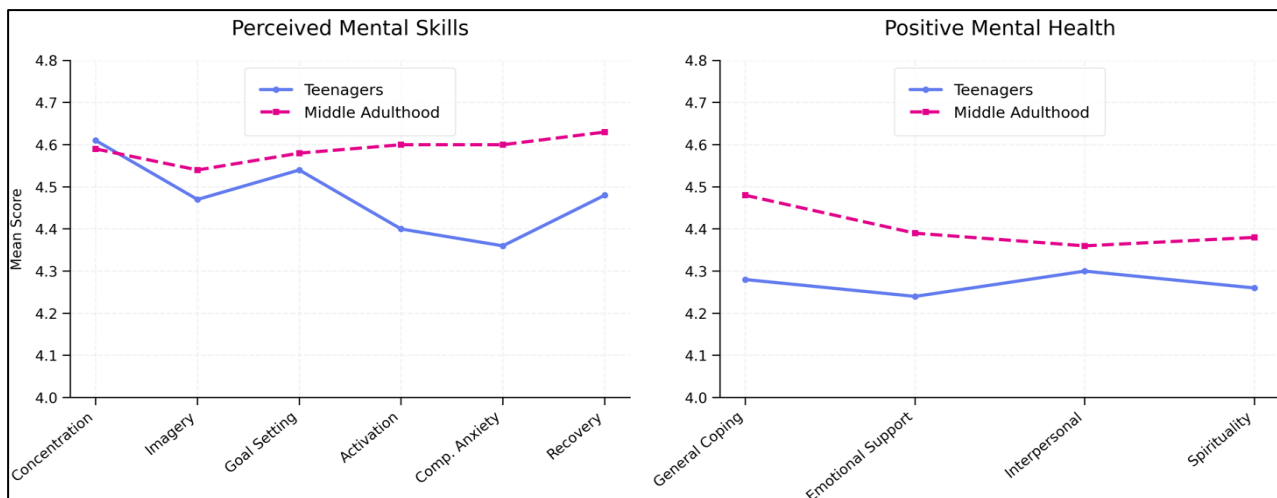


Figure 1 illustrates the psychological levels of pickleball players across age groups, where the grouping variable is the developmental stage (adolescents and middle adulthood). In the domain of perceived mental skills, both age groups demonstrated high to very high levels across all indicators. Among adolescent players, concentration ($M = 4.61$, $SD = 0.59$), imagery ($M = 4.47$, $SD = 0.74$), and goal setting ($M = 4.54$, $SD = 0.65$) reached very high levels, indicating strong attentional focus and strategic thinking even at younger stages. Adolescents showed comparatively lower levels in activation ($M = 4.40$, $SD = 0.79$), competitive anxiety management ($M = 4.36$, $SD = 0.80$), and recovery ($M = 4.48$, $SD = 0.70$), interpreted as high rather than very high. In contrast, middle-adulthood players exhibited consistently very high levels across all mental skill indicators, including activation ($M = 4.60$, $SD = 0.63$), competitive anxiety management ($M = 4.60$, $SD = 0.62$), and recovery ($M = 4.63$, $SD = 0.60$). With respect to positive mental health, both groups reported uniformly high levels across all dimensions; middle-adulthood

Psychological profiles in pickleball across two age groups

participants demonstrated slightly higher mean scores (4.36–4.48) than adolescents (4.24–4.30), most notably in general coping ($M = 4.48$, $SD = 0.66$), spirituality ($M = 4.38$, $SD = 0.69$), and emotional support ($M = 4.39$, $SD = 0.67$).

Tabla 2

Independent-samples t-test for perceived mental skills between teenage and middle-adulthood pickleball players.

Comparison	t	df	p	d [95% CI]
Equal variances assumed	-2.613	100	.010	-0.52 [-0.92, -0.12]
Equal variances not assumed	-2.451	60.94	.017	—

Note. The negative t-value indicates that middle-adulthood players scored higher than teenagers. The difference is statistically significant ($p < .05$).

As shown in Table 2, significant differences were found in perceived mental skills in favor of middle-adulthood players, $t(100) = -2.613$, $p = .010$, $d = -0.52$. The negative effect size indicates higher perceived mental skills among middle-adulthood players than among adolescent players.

Tabla 3

Independent-samples t-test for positive mental health between teenage and middle-adulthood pickleball players.

Comparison	t	df	p	d [95% CI]
Equal variances assumed	-3.239	100	.002	-0.64 [-1.04, -0.24]
Equal variances not assumed	-3.191	89.36	.002	—

Note. Middle adulthood ($M = 4.41$, $SD = 0.22$) scored higher than teenagers ($M = 4.26$, $SD = 0.25$); mean difference = -0.15 . The difference is statistically significant ($p < .05$).

As shown in Table 3, a statistically significant differences in positive mental health emerged between adolescent and middle-adulthood pickleball players, $t(100) = -3.239$, $p = .002$, $d = -0.64$. The negative t-value and effect size indicate that middle-adulthood players ($M = 4.41$, $SD = 0.22$) reported higher levels of positive mental health than adolescent players ($M = 4.26$, $SD = 0.25$), suggesting that age and accumulated life experience may contribute to improved psychological well-being.

Tabla 4

Pearson correlation between perceived mental skills and positive mental health within each age group.

Age group	n	r	p	Decision	95% CI
Teenagers	46	-.014	.927	Not significant	[-.303, .277]
Middle adulthood	56	-.042	.760	Not significant	[-.302, .223]

Note. Both coefficients are non-significant ($p > .05$).

Table 4 presents the Pearson correlation between perceived mental skills and positive mental health within each age group. For teenage players, the analysis yielded a near-zero, non-significant correlation, $r(44) = -.014$, $p = .927$, while a similarly negligible and non-significant association was found among middle-adulthood players, $r(54) = -.042$, $p = .760$. Because both p-values exceed .05, the null hypothesis is retained for both groups, indicating no significant relationship between the two constructs. Although both groups reported high to very high levels on both measures, variations in perceived mental skills were not systematically associated with variations in

positive mental health within either developmental stage, suggesting that the two constructs functioned as relatively independent psychological dimensions. The uniformly elevated scores and restricted variability observed in both measures may also have attenuated the strength of any underlying association.

Tabla 5

Mann-Whitney U tests for both constructs between teenage and middle-adulthood pickleball players.

Variable	Mean rank		U	z	p	r
	teen	middle				
Perceived mental skills	44.05	57.62	945.5	-2.301	.021	.27
Positive mental health	40.13	60.84	765.0	-3.514	<.001	.41

Note. r = rank-biserial correlation. Both non-parametric tests confirm the significant differences reported in Tables 2 and 3, with middle-adulthood players scoring higher on both constructs.

Tabla 6

Spearman rank-order correlations between perceived mental skills and positive mental health within each age group.

Age group	n	Spearman ρ	p	Decision
Teenagers	46	-.061	.689	Not significant
Middle adulthood	56	-.036	.792	Not significant

Note. Both non-parametric coefficients are non-significant and converge with the Pearson correlations reported in Table 4.

The non-parametric analyses converge with the parametric results in every case. The Mann-Whitney tests confirmed significant age-group differences in perceived mental skills, $U = 945.5$, $z = -2.301$, $p = .021$, rank-biserial $r = .27$, and in positive mental health, $U = 765.0$, $z = -3.514$, $p < .001$, rank-biserial $r = .41$, in both cases favouring middle-adulthood players. Spearman's rho likewise reproduced the null associations obtained with Pearson correlations, both among teenagers, $\rho(44) = -.061$, $p = .689$, and among middle-adulthood players, $\rho(54) = -.036$, $p = .792$. The conclusions reported above therefore do not depend on the parametric assumptions, and the effect sizes accompanying each comparison ($d = -0.52$ and $d = -0.64$, both medium in magnitude) provide the quantitative information required for inclusion in future meta-analyses.

DISCUSSION

This study examined the psychological profiles of pickleball players by comparing perceived mental skills and positive mental health between teenagers and individuals in middle adulthood, and by testing whether the two constructs were related within each age group. Three principal findings emerged. First, both age groups displayed high to very high levels of perceived mental skills and uniformly high levels of positive mental health. Second, middle-adulthood players reported significantly higher perceived mental skills and positive mental health than teenage players; both differences correspond to medium effect sizes ($d = -0.52$ and $d = -0.64$) and were confirmed by non-parametric tests. Third, perceived mental skills and positive mental health were not significantly correlated in either group, suggesting that the two constructs operated as relatively independent dimensions of psychological functioning in this recreational context. The consistently favorable profiles observed in both groups align with a growing body of evidence linking pickleball participation to positive psychosocial outcomes. Systematic reviews have associated regular play with improved well-being, life satisfaction, and reduced depressive symptoms, particularly through its social, enjoyable, and low-barrier nature (Cerezuela et al., 2023; Lauxtermann & Stubbs, 2025; Stroesser et al., 2024). The doubles-oriented format, compact court, and intergenerational accessibility create frequent opportunities for social connection and mastery experiences, which are central motives for sustained

Psychological profiles in pickleball across two age groups

participation (Buzzelli & Draper, 2020; Casper & Jeon, 2019). The very high levels of concentration, goal setting, and imagery reported here further suggest that the tactical and perceptual demands of pickleball may naturally engage and reinforce core psychological skills, even among recreational participants who have not undergone formal mental skills training (Lange-Smith et al., 2023; Reinebo et al., 2023).

The significant age-group differences favoring middle-adulthood players are consistent with developmental perspectives on emotional regulation and coping. Adolescence is characterized by ongoing maturation of regulatory capacities, heightened emotional reactivity, and greater susceptibility to stress and fluctuations in well-being (Bos et al., 2020; Favini et al., 2025; Herd et al., 2020). In contrast, adults in midlife tend to draw upon accumulated life experience and more refined, flexible coping repertoires, which longitudinal evidence shows continue to be reorganized and consolidated across midlife and older adulthood (Kurth et al., 2024); comparable resource-based accounts have been advanced for masters athletes in individual endurance sports (Pérez-García, 2025). In the present sample, these developmental advantages were most visible in activation, competitive anxiety management, and recovery—the regulatory components of the mental skills profile—as well as in general coping, spirituality, and emotional support within the positive mental health domain. The findings therefore suggest that the age-related differences observed are less about sport-specific competencies, such as concentration or imagery, in which adolescents performed comparably, and more about broader self-regulatory and resource-based capacities that mature over the life course.

Perhaps the most theoretically informative finding is the absence of a significant relationship between perceived mental skills and positive mental health in both age groups. This result is coherent with dual-continua models of mental health, which hold that psychological well-being and other domains of psychological functioning represent related but distinct dimensions rather than points on a single continuum (Keyes, 2002, 2005). Within sport psychology, scholars have similarly cautioned that athletes' performance-related psychological competencies should not be conflated with their mental health, as an athlete may possess well-developed self-regulatory skills while experiencing diminished well-being, or conversely may flourish psychologically despite modest mental skills (Lundqvist, 2011; Uphill et al., 2016). Intervention research pointing in the same direction shows that training packages targeting cognitive and regulatory capacities and those targeting well-being produce partially dissociable gains (Taylor et al., 2025). The near-zero coefficients obtained here empirically reinforce this conceptual distinction in a recreational sport context: the mechanisms that support effective in-game psychological functioning, such as attentional control and arousal regulation, appear to differ from those that sustain emotional well-being, which in this sample were more closely tied to coping resources, social support, and spirituality (Kee, 2019). From a measurement standpoint, the restricted variability produced by uniformly high scores on both instruments may also have attenuated the observable association, meaning the null result should be interpreted as an absence of evidence for a linear relationship within a high-functioning sample rather than definitive proof that the constructs are unrelated in all sporting populations; the 95% confidence intervals now reported in Table 3 make this precision explicit, since their upper bounds correspond to associations no stronger than small.

Limitations

Several limitations should be considered. First, the study employed a cross-sectional, descriptive-comparative design, which captures psychological characteristics at a single point in time. Age-group differences therefore reflect cohort comparisons rather than developmental change, and no causal inferences can be drawn regarding whether pickleball participation produces the favorable psychological profiles observed or whether psychologically well-functioning individuals are simply more likely to participate. Longitudinal designs tracking players across developmental transitions would provide stronger evidence of within-person change. Second, both constructs were measured through self-report questionnaires, which are susceptible to social desirability and self-presentation biases. The uniformly high scores suggest possible ceiling effects, and the resulting restriction of range may have attenuated both the correlation coefficients and the internal-consistency estimates obtained in this sample. The supplementary analyses reported in the Materials section quantify this ceiling directly—more than half of all item responses on both instruments fell at the scale maximum—and the moderate PMHI coefficient should be read in that light. Future studies could complement self-reports with behavioral indicators, informant ratings, or measures with

greater sensitivity at the upper end of the distribution. Third, the departures from normality identified in the teenage group (Table 1) indicate that the parametric assumptions were only partially satisfied. Although the non-parametric analyses reported in Tables 5 and 6 converged with the parametric results in every case, which supports the robustness of the conclusions, this distributional feature should be taken into account when comparing the present estimates with those obtained in samples with greater variability. Finally, the correlational analysis was conducted at the level of composite scores, which may mask meaningful associations between specific mental skill components and particular dimensions of positive mental health. Potential moderating variables, such as playing experience, frequency of participation, and competitive orientation, were not examined. Future research should explore subscale-level relationships, test nonlinear associations, and model moderators that may condition the link between psychological skills and well-being in recreational sport settings.

CONCLUSIONS

This study provides one of the first empirical examinations of perceived mental skills and positive mental health across two developmental stages within Pickleball. Both teenage and middle-adulthood players exhibited favorable psychological profiles, with middle-adulthood players reporting significantly higher levels on both constructs, and the two constructs were not significantly related in either group. These results indicate that mental proficiency on the court does not automatically translate into psychological flourishing, nor does flourishing guarantee well-developed sport-related mental skills, underscoring the value of treating mental skills and mental health as distinct outcomes in sport psychology research and of extending this line of inquiry to longitudinal, multi-site, and subscale-level investigations.

PRACTICAL APPLICATIONS

Because mental skills and positive mental health emerged as independent dimensions, coaches, club organizers, and sport practitioners should not assume that players who appear mentally skilled on court are necessarily flourishing, nor that well-being initiatives alone will cultivate competition-ready psychological skills. Programs serving adolescent players may benefit from explicitly targeting activation control, competitive anxiety management, and recovery—the areas in which teenagers lagged behind their older counterparts while simultaneously embedding age-appropriate well-being support, given adolescents' comparatively lower positive mental health scores (Prior et al., 2022; Zhang et al., 2025). Structured club programming of this kind has been associated with broader psychosocial and academic benefits in adolescent samples (Esen & Senturk, 2026; Zarazaga-Peláez et al., 2024), and coach-level competence and leadership are themselves determinants of players' psychological needs satisfaction (Gutiérrez Caballero et al., 2024; Sáenz-López Buñuel et al., 2025; Soto García et al., 2024). For middle-adulthood players, sustaining the social, coping, and meaning-related benefits of participation appears central to continued flourishing. More broadly, lifespan models of athlete development support developmentally differentiated psychological programming rather than one-size-fits-all approaches (Baker et al., 2023), and the use of sport-specific well-being screening alongside mental skills assessment would allow practitioners to monitor both dimensions independently (Foster & Chow, 2019); validated, sport-relevant screening instruments continue to be developed for this purpose (Vega-Díaz & González-García, 2025).

ACKNOWLEDGEMENTS

The author(s) thank all participants and clubs for their involvement in the study.

Funding

The author(s) received no funding for this study.

Psychological profiles in pickleball across two age groups

Conflicts of interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Author contributions

All authors contributed to the conception and design of the study, data collection, analysis and interpretation of the data, and drafting and critical revision of the manuscript, and all approved the final version submitted. The order of authorship was agreed upon by all authors based on their relative contribution to the study.

Data availability

The author(s) will provide the raw data supporting the conclusions of this article without undue reservation.

REFERENCES

1. Ato, M., López-García, J. J., Benavente, A. (2013). Un sistema de clasificación de los diseños de investigación en psicología. *Anales de Psicología*, 29(3), 1038–1059. <https://doi.org/10.6018/analesps.29.3.178511>
2. Ayranci, M., Aydin, M. K. (2025). The complex interplay between psychological factors and sports performance: A systematic review and meta-analysis. *PLOS One*, 20(8), e0330862. <https://doi.org/10.1371/journal.pone.0330862>
3. Bagayas, J. C., Poblador, S. A., Cuya, M., Wacan, J. G., Lavente, S., Longakit, J. (2025). Which goals matter? Examining the influence of task and ego orientation on the sports performance of Physical Education students. *Sportis. Scientific Journal of School Sport, Physical Education and Psychomotricity*, 11(4), 1–20. <https://doi.org/10.17979/sportis.2025.11.4.11973>
4. Baker, J., Gayman, A., Johnston, K. (2023). Lifespan models of athlete development: What have we learned from previous attempts? *Frontiers in Sports and Active Living*, 5. <https://doi.org/10.3389/fspor.2023.1179767>
5. Bos, D. J., Dreyfuss, M., Tottenham, N., Hare, T. A., Galván, A., Casey, B. J., Jones, R. M. (2020). Distinct and similar patterns of emotional development in adolescents and young adults. *Developmental Psychobiology*, 62(5), 591–599. <https://doi.org/10.1002/dev.21942>
6. Bošnjak, S. (2001). The Declaration of Helsinki: The cornerstone of research ethics. *Archive of Oncology*, 9(3), 179–184.
7. Buzzelli, A. A., Draper, J. A. (2020). Examining the motivation and perceived benefits of pickleball participation in older adults. *Journal of Aging and Physical Activity*, 28(2), 180–186. <https://doi.org/10.1123/japa.2018-0413>
8. Casper, J. M., Jeon, J.-H. (2019). Psychological connection to pickleball: Assessing motives and participation in older adults. *Journal of Aging and Physical Activity*, 27(1), 28–33. <https://doi.org/10.1123/japa.2017-0381>
9. Cerezuela, J.-L., Lirola, M.-J., Cangas, A. J. (2023). Pickleball and mental health in adults: A systematic review. *Frontiers in Psychology*, 14. <https://doi.org/10.3389/fpsyg.2023.1137047>
10. Diaz-Milanes, D., Santin Vilariño, C., Andrés-Villas, M., Segura-Barriga, A., Pérez-Moreno, P. J. (2024). Evidence of validity, invariance, and reliability of the body image dimension in the Body Investment Scale: A study in Spanish university students. *Psych*, 6(1), 345–355. <https://doi.org/10.3390/psych6010020>

11. Esen, G., Senturk, H. E. (2026). Towards educational sustainability: The role of kinesthetic profiles in predicting sports attitudes and academic success among adolescents. *Sustainability*, 18(6), 2862. <https://doi.org/10.3390/su18062862>
12. Favini, A., Lunetti, C., Tommaselli, M. C., Quarto, T. (2025). Psychosocial adjustment during adolescence: The role of individual differences. *Encyclopedia*, 5(4), 166. <https://doi.org/10.3390/encyclopedia5040166>
13. Foster, B. J., Chow, G. M. (2019). Development of the Sport Mental Health Continuum—Short Form (Sport MHC-SF). *Journal of Clinical Sport Psychology*, 13(4), 593–608. <https://doi.org/10.1123/jcsp.2017-0057>
14. Gutiérrez Caballero, J. M., Blázquez Manzano, A., Feu Molina, S. (2024). Psychological strengths, leadership and satisfaction at work in soccer coaches in Spain. *E-balonmano.com: Journal of Sports Science*, 20(3), 355–366. <https://doi.org/10.17398/1885-7019.20.355>
15. Harriss, D. J., MacSween, A., Atkinson, G. (2019). Ethical standards in sport and exercise science research: 2020 update. *International Journal of Sports Medicine*, 40(13), 813–817. <https://doi.org/10.1055/a-1015-3123>
16. Herd, T., King-Casas, B., Kim-Spoon, J. (2020). Developmental changes in emotion regulation during adolescence: Associations with socioeconomic risk and family emotional context. *Journal of Youth and Adolescence*, 49(7), 1545–1557. <https://doi.org/10.1007/s10964-020-01193-2>
17. Huang, W., Xiao, D., Cheng, B. (2026). What drives people to play pickleball? A mixed-methods study using SEM and fsQCA. *Frontiers in Psychology*, 17. <https://doi.org/10.3389/fpsyg.2026.1740931>
18. Huyghe, L. (2022). UMSAT6: Unified Mental Skills Assessment Tool; a self-questionnaire on mental skills. Institut Neurosport. <https://institutneurosport.com/questionnaire-umsat6-us.html>
19. Kee, Y. H. (2019). Looking East for mindfulness: A glimpse of practices and research on Shaolin martial arts and related practices to advance sport psychology. *Psych*, 1(1), 76–91. <https://doi.org/10.3390/psych1010006>
20. Keyes, C. L. M. (2002). The mental health continuum: From languishing to flourishing in life. *Journal of Health and Social Behavior*, 43(2), 207–222. <https://doi.org/10.2307/3090197>
21. Keyes, C. L. M. (2005). Mental illness and/or mental health? Investigating axioms of the complete state model of health. *Journal of Consulting and Clinical Psychology*, 73(3), 539–548. <https://doi.org/10.1037/0022-006X.73.3.539>
22. Kurth, M. L., Witzel, D. D., Cerino, E. S., Almeida, D. M. (2024). Longitudinal changes in coping strategies across midlife and older adulthood: Findings from the Midlife in the United States study. *Aging, Mental Health*, 1–12. <https://doi.org/10.1080/13607863.2024.2396066>
23. Lange-Smith, S., Cabot, J., Coffee, P., Gunnell, K., Tod, D. (2023). The efficacy of psychological skills training for enhancing performance in sport: A review of reviews. *International Journal of Sport and Exercise Psychology*, 22(4), 1–18. <https://doi.org/10.1080/1612197X.2023.2168725>
24. Lauxtermann, L., Stubbs, B. (2025). Padel, pickleball and wellbeing: A systematic review. *Frontiers in Psychology*, 16. <https://doi.org/10.3389/fpsyg.2025.1614448>
25. Ley Orgánica 3/2018, de 5 de diciembre, de Protección de Datos Personales y garantía de los derechos digitales. *Boletín Oficial del Estado*, 294, 119788–119857. <https://www.boe.es/eli/es/lo/2018/12/05/3>

Psychological profiles in pickleball across two age groups

26. López, L. R., Corti, J. F., Vallejos, L., Rosas, A., Maturano, K., Raimundi, M. J. (2026). Profile of psychological skills in South American figure skaters and its relation to engagement and intention to drop-out of sport. *Cuadernos de Psicología del Deporte*, 26(1), 13–30. <https://doi.org/10.6018/cpd.657221>
27. Lundqvist, C. (2011). Well-being in competitive sports—The feel-good factor? A review of conceptual considerations of well-being. *International Review of Sport and Exercise Psychology*, 4(2), 109–127. <https://doi.org/10.1080/1750984X.2011.584067>
28. McDonald, R. P. (1999). *Test theory: A unified treatment*. Lawrence Erlbaum Associates.
29. Monteiro-Araujo, C., Hernández-Morante, J. J., Reche-García, C. (2025). Psychological well-being through the PERMA-model and burnout in elite athletes: Cross-sectional study. *Cuadernos de Psicología del Deporte*, 25(1), 134–147. <https://doi.org/10.6018/cpd.617861>
30. Pérez-García, J. (2025). Competencias mentales y emocionales en nadadores máster de aguas abiertas: Un estudio cualitativo. *Revista de Psicología Aplicada al Deporte y al Ejercicio Físico*, 10(2). <https://doi.org/10.5093/rpadef2025a14>
31. Prior, E., Papathomas, A., Rhind, D. (2022). A systematic scoping review of athlete mental health within competitive sport: Interventions, recommendations, and policy. *International Review of Sport and Exercise Psychology*, 17(2), 1–23. <https://doi.org/10.1080/1750984X.2022.2095659>
32. Raosoft, Inc. (2004). *Sample size calculator*. <http://www.raosoft.com/samplesize.html>
33. Reinebo, G., Alfonsson, S., Jansson-Fröjmark, M., Rozental, A., Lundgren, T. (2023). Effects of psychological interventions to enhance athletic performance: A systematic review and meta-analysis. *Sports Medicine*, 54(1). <https://doi.org/10.1007/s40279-023-01931-z>
34. Reyes-Bossio, M., Corcuera-Bustamante, S., Veliz-Salinas, G., Villas Boas Junior, M., Delgado-Campusano, M., Brocca-Alvarado, P., Caycho-Rodríguez, T., Casas-Apayco, L., Tutte-Vallarino, V., Carbajal-León, C., Brandão, R. (2022). Effects of psychological interventions on high sports performance: A systematic review. *Frontiers in Psychology*, 13. <https://doi.org/10.3389/fpsyg.2022.1068376>
35. Reyes-Bossio, M., Vásquez-Cruz, D. (2024). Habilidades psicológicas deportivas y estados de ánimo en jugadores peruanos de Quadball (Quidditch). *Revista de Psicología Aplicada al Deporte y al Ejercicio Físico*, 9(1). <https://doi.org/10.5093/rpadef2024a2>
36. Rodríguez, S. T., Rueda-Extremuera, M., Bolló-Gasol, S., Cantero-García, M. (2026). Mindfulness in endurance athletes: Psychological well-being and sport performance—A systematic review. *Cuadernos de Psicología del Deporte*, 26(2), 105–131. <https://doi.org/10.6018/cpd.672521>
37. Sáenz-López Buñuel, P., García-Ceberino, J. M., Fierro Suero, S., Leicht, A. S. (2025). Relationship between motivation, intensity, performance and physical fitness in youth athletes. *E-balonmano.com: Journal of Sports Science*, 21(4), 571–582. <https://doi.org/10.17398/1885-7019.21.571>
38. Soto García, D., Reynoso Sánchez, L. F., Lagunes Carrasco, J. O., Fernández Barradas, E. Y. (2024). Being a competent coach and authentic leader influences the fulfillment of the athlete's basic psychological needs. *E-balonmano.com: Journal of Sports Science*, 20(2), 135–142. <https://doi.org/10.17398/1885-7019.20.135>

39. Stroesser, K., Mulcaster, A., Andrews, D. M. (2024). Pickleball participation and the health and well-being of adults—A scoping review. *Journal of Physical Activity and Health*, 21(9), 1–14. <https://doi.org/10.1123/jpah.2024-0092>
40. Tannoubi, A., Quansah, F., Hagan, J. E., Jr., Srem-Sai, M., Bonsaksen, T., Chalghaf, N., Boussayala, G., Azaiez, C., Snani, H., Azaiez, F. (2023). Adaptation and validation of the Arabic version of the University Student Engagement Inventory (A-USEI) among sport and physical education students. *Psych*, 5(2), 320–335. <https://doi.org/10.3390/psych5020022>
41. Taylor, P., Harris, D., Aidman, E. (2025). Effects of a multimodal psychophysiological training intervention on cognitive fitness, hardiness and wellbeing of corporate professionals. *Sustainability*, 17(17), 7845. <https://doi.org/10.3390/su17177845>
42. Tyebkhan, G. (2003). Declaration of Helsinki: The ethical cornerstone of human clinical research. *Indian Journal of Dermatology, Venereology and Leprology*, 69(3), 245–247.
43. Uphill, M., Sly, D., Swain, J. (2016). From mental health to mental wealth in athletes: Looking back and moving forward. *Frontiers in Psychology*, 7, 935. <https://doi.org/10.3389/fpsyg.2016.00935>
44. Vaingankar, J. A., Subramaniam, M., Chong, S. A., Abidin, E., Edelen, M. O., Picco, L., Lim, Y. W., Phua, M. Y., Chua, B. Y., Tee, J. Y. S., Sherbourne, C. (2011). The Positive Mental Health Instrument: Development and validation of a culturally relevant scale in a multi-ethnic Asian population. *Health and Quality of Life Outcomes*, 9, 92. <https://doi.org/10.1186/1477-7525-9-92>
45. Vega-Díaz, M., González-García, H. (2025). Validation of the Mental Toughness Index (MTI) in young Spanish athletes. *Cuadernos de Psicología del Deporte*, 25(2), 1–15. <https://doi.org/10.6018/cpd.635991>
46. Veliz-Salinas, G., Brandão, R., Tutte-Vallarino, V., Cañizares-Hernández, M., Pallone-Manzini, M., Ríos-Garit, J., Reyes-Bossio, M. (2026). Nadando hacia el éxito: Resiliencia y orientación a la meta en nadadores peruanos. *Revista de Psicología Aplicada al Deporte y al Ejercicio Físico*, 11. <https://doi.org/10.5093/rpadef2026a1>
47. Vitale, K., Liu, S. (2020). Pickleball: Review and clinical recommendations for this fast-growing sport. *Current Sports Medicine Reports*, 19(10), 406–413. <https://doi.org/10.1249/jsr.0000000000000759>
48. World Medical Association. (2013). World Medical Association Declaration of Helsinki: Ethical principles for medical research involving human subjects. *JAMA*, 310(20), 2191–2194. <https://doi.org/10.1001/jama.2013.281053>
49. Zarazaga-Peláez, J., Barrachina, V., Gutiérrez-Logroño, A., Villanueva-Guerrero, O., Roso-Moliner, A., Mainer-Pardos, E. (2024). Impact of extracurricular physical activity on achievement of the Sustainable Development Goals and academic performance: Mediating cognitive, psychological, and social factors. *Sustainability*, 16(16), 7238. <https://doi.org/10.3390/su16167238>
50. Zhang, N., Du, G., Tao, T. (2025). Empowering young athletes: The influence of autonomy-supportive coaching on resilience, optimism, and development. *Frontiers in Psychology*, 15. <https://doi.org/10.3389/fpsyg.2024.1433171>