The Spectrum of First-Generation Student-Athletes' Mental Toughness: Moderation and Mediation Analyses

Alexis Ramirez[1, 2, *] Clarissa Delariarte [3]

[1] Graduate Student, Doctor of Philosophy in Psychology Department of Psychology, Institute of Arts and Sciences Far Eastern University – Manila, Philippines
[2] Faculty Member, Department of Psychology, College of Arts and Social Sciences In-Charge, Guidance Services Unit, Office of Student Affairs, Central Luzon State University, Philippines
[3] Faculty Member, Department of Psychology, Institute of Arts and Sciences Far Eastern University – Manila, Philippines.
aramirez@clsu.edu.ph

Abstract. This study investigated the interaction between social identity as subscale of athletic identity and mental toughness (MT) as moderated ego-involved motivation and examined the serial mediation effects of task-involved and ego-involved motivation, between the relationship of positivity to mental toughness. Specifically, it explored whether and how social identity, motivation and positivity influenced mental toughness of first-generation student-athletes of Central Luzon State University. Based on the Identity Control Theory and Bioecological Systems Theory, the original themes are integrated with the existing theory, which includes the interdependent interactions between the person, proximal processes, context, and time as well as the interaction of identity control through people's identities and the link between identities and behavior within the context of their social structures. In the analysis of data, the sample consisted of seventy-four first-generation student-athletes aged 18 to 25 years old (Mage= 20.80, SD age= 1.62); generally females (56.8%) (SDsex= .50), third year (SDYearLevel = 1.144), regular students (SDenrollstat = .447) with regular academic load (SDacadstat =.354), typically residing to an apartment (SDTypeResidence =.915), and who have been playing to a regional competitive sports (SDHiLevelSports = .782) both in individual sporting events and team sports (MTypeSports = 2.04, SDTypeSports = .711). Generally, male first-generation student-athletes were more motivated through intra-team rivalry and tend to develop an ego-involved motivation. The result of moderation analysis revealed that relationship between social identity and mental toughness becomes weaker when ego-involved motivation increases, further supported by the results of the significant indirect effect of positivity on mental toughness through task-involved and ego-involved motivation. Specifically, this demonstrates that the task-involved incentive enhances the connection between the positivity and toughness of mind whereas this ego-involving motivate dampens the association. Hence, the relationship between positivity and mental toughness partially intensifies through the task-involved and ego-involved motivation.

Keywords: first-generation student-athletes, mental toughness, positivity, athletic identity, motivation

Y. Prasetyo et al. (eds.), *Proceedings of the 6th Yogyakarta International Seminar on Health, Physical Education, and Sports Science (YISHPESS 2023)*, Advances in Health Sciences Research 73,
https://doi.org/10.2991/978-94-6463-356-6_2

1. Introduction

In an instant perfect circumstance, limelight is focused to varsity athletes who widely regarded as campus heroes. But despite of this instant celebrity attention, scholars commonly agree that the "college varsity athletes are experiencing unique obstacles to sport participants' mental welfare" [1]. In fact, juggling and exhibiting the "ability to overcome obstacles, to push through pain, and to capitalize on beneficial training adaptations are necessary resources" with "optimum adaptation to training that requires careful balancing of stress and recovery" just to be on top of their game and academics [2]. Furthermore, the mere "participation in a varsity athletic program requires a great amount of time and effort to meet the demands of practices, meetings, training, film sessions and games" [3]. Hence, being an exceptional athlete takes time, dedication, and well-planned preparation to the point that students forego their studies with the goal to spend a greater amount of time in the gym working out, practicing, gaining strength, maintaining fitness, and learning how to play within a system.

Aside from the development of mental toughness among student-athletes, athletic sports performance was found related to motivation, and athletic identity [4]. These are evident in the conditions and processes that facilitate persistence, performance, healthy development, and vitality in our human endeavors evolved within the bound of motivation [5]. In addition, one of the tactics that focuses on discovering various psychological strategies, both during competition and practice, is the relationship between mental toughness and positivity. It is revealed that mental toughness and positivity correlates to eight (8) performance strategies including self-talk, goal setting, imagery, activation, negative thinking, relaxation, attention control and automaticity" [6].

On the other hand, the recent emerging interest in research is the topic related first-generation college student, since education is one of the key equalizers of the opportunities thru engagement of these young sports enthusiast while pursuing their college academic endeavors. Interestingly, most (93%) of first-generation student-athletes are confident that they will graduate from college. These first-generation students are more likely to believe they will become a professional or Olympic athlete and that their future jobs will involve sports in some form [7]. The student-athlete must "balance all these demands with the additional requirements of an academic programme" [8].

Nevertheless, with a strong body of information supporting its practical usage in the field of sports performance enhancement, tremendous progress has been made in understanding the relationship between an athlete's traits, mental abilities, and athletic performance. Hence, it acknowledges the "contributions of psychological aspect in sports lead to the emergence of applied sports psychology which has grown exponentially over the past decade, primarily due of increased acceptance and the use of mental skills among athletes and coaches" [9].

The theoretical background of research on mental toughness has been grounded in the Identity Control Theory and Bioecological Systems Theory [10]. They put forth original themes that were integrated with existing theory. This model considers the interdependencies between the person, proximal processes, context, and time as well as the interaction of identity control through people's identities and the connection between identities and behavior in the context of their social structures. With the

evidence of the confounding factors in developing mental toughness, it is high time to investigate and address the specific need of the first-generation student-athletes in order to perform in their full potentiality as student and as a young athlete.

Now, these are the questions sought for a response. Does ego-centered motivation affect the relationship between social identity and mental toughness? Does the relationship between positivity and mental toughness involve both task- and ego-related motivation?

2. Methods

2.1. Study Design

This is descriptive and multivariable analyses, researcher used SPSS and Process. Scores were provided for the moderating and mediating factors that may be identified in the quantitative data analysis (e.g., SMTQ for mental toughness, PMCSQ-2 for motivation, AIMS for athletic identity and P Scale for level of positivity) by consideration of respective scoring procedure for every item within the factors.

2.2. Research Participants

The respondents for the current research were college student-athletes enrolled during the 1st Semester of School Year 2022-2023 from Central Luzon State University, Philippines. First, the researcher administered the personal data sheet and mental toughness instruments. After gathering the pertinent information of the student-athletes, the researcher employed to determine who among all the student-athletes belong to the category as first-generation college student-athlete. Then, researcher administered the instruments measuring the motivation, athletic identity, and positivity. Necessary statistical analysis for the quantitative data employed, to enumerate the variables related to the mental toughness. One hundred seventy-seven student-athletes were asked to accomplish the preliminary questionnaire. Eighty-one student-athletes consider themselves as first-generation. There were seven respondents with missing/lacking information the researcher omitted in the analysis of data.

2.3. Variables understudy

The Sports Mental Toughness Questionnaire (SMTQ) was used as the outcome measure, the Athletic Identity Measurement Scale (AIMS) was used as the predictor, and the Positivity Scale was used to measure positivity. The ego-involved motivation was used as the moderated variable and was measured by the Perceived Motivational Climate in Sport Questionnaire-2 (PMCSQ-2) for the analysis.

2.4. Instruments

2.4.1. SMTQ

SMTQ was used to measure the mental toughness. The SMTQ is a 14-item instrument with three subscales for measuring confidence, control, and constancy in addition to overall mental toughness. The replies are ranked from not at all true to extremely true on a 4-point Likert scale. The hierarchical three-factor model was well supported by CFA, with a goodness-of-fit index (GFI) of.95 indicating good model fit. The correlations between the second-order components of control (r=.66), constancy

(r=.71), and confidence (r=.72) and the higher-order factor of total mental toughness (r=.72) were deemed satisfactory. According to reports, there were statistically significant correlations between control and confidence, constancy and confidence, and constancy and control of.28,.31, and.31, respectively. On this test, internal consistency for overall mental toughness was high (r =.81). Additionally, was regarded as moderate to strong for sub-factors (confidence =.79, consistency =.76, control =.72).

2.4.2. PPI-A

Based on student-athletes' athletic prowess and resolve, the PPI-A was utilized to gauge their self-reported mental toughness. A 14-item tool called the PPI-A is based on the original PPI. The PPI-A has four subscales: determination, self-belief, visualization, and positive cognition. On a 5-point Likert scale, the PPI-A responses are anchored by almost always and almost never. CFA showed significant factor loadings and low standard errors together with satisfactory fit. The calculated overall mental toughness reliability (= 0.81) was found to be acceptable. The PPI-A generally showed respectable reliability (= 0.81).

2.4.3. AIMS

The self-determined identity of participants with the sport was assessed using seven (7) AIMS questions, including social identity, exclusivity, and negative affectivity. When item 3 was deleted and the Cronbach's alpha value rose to 0.82, the data demonstrated strong internal consistency (á = 0.78). These researchers confirmed that the items had loadings in two domains by factor analysis. Test and retest had an intraclass correlation value of 0.91. University students and athletes were compared, and the results indicated strong discriminant validity.

2.4.4. PMCSQ-2

The motivational PMCSQ-2 scale was employed. Student-athletes responded to 33 questions that are graded on a Likert scale, with 1 being strongly disagreed with and 5 being highly agree. The survey creates two categories: task-oriented climate, which includes the subcategories of cooperative learning, effort/improvement, and important role; and ego-oriented climate, which includes the subcategories of punishment for mistakes, unequal recognition, and intragroup rivalry. The internal consistency (Cronbach's Alpha) of the instrument developed by Newton, Duda, and Yin (2000) received a = 0.90 in the ego-oriented climate (punishment for mistakes, unequal recognition, and member rivalry received values of 0.77, 0.87, and 0.61, respectively), and a = 0.84 in the task-oriented climate (cooperative learning, effort/improvement, and important role received values of 0.65 and 0.70, respectively).

2.4.5. Positivity Scale

The P-Scale's eight items gauge a person's propensity to view their life and events in a positive light. A 5-point scale was used to rate each response, with 1 being the most negative response and 5 being the most positive. Cronbach's alpha =.75 (95% confidence interval [CI]: lower.71, higher.79) is used to measure the internal consistency of the P Scale. It is also used with related confidence intervals and corrected item total correlations. The average (standard deviation) corrected item-total correlation was .48.

2.5. Data analysis

In terms of descriptive and multivariable analyses, researcher used SPSS and Process. Scores were provided for the moderating and mediating factors that may be identified in the quantitative data analysis (e.g., SMTQ for mental toughness, PMCSQ-2 for motivation, AIMS for athletic identity and P Scale for level of positivity) by consideration of respective scoring procedure for every item within the factors.

3. Results

In the analysis of data, the sample consisted of seventy-four first-generation student-athletes aged from 18 to 25 years old (Mage= 20.80, SDage= 1.62); mostly were females (56.8%, SDsex= .50). Most of them are third year (SDYearLevel = 1.144) regular students (SDenrollstat = .447) with regular academic load (SDacadstat =.354), mostly residing to an apartment (SDTypeResidence =.915), and who have been playing to a regional competitive sports (SDHiLevelSports = .782) both in individual sporting events and team sports (regional competitive sports (SDHiLevelSports = .782).

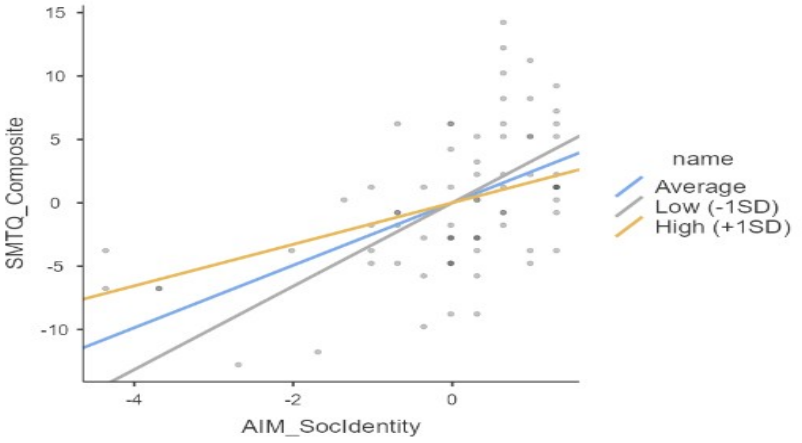

Fig 1. Interaction of the relationship between Social Identity and Mental Toughness as moderated by Ego-Involved Motivation

In terms of the correlation between the demographic factors, the monthly family income of the respondents is connected favorably with the year level (r2=.261*). Additionally, enrollment status is inversely connected with year level (r2=-.240*) but favorably correlated with academic standing (r2=.246*). The type of athletic events is strongly connected with the exposure and level of competitive sports (r2=.286*). Moreover, the respondents' sex is positively correlated with their motivation, particularly with Intra-Team Rivalry (r2=.294*) and Ego-Involved (r2=.252*)

motivation, according to research on the relationships between demographic characteristics, mental toughness, athletic identity, motivation, and positivity. In addition, first-generation student-athletes' residence location is positively connected with their resolve (r2=.243*) and negatively correlated with their negative affectivity (r2=-.283*) while they are in school.

Table 1. Moderation analysis: relationship between social identity and mental toughness as moderated by ego-involved motivation

Effect	Estimate	SE	95% CI		P
			LL	UL	
Intercept	12.4539	9.2227	-5.9402	30.8480	.1812
Social Identity a	5.4518	1.5708	2.3190	8.5847	.0009
Ego-Involved Motivation b	4.7072	2.6354	-.5489	9.9633	.0784
Interaction c	-.9940	.4537	-1.8990	-.0890	.0318

Note. Number of Respondents = 74, CI = confidence interval, *LL* = lower limit, *UL* = upper limit
[a] = Subordinate of Athletic Identity, [b] = First order subscale of Motivation: Mean score of Punishment for Mistakes; Unequal Recognition; and Intra-Team Rivalry, [c] = Interaction between Social Identity and Mental Toughness as moderation by Ego-Involved Motivation

This study's moderation analysis looked into the relationship between social identity and mental toughness as it was influenced by ego-centered motivation. R =.5695, F(3, 70) = 11.2014, p .000, indicates that the overall model for the interaction between social identity and mental toughness as modulated by ego-involved motivation was statistically significant.

A statistically significant relationship between social identity and ego-centered motivation was discovered [= -.9940, 95% C.I. (-1.8990, -0.0890), p < 0.05]. However, the results of the serial mediation analysis show that positive thinking, when combined with task- and ego-related motivation, has an indirect impact on mental toughness (=.18 [.143;.000]; 95% CI does not include 0).

Figure 2 specifically displays the standardized estimates between the model's variables. As seen, optimism significantly and favorably influences both ego- and task-related motivation (=.25 [.018;.413] and.68 [.359; 1.007]). Moreover, task-involved motivation has a negative effect on ego-involved motivation when the effects of positivity are controlled (β = - .52 [-.889; -.141]), same with a negative effect of ego-involved motivation on mental toughness when positivity and task-involved motivation are controlled (β = -.24 [-3.200; -.063]), unlike task-involved motivation on mental toughness having positive effect when positivity is controlled (β = .32 [1.093; 6.306]). beneficial thinking has a significantly beneficial overall effect on mental toughness (= 2.57 [.278;.4.867]). In contrast, when task-involved and ego-involved motivation are controlled, the direct effect of optimism on mental toughness is significant (= 2.71 [.309; 5.110]). Finally, effects of competitive partial serial mediation are visible. Because 0 is not included in the 95% range, the indirect relationship between optimism and mental toughness is in fact statistically positive in the presence of task- and ego-related motivation (=.018 [.000;.0532]). Based on this finding, it was shown that positivity and mental toughness were mediated by the mediating variables.

Additionally, it was determined that the entire model was significant (F(1-72) = 4.995, p .05) and that it explained 6% of the total variation in mental toughness.

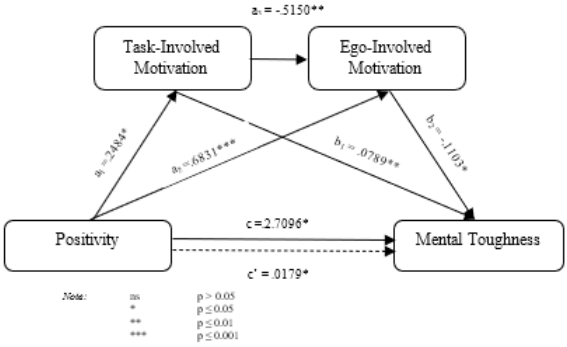

Fig 2.Serial Mediation Model: Relationship between Positivity and Mental Toughness as mediated by Task-Involved Motivation and Ego-Involved Motivation

Table 2 . Path Coefficient and Indirect Effect of Positivity on Mental Toughness through Task-Involved Motivation and Ego-Involved Motivation

	Path Coefficients			Indirect Effects	
	to Mental Toughness b (MT)	Task-Involved Motivation c (TIM)	Ego-Involved Motivation d (EIM)	Estimate	95% Confidence Interval
Positivity a (Pos)	2.7096 (1.2036)	.2484 (.2201)	.6831 (.1625)		
Task-Involved Motivation (TIM)	3.6994 (1.3069)		-.5150 (.1875)		
Ego-Involved Motivation (EIM)	-1.6314 (.7866)				
Total				2.5725 (.1511)	.2779, 4.8671
Pos→TIM→MT				.0789 (.0427)	.0082, .1753
Pos→EIM→MT				-.1103 (.0603)	-.2480, -.0119
Pos→TIM →EIM→MT				.0179 (.0138)	.0000, .0532

Note. Number of Respondents = 74,
[a] = Mean score of Positivity, [b] = Mean score of Mental Toughness, [c] = First order subscale of Motivation: Mean score of Cooperative Learning; Important Role; and Effort/Improvement; [d] = First order subscale of Motivation: Mean score of Punishment for Mistakes; Unequal Recognition; and Intra-Team Rivalry

Findings showed that, despite an increase in the respondents' monthly family income, first-generation student-athletes who are regularly promoted to the following year level have shoddier enrollment status, which may cause negative affectivity. Unexpectedly, even though higher levels of competitive sports exposure and enrollment status relate to better academic standing, participants in both individual and team sports were expected to be interested and encouraged. This may be supported by research on the growth of general emotional intelligence and the stark differences in psychological abilities and drive for athletic success between athletes competing in individual sports and team sports. [11]. Male first-generation student-athletes, on the other hand, are more driven by intra-team rivalry and ego-driven motivation. This serves as a demonstration that "for adolescent male athletes, emotions were a significant predictor of mental toughness and the relationship between these emotions and coping effectiveness was fully mediated by mental toughness" [12]. Additionally, people in higher year levels might have less negative affectivity. The reality that "school factors, which include the training and sports facilities, training schedules, and incentives, are truly affected by athletic performance of varsity players" [13]. Both academically and while participating in their respective sports, they must face confusing duties. However, it's surprising how much more determined first-generation student athletes are who were living independently of their respective homes in either a dorm or an apartment. The fact that "with the sport commitment model, personal investment, enjoyment, involvement opportunities, and social support were found to be significant predictors of sport commitment, whereas commitment significantly predicted participation frequency and purchase intention" [14].

In conclusion, there is a higher correlation between social identity and mental toughness if these traits are demonstrated, together with a deflated sense of ego-centered motivation. In support, a competitive partial serial mediation between the connection between optimism and mental toughness was created by task-involved motivation and ego-involved motivation.

4. Discussions

These study topics were clearly addressed by the existing model. The results of the moderation analysis showed that as ego-involved motivation rises, the link between social identity and mental toughness weakens. First-generation student-athletes with a strong sense of social identity and a better level of mental toughness are those who have a muted ego-centered motivation. According to research findings, "motivational climates (each represented by task- and ego-involving latent variables) were hypothesized to be related to the athletes' respective goal orientations (task or ego), which in turn were expected to be associated with their mental toughness" [15]. These conclusions are confirmed by the results of the positive attitude's considerable indirect impact on mental toughness via task- and ego-related motivation. The gaps in the underlying spectrum of mental toughness are considered by this competitive partial serial mediation of task-involved and ego-involved motivation on the connection of optimism and mental toughness of first-generation student-athletes. According to

research, "global mental toughness was associated with self-concept positivity, which was particularly high in individuals with positive-integrative self-organization (an individual who distributes positive and negative self-attributes evenly across multiple selves)." [16] In particular, a shift in social identification score from a range of 1.581 to 3.350 may tend to have a 2.47 moderating effect on first-generation student-athletes' mental toughness. It has a conditional impact of 3.29 with a 95% confidence interval for low moderation (-1SD) of ego-involved motivation. For high moderation (+1SD) of ego-involved motivation, conditional effect = 1.64, 95% C.I. (0.688, 2.590). The results of the mediation analysis showed that first-generation student-athletes' levels of positivity have an impact on the development of their mental toughness through task-involved and ego-involved motivation. On the association between optimism and mental toughness of first-generation student-athletes, competitive partial serial mediation of task-involved and ego-involved motivation is present. Therefore, in the presence of incentive based on the job assigned to athletes, positivism has an indirect impact on the development of mental toughness, and the encouragement of ego-enhancing activities may tend to reduce the mental toughness of first-generation student-athletes.

5. Conclusion

In conclusion, there is a higher correlation between social identity and mental toughness if these traits are demonstrated, together with a deflated sense of ego-centered motivation. In support, a competitive partial serial mediation between the connection between optimism and mental toughness was created by task-involved motivation and ego-involved motivation.

References

[1] Davoren, A. K., & Hwang, S. (2014, October 8). Mind, Body and Sport: Depression and anxiety prevalence in student-athletes [Text]. NCAA.Org - The Official Site of the NCAA. http://www.ncaa.org/sport-science-institute/mind-body-and-sport-depression-and-anxiety-prevalence-student-athletes

[2] Drinkwater, K., Dagnall, N., Denovan, A., & Parker, A. (2018). The Moderating Effect of Mental Toughness: Perception of Risk and Belief in the Paranormal. Psychological Reports, 122(1), 268–287. https://doi.org/10.1177/0033294118756600; Jones, M. & Parker, J. (2019). An analysis of the size and direction of the association between mental toughness and Olympic distance personal best triathlon times. Journal of Sport and Health Science, 8(1), 71–76. https://doi.org/10.1016/j.jshs.2017.05.005

[3] Ezechiel RothschildChecroune, François Gravelle, Don Dawson & George Karlis (2012) Balancing academic and athletic time management : A qualitative exploration of first year student athletes' university football experiences,. Loisir et Société / Society and Leisure, 35(2), 243–261. https://doi.org/10.1080/07053436.2012.10707843

[4] Karoblis, E. C. (2016). Motivation, Athletic Identity, and Commitment to Sport in Division I Varsity Athletes and Collegiate Club Level Athletes: A Qualitative Analysis. 45.

[5] Deci, E. L., & Ryan, R. M. (2008). Self-determination theory: A macrotheory of human motivation, development, and health. Canadian Psychology/Psychologie Canadienne, 49(3), 182–185. https://doi.org/10.1037/a0012801

[6] Jemmy, S., & Veena, E. (2018). Mental Toughness and Positivity as Predictors of Performance Strategies Used Among Competing Athletes. International Journal of Sports Sciences and Fitness; Bhopal, 8(2), 98–119.

[7] smeyers@ncaa.org. (2016, June 16). The First in Their Family [Text]. NCAA.Org - The Official Site of the NCAA. http://www.ncaa.org/about/resources/research/first-their-family

[8] Gomez, J., Bradley, J., & Conway, P. (2018). The challenges of a high-performance student athlete. Irish Educational Studies, 37(3), 329–349. https://doi.org/10.1080/03323315.2018.1484299

[9] Holliday, B., Burton, D., Sun, G., Hammermeister, J., Naylor, S., & Freigang, D. (2008). Building the better mental training mousetrap: Is periodization a more systematic approach to promoting performance excellence? Journal of Applied Sport Psychology, 20(2), 199–219. https://doi.org/10.1080/10413200701813889

[10] Gucciardi, D. F., Jackson, B., Hodge, K., Anthony, D. R., & Brooke, L. E. (2015). Implicit theories of mental toughness: Relations with cognitive, motivational, and behavioral correlates. Sport, Exercise, and Performance Psychology, 4(2), 100–112. https://doi.org/10.1037/spy0000024

[11] Kajbafnezhad, H., Ahadi, H., Heidarie, A. R., Askari, P., & Enayati, M. (2011). Difference between team and individual sports with respect to psychological skills, overall emotional intelligence and athletic success motivation in Shiraz city athletes. Journal of Physical Education and Sport; Pitesti, 11(3), 249–254.

[12] Cowden, R. G. (2016). Mental Toughness, Emotional Intelligence, and Coping Effectiveness: An Analysis of Construct Interrelatedness Among High-Performing Adolescent Male Athletes. Perceptual and Motor Skills, 123(3), 737–753. https://doi.org/10.1177/0031512516666027

[13] Manalo, A. D., & Dela Cruz, R. G. (2000). Factors Affecting the Performance of Varsity Players of Technological Institute of the Philippines – Manila. TIP Research Journal Manila, 5(1), 1–1.

[14] Casper, J. M., Gray, D. P., & Babkes Stellino, M. (2007). A Sport Commitment Model Perspective on Adult Tennis Players' Participation Frequency and Purchase Intention. Sport Management Review, 10(3), 253–278. https://doi.org/10.1016/S1441-3523(07)70014-1

[15] Beck, N. M. (2014). The relations between perceived parent, coach, and peer created motivational climates, goal orientations, and mental toughness in high school varsity athletes [Ph.D., University of North Texas]. https://search.proquest.com/central/docview/1724063408/abstract/6245465192294EACPQ/8

[16] Meggs, J., Ditzfeld, C., & Golby, J. (2014). Self-concept organisation and mental toughness in sport. Journal of Sports Sciences, 32(2), 101–109. https://doi.org/10.1080/02640414.2013.812230