Original Article

Mental Toughness in Sports Satisfaction: Exploring Role of Medication, Exertion, and Patient-Physician Interaction

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Abstract

Purpose: This study investigates the relationships between sports mental toughness, physical exertion, medication efficacy, and perceived efficacy in patient-physician interaction on subjective sport performance satisfaction, aiming to uncover how these variables influence athletes' performance in the context of Saudi Arabian sports environment. **Method:** The research was conducted among 212 provincial and national level athletes of the Kingdom of Saudi Arabia. Data were collected through a structured questionnaire using validated scales for the constructs. The analysis was carried out using Stata-SEM to assess the direct and indirect effects of the variables. **Findings:** The results indicate that sports mental toughness significantly impacts subjective sport performance satisfaction, both directly and indirectly through the mediating role of physical exertion and medication efficacy. Furthermore, perceived efficacy in patient-physician interaction was found to moderate the relationship between sports mental toughness and subjective performance satisfaction. All hypotheses were accepted, confirming the critical role of mental toughness and related variables in shaping performance outcomes. **Originality/Implications:** This study adds to the growing literature on athlete performance by integrating mental toughness, physical exertion, and medication efficacy as key determinants of satisfaction. The findings offer practical implications for enhancing athlete well-being and performance through targeted health interventions.

Keywords: Sports Mental Toughness, Physical Exertion, Medication Efficacy, Perceived Efficacy in Patient-physician Interaction, Subjective Sport Performance Satisfaction.

Introduction

In terms of subjective sport performance satisfaction, research has received a lot of attention in recent years, as scholars and practitioners recognize the importance of athletes' personal evaluations of their performance, which extend beyond objective outcomes like winning or ranking.[1] In fact, regardless of winning or losing, an athlete's self-perceived sense of accomplishment, competence, and fulfilment following a sporting event is referred to as subjective performance satisfaction.[2] This psychological construct is an important influencing factor for any athlete regarding motivation, long-term involvement, and well-being.[3] Research in the sports domain has revealed that satisfaction is a multi-dimensional variable involved by a number of factors such as psychological traits, physical exertion, medication efficacy, and quality support systems for athletes.[4] This increased focus is part of the overall movement toward athlete-centric models of performance, which prioritize mental wellness and personal well-being over pure competition metrics.[5] It could prove useful in appreciating how various factors influence subjective performance satisfaction as one looks to develop more integrated training and recovery programs for the sports industry.[6]

A significant body of empirical research has been done on the variables that affect athletes' subjective satisfaction with their performance.[7] These variables include psychological variables like mental toughness and physical exertion levels, both of which have been shown to be crucial for improving athletes' performance-related satisfaction.[8] Most researchers agree that mental toughness is what allows individual athletes to stay focused, resilient,

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and composed even under pressure.[9] For instance, it was reported by Xu *et al.*[10] that athletes with a higher mental toughness reported greater satisfaction with their performance even when objective outcomes were not in their favor. The physical exertion or the effort exerted during training and competition has directly been related with performance satisfaction.[11] Ekkekakis[12] found that athletes who believe they have gone the extra mile also tend to be more satisfied with performance, regardless of winning or losing. Additionally, medication effectiveness, particularly in the management of injuries or chronic conditions, is highlighted as essential for subjective satisfaction.[13] Such athletes who think that the drug they are currently taking helps them recover better or assuages the pain will feel more self-assured and satisfied about their performances.[14]

Despite a considerable body of research on subjective sport performance satisfaction, there are still some gaps in the literature.[15] To start with, many studies have focused on individual factors: namely, mental toughness and physical exertion. Yet very little information is still available about how these variables influence each other in shaping subjective satisfaction.[16] Specifically, far fewer investigations examine the mediating function of physical effort by mental toughness and performance satisfaction that could offer deeper insight into how psychological resilience translates into physical effort and satisfaction.[17] The second gap lies in the mediation of efficacy of medication between mental toughness and satisfaction.[18] While medication efficacy is known to play a critical role in recovery, it has not been scouted for the degree to which it mediates such psychological traits as mental toughness.[19] In addition, the moderating effect of perceived efficacy in patient-physician interaction on the relationship between mental toughness and performance satisfaction has remained somewhat understudied.[20] Understood through how perceptions on the side of athletes shape this dynamic, the above can offer critical insight in the designing of more effective support systems in athletics.[21]

Based on very well-established psychological theories that explain how mental and physical factors culminate to performance outcomes, the relationships proposed in this research have been grounded. The theoretical underpinning as regards the fulfillment of basic psychological needs for competence, autonomy, and relatedness is explained within self-determination theory.[22] This perspective would predict that individuals with high mental toughness feel more competent and in control of their performances, which increases their satisfaction. Similarly, the exertion of physical effort fits well with the theory's focus on competence: athletes who work at maximum capacity tend to feel accomplished. Further explanation of this mediating role would take into account the process model of self-regulation, which asserts that individuals with stronger self-regulatory skills, such as mental toughness, are more likely to be involved in effortful behavior. Such will then lead to a positive consequence regarding performance.[23] Finally, the moderation presented here for perceived efficacy in patient-physician communication is based on social support theory, whereby the quality of interpersonal relationships may also significantly affect psychological outcomes. The hypotheses tested in this study are based on empirical evidence, providing a new avenue of research into the complex interaction between psychological traits, physical effort, and performance satisfaction among athletes.

Literature Review

Subjective sport performance satisfaction is an area of growing interest in sports psychology, as it reviews how athletes personally and subjectively evaluate their performances in relation to their expectations, goals, and standards.[24] The overall subjective sport performance satisfaction of a sportsman is affected by both internal and external factors - perceived competence, goal orientations, and comments from coaches or teammates.[25] Satisfaction over performance has always been an established predictor of wider psychological outcomes, including motivation, self-esteem, and general well-being.[26] Athletes who are more satisfied with their performances have higher intrinsic motivation and are mostly likely to stand the test of time enjoying the sport.[27] This is consistent with self-determination theory, where satisfaction of the basic psychological needs of competence, autonomy, and relatedness fosters a feeling of accomplishment which becomes translated into sustained participation and effort in sports settings.[28-30] Thus, subjective performance satisfaction is not only an outcome but also an essential mediator in the athlete's journey toward success over time.

Subjective sport performance satisfaction can also be susceptible to effects from processes for short-term experiences and long-term developmental processes.[31] The level of satisfaction among athletes does oscillate with certain events or practice sessions against the eventual outcome of those events.[32] For example, winning or achieving personal bests immediately depicts satisfaction, but falling below expectations may represent dissatisfaction.[33] However, performance-oriented athletes are more likely over time to retain a good sense of satisfaction with their performance because they focus on skill development and personal growth rather than external outcomes.[34] Social factors such as the quality of coaching, interpersonal relations within the team, and perceptions of fair competition also strongly affect what levels of satisfaction an athlete achieves.[35] In team sports, where interdependence between teammates is also critical, group performance and team cohesiveness also weigh in considerable in individual fulfillment.[36] Subjective sport performance satisfaction, therefore, is a very complex construct influenced by a myriad of psychological, social and environmental factors that influence the experience of the athlete and long-term engagement in sport.[1]

It is admitted that the sports mental toughness has been widely regarded as an important psychological

characteristic that assists sportspersons to consistently perform under pressure and overcome adversity in competitive settings.[3] There has been a consistent demonstration of the studies over past years in terms of a direct relationship wherein higher levels of mental toughness in athletes were related to better resilience, focus, and emotional regulation, which increases the satisfaction of performance.[5,37] Research by Saenz *et al*.[7] showed that athletes with greater mental toughness dealt more competently with stressful experiences and were better at maintaining high performance levels, thus increasing selfreported satisfaction for the sport outcomes. Other empirical studies, like that of Ekkekakis[9], show that mental toughness has a positive correlation with perceived performance success in terms of the described relationship; indeed, mental toughness leads to adaptive coping, hence making it easier for the athlete to recover from failure. This body of literature is growing, and it could thus serve as a good base for further study on the direct effect of mental toughness on subjective performance satisfaction.[11,38] Based on previous research studies, this hypothesis, that sports mental toughness does have a significant influence on subjective sport performance satisfaction, would be based on the thought that mentally tougher athletes can better regulate their emotions and hold their attention in situations with high demands.[13] The developing resilience and composure for one to meet or surpass performance expectations leads to the source of satisfaction.[15] Likewise, in like manner, high mental toughness athletes are more likely to embrace positive self-talk and goal setting, both of which contribute to a more exceptional feeling of achievement and fulfillment.[17] Thus, it is suggested that mental toughness considerably influences the way athletes think about their performance and then has better and greater satisfaction for the outcome.
H1: Sports mental toughness significantly influences the subjective sport performance satisfaction.

The other variable related to the performance outcome variable is the effort of an athlete during training or competition.[17] Level of effort can be described as a behavior through which an athlete exerts himself/herself while training or competing.[19] It can take any of the forms: high or low intensity, hard or light effort, or a lot of effort put up or barely enough effort. Empirical research has established that most athletes perceive they have performed at their best when they feel they have made all the effort possible for a performance.[21] Thus, even when performance is unsatisfactory, satisfaction in self-efficacy is often reported as compared to one's comparison condition.[23,39] For example, there is research by Wilk and Joyner[24] which concluded that the elevation of physical exertion during sport was positively correlated with performance-satisfaction among the participants. The researchers ascribed this to the feeling of accomplishment, or what they refer to as the sense of pushing beyond physical limits.[26] Further, studies on endurance sports like cycling or running a marathon have confirmed that physical effort is indeed directly associated with the subjective evaluation of performances in such sports.[28] The athlete is typically content in knowing he has built his skills to the best of his capabilities, irrespective of winning or losing.[32,40] With the available empirical data concerning such observations, there is good foundation for the assumption that the amount of physical effort is markedly influential in subjective satisfaction with sport performance.[34] Because the athletes would perceive that they have exerted at their maximum ability, the athletes are likely to be satisfied with their performance because it would correspond to their internal expectation of hard work and efforts.[36] In high physical exertion, feelings of exhaustion or fatigue often serve as internal cues of efforts that lead to good assessment of oneself.[2] This link between exertion level and satisfaction has the underlying implication that, even though effort is a strong contributor to performance outcomes, it is an even stronger determinant of whether athletes assess their experience of the sport positively or not.[4] Thus, it is hypothesized that higher levels of exertion will predict greater subjective satisfaction with performance.
H2: Physical exertion significantly influences the subjective sport performance satisfaction.

Substantial scientific work has been conducted on the interplay between psychological characteristics, like mental toughness, and physical exertion in sports performance.[6] Such research asserts that the possibility of pushing themselves physically characterizes an athlete as more mentally tough while showing stamina and endurance to sustain in cases of high pressure.[8] According to studies by Xu *et al*.[10], it was established that mental toughness is ascertained in a majority of instances with the accompanied experience of high effort at physically since mentally tough athletes are usually persistent with strain or discomfort. This helps positively enhance the performance satisfaction. However, exertion itself was found to positively relate to satisfaction, as indicated above.[12] Up to date, however, the interplay between mental toughness, exertion, and satisfaction has received little empirical attention, and only recently have these factors begun to attract attention regarding exertion possibly acting as a mediator.[14] Based on the above empirical findings, it becomes possible to hypothesize that physical exertion mediates the relationship between sports mental toughness and subjective satisfaction of sport performance.[16] The mediational hypothesis is a premise that grounds itself on the argument that well-off sport performers who are mentally tough would operate at higher intensities of physical activity, thus leading to higher subjective satisfaction with performance.[18] Thus, mediation implies allowing athletes to overcome or push beyond their physically determined limits and propel perceived effort to a higher level, which directly feeds into the performance satisfaction outcome.[20,41] It is expected, then, that the impact of mental toughness on satisfaction would be partially mediated via the perceived intensity of physical exertion athletes feel in competition or during training.

H3: Physical exertion significantly mediates the relationship of sports mental toughness and the subjective sport performance satisfaction.

Medication that may potentially impact athletic performance and recovery has perhaps been part of an array of concerns whose research worthiness has been debated in the overall importance of sports.[22] That is, concerns regarding chronic pain, injuries or other health-related issues and how athletes cope with them have raised questions.[42] They even discovered that there was a greater degree of performance satisfaction among athletes who perceived their medication to be efficacious in regulating their symptoms.[25] For example, a study conducted by Schneider *et al*.[27] among injury-recovering athletes found that the athletes who considered their medication efficacious in terms of pain reduction and improvement of their function were likely to report being satisfied with their overall performance in the training or competition. This body of research clarifies the psychological effect of medication efficacy, whereby confident athletes in their physical health-habitus, fostered by a curative medicine effect-retranslate into positive performance appraisals.[31] Based on the empirical studies carried out, it is hypothesized that subjective sport performance satisfaction is strongly influenced by medication efficacy.[33] Also, athletes who are of the opinion that their drugs are effective in managing pain, enhancing recovery, or general well-being tend to have confidence and competence at the point of performance, which is readily translated to higher satisfaction.[35,43] The psychological comfort of knowing that their physical condition is managed effectively frees them from dwelling more on their performance rather than anything that could be wrong with them, thus fostering a sense of greater accomplishment.[1] Consequently, this effectiveness of medication should significantly impact an athlete's subjective satisfactory performance.

H4: Medication efficacy significantly influences the subjective sport performance satisfaction.

There is emerging evidence that, perhaps the relationship between mental toughness and performance outcomes may be mediated through the aspect of effectiveness in medication, particularly in most cases in which athletes are managing physical injuries or conditions.[4] Studies have found that athletes with mental toughness endure more hardships physically, but their subjective satisfaction might be a function of how well their drugs manage the symptoms.[7] For example, Xu *et al*.[10] demonstrated that athletes who perceived their drug to actually do good to them were better at tapping into their mental toughness because the drug helped the athletes be in good physical condition ready for service and maintain their focus. This implies that medication efficacy acts as a buffer, allowing the subjective satisfaction of performance to relate more directly with mental toughness.[13] Based on such insights, it would be hypothesized that there is a significant mediation between sports mental toughness and subjective sport performance satisfaction due to medication efficacy.[16] They are mentally tougher athletes who can push themselves through physical discomfort, but satisfaction of performance is going to be dependent on how well their medication is working.[19] Effective medication that leads to the aid of regaining body strength and other physiological symptoms will enable them to stay focused on their performance rather than physical constraining effects.[22] In this manner, the efficacy of medication is likely to mediate the process; the effect of being mentally tough would be conditioned by medication efficacy,[24] where high medication efficacy related to experience would facilitate the positive influence on the satisfaction of performance.

H5: Medication efficacy significantly mediates the relationship of sports mental toughness and the subjective sport performance satisfaction.

Experienced-based perceived efficacy in patient-physician interaction is among the variables indicated to shape athletes' health management and recovery.[27] Studies have proven that athletes rely on their medical providers if they feel competent and supportive.[32] It has been suggested that such athletes would be more likely to adhere to treatment plans if provided, to have recovery outcomes of better quality, and have greater satisfaction with performance.[35] It is highlighted by Wood *et al*.[3] that the quality of communications among athletes and physicians is significant, contributing significantly to the confidence of athletes in treatment and general health. Also, the reported effectiveness was said to mediate psychological elements like psychological hardness in that it will give sport people confidence toward their physicians and as such would enable them to be more fit and feel successful within events feeling that everything is under control from their physicians.[6] Therefore, such evidence calls for an effort trying to identify the moderating role played by patient-physician interaction on mental toughness and performance satisfaction.[9] Based on the empirical base, it might be hypothesised that perceived physician effectiveness in patient-physician interaction is likely to be an important moderator between sports mental toughness and subjective sport performance satisfaction.[12] After all, athletes who perceive their physicians as effective and trustworthy have enhanced confidence with their physical well-being and recovery, which may have a positive interactive effect with mental toughness on performance satisfaction.[15] In this respect, positive interaction with physicians should strengthen the psychological benefits of mental toughness for the athletes because they feel safer about their physical well-being and more focused on performance.[18] Therefore, a patient-physician interaction's effectiveness would moderate this relationship, enhancing the positive effects of mental toughness on subjective performance satisfaction.

H6: Perceived efficacy in patient-physician interaction significantly moderates the relationship of sports mental toughness and the subjective sport performance satisfaction.

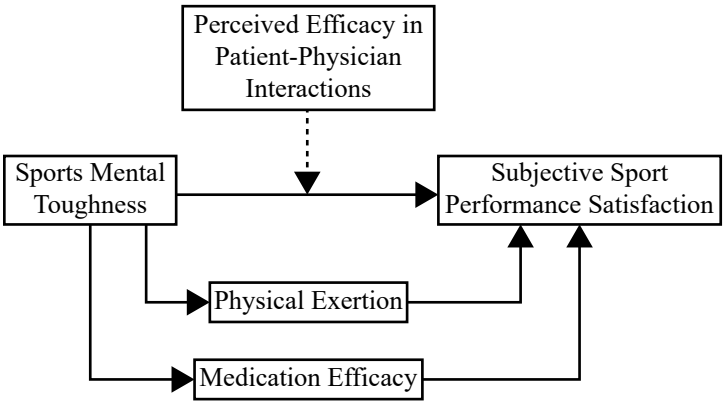

Figure 1: Theoretical Model.

Methodology

This section outlines the methodology implemented in conducting the research on impact of sports mental toughness, physical exertion, efficacy medication, and perceived efficacy in patient-physician interaction on subjective sport performance satisfaction. The study involved different sports athletes who were playing at different provincial and national levels of Kingdom of Saudi Arabia. This was a quantitatively approached study through the use of a structured questionnaire for data collection and Stata-SEM used in data analysis. By doing so, this research ensured robust testing of the hypotheses proposed and provided meaningful insights into these relationships and connections between variables. This study targeted the provincial and national level athletes of the Kingdom of Saudi Arabia. A total of 212 participants were sampled for the study through convenience sampling, a non-probability sampling technique often utilized in sports management research. The athletes were chosen because of their relevant experience plus the critical role they play as in provision of information, whereupon reaps valuable insights into how mental toughness and allied factors influence performance satisfaction. The sample size used was found to be sufficient for applying in the structural equation modeling technique as 212 participants were recruited. SEM is used with a larger sample to achieve reliable estimates of parameters as well as indices of model fit.

The study adopted scales from established research to measure the constructs of interest. In measuring sports mental toughness, the study adapted scales from previous validated measures that assessed the mental resilience, focus, and perseverance of respondents in relation to tough tasks. Physical exertion was measured through the use of a scale that referred to the respondents' perception of their physical effort and endurance during work-related activities. Medication effectiveness would be assessed using a scale of the effectiveness with which athlete perceived their medications, if any, in terms of managing physical or mental health issues which could affect their performance. Perceived efficacy regarding patient-physician interaction is measured by items that evaluate the level of confidence and satisfaction with quality interaction/advice received from healthcare professionals. Finally, subjective sport performance satisfaction was measured through a scale that included the respondents' general satisfaction with their performance in both physically and mentally demanding tasks. All scales used a Likert-type format ranging from 1, the respondent's strong disagreement, to 5, the respondent's strong agreement. The data-gathering span was two months. The participants were administered a structured questionnaire, either in person or via an online platform with respondents communicating their convenience. They were informed about the purpose of the research, and participation was voluntary. The questionnaires included sections on demographic information and the key variables of the study using the aforementioned scales. Once the data were collected, they were screened for completeness and accuracy. This was done before even entering them into the statistical software for analysis.

Table 1: The Questionnaire Information.

Name of Variable	Number of Items	Reference Study
Sports mental toughness	Fourteen	Astaficevs *et al.*[44]
Physical exertion	Three	Keohane *et al.*[45]
Medication efficacy	Six	Volpicelli Leonard *et al.*[46]
Perceived efficacy in patient-physician interaction	Ten	Maly *et al.*[47]
Subjective sport performance satisfaction	Six	Nahum *et al.*[48]

The data were analyzed with Stata-SEM robust method and appropriate to assess complex interrelations involving latent variables. Adopting Structural Equation Modeling was adopted because it evaluates multiple relationships between

observed and latent variables simultaneously, allowing it to measure both direct and indirect effects. SEM also enables the assessment of model fit so that the proposed theoretical model can accurately capture the data in hand. Confirmatory factor analysis started by testing validity and reliability for the measurement model and then continued to test the structural model for the hypothesized relationships between sports mental toughness, physical exertion, medication efficacy, perceived efficacy in patient-physician interaction, and subjective sport performance satisfaction. Composite reliability, Cronbach's alpha, and average variance extracted (AVE) were calculated to determine the reliability and convergent validity of constructs. Path coefficients along with their significances were further tested to confirm the direct and mediating effects offered by the hypotheses.

Results

Table 2 provides Cronbach's Alpha values measuring internal consistency for the scales used in this study to tap all the constructs. The closer a Cronbach's Alpha value is to 1.0, the greater is the scale reliability. All the values for sports mental toughness 0.762, physical exertion 0.831, efficacy of medication 0.847, perceived efficacy in patient-physician interaction 0.835, and subjective sport performance satisfaction 0.862 were all above the acceptable threshold of 0.70, meaning that there was strong internal consistency for each construct. The outcome showed that the measures used are indeed reliable and can reliably measure the variables underlying the construct across the sample. Notably, the subjective sport performance satisfaction possesses the highest reliability with an alpha of 0.862, which further enhances the validity of its measure.

Table 2: Cronbach's Alpha.

Variable	Cronbach's Alpha
Sports mental toughness	0.762
Physical exertion	0.831
Medication efficacy	0.847
Perceived efficacy in patient-physician interaction	0.835
Subjective sport performance satisfaction	0.862

The CR values of all constructs sports mental toughness (0.724), physical exertion (0.850), medication efficacy (0.793), perceived efficacy in patient-physician interaction, and subjective sport performance satisfaction (0.837) are all above 0.70, thus verifying excellent construct reliability. AVE range from 0.525 to 0.612, which is well above the threshold of 0.50 and, therefore, indicates that more than half of the variance for each of the variables is accounted for by its items. It thus indicated adequate convergent validity. Specifically, subjective sport performance satisfaction again ranks first with an AVE of 0.612, meaning that the items intended to measure this construct have high common variances (see table 3).

Table 3: Variables Reliability and Validity.

Variable	Composite Reliability	Average Variance Extracted (AVE)
Sports mental toughness	0.724	0.599
Physical exertion	0.850	0.543
Medication efficacy	0.793	0.525
Perceived efficacy in patient-physician interaction	0.823	0.576
Subjective sport performance satisfaction	0.837	0.612

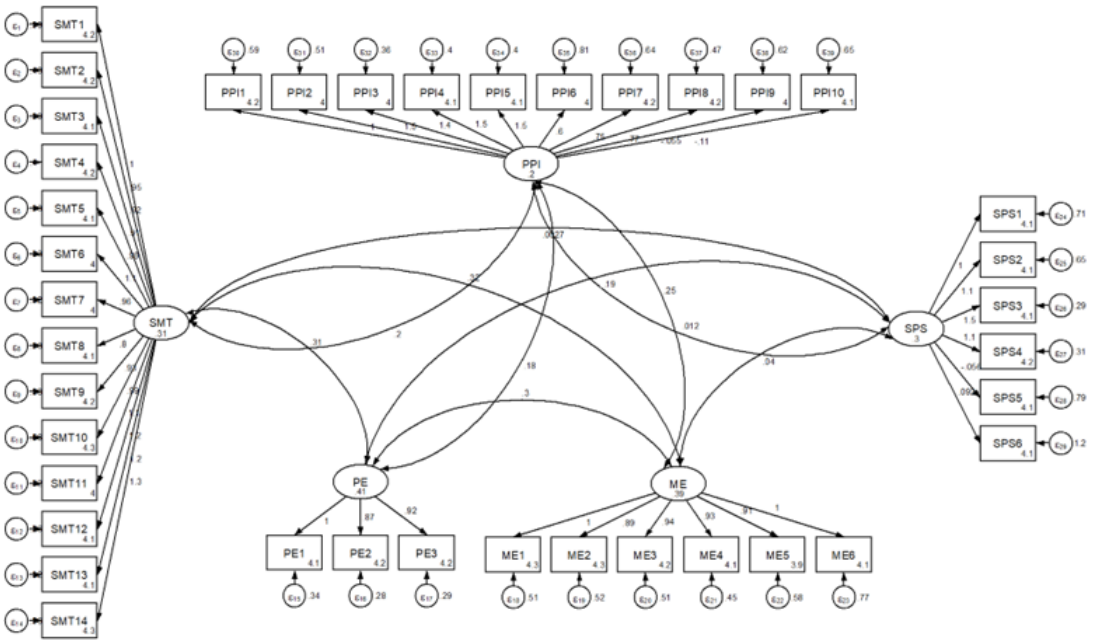

Figure 2: Estimated Model.

As shown in table 4, all the items (sports mental toughness items; SMT1 to SMT14) have statistically significant factor loadings by z-values way above 1.96 and p-values of .000; all indicate that the loadings are strong across all variables. The factor loadings of sports mental toughness range from 0.321 to 0.895; thus, there is a variance of stronger relationships among the items and the latent factor. PE1 to PE3 Physical exertion; ME1 to ME6 efficacy of medication; PPI1 to PPI10 perceived efficacy in patient-physician interaction; SPS1 to SPS6 subjective sport performance satisfaction all possess high loadings again with meaningful coefficients. The loadings are also robust across all items as could be seen from the confidence intervals, also justifying these scales to measure the dimensions they are supposed to be measuring.

Table 4: Confirmatory Factor Analysis.

Measurement	OIM Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]	
SMT1	1	(constrained)				
SMT2	0.748	0.069	10.646	0.000	0.612	0.883
SMT3	0.550	0.061	8.780	0.000	0.429	0.670
SMT4	0.321	0.057	8.407	0.000	0.692	0.885
SMT5	0.875	0.080	10.734	0.000	0.718	0.836
SMT6	0.810	0.076	11.435	0.002	0.667	0.822
SMT7	0.641	0.067	9.448	0.000	0.510	0.771
SMT8	0.321	0.064	4.930	0.000	0.195	0.446
SMT9	0.851	0.080	12.021	0.002	0.701	0.864
SMT10	0.601	0.070	10.017	0.005	0.501	0.825
SMT11	0.598	0.063	9.251	0.000	0.474	0.722
SMT12	0.792	0.064	12.109	0.000	0.666	0.918
SMT13	0.710	0.083	8.407	0.000	0.547	0.872
SMT14	0.895	0.070	12.551	0.000	0.757	0.835
PE1	1	(constrained)				
PE2	0.877	0.057	15.085	0.000	0.765	0.793
PE3	0.760	0.062	11.612	0.000	0.639	0.881
ME1	1	(constrained)				
ME2	0.610	0.063	8.987	0.000	0.485	0.734
ME3	0.737	0.070	13.844	0.000	0.692	0.891
ME4	0.781	0.064	11.461	0.000	0.655	0.907
ME5	0.758	0.065	11.009	0.000	0.631	0.885
ME6	0.858	0.067	12.036	0.000	0.726	0.801
PPI1	1	(constrained)				
PPI2	0.790	0.065	11.424	0.000	0.663	0.918
PPI3	0.818	0.065	11.932	0.000	0.692	0.756
PPI4	0.810	0.064	11.998	0.000	0.685	0.935
PPI5	0.679	0.058	10.930	0.000	0.565	0.792
PPI6	0.305	0.061	4.690	0.000	0.186	0.424
PPI7	0.867	0.064	12.715	0.000	0.742	0.805
PPI8	0.784	0.065	11.332	0.000	0.657	0.910
PPI9	0.812	0.064	11.836	0.000	0.686	0.750
PPI10	0.819	0.069	11.126	0.000	0.685	0.767
SPS1	1	(constrained)				
SPS2	0.826	0.063	12.238	0.000	0.703	0.763
SPS3	0.853	0.062	12.827	0.000	0.732	0.788
SPS4	0.692	0.060	10.865	0.000	0.576	0.809
SPS5	0.832	0.076	10.211	0.000	0.683	0.795
SPS6	0.572	0.067	9.529	0.005	0.476	0.785

Table 5 Measurement items fitness statistics. For sport mental toughness, items like SMT9 (.952) and SMT14 (.877) are strong fits and nearly perfectly aligned with the underlying construct. Other items, for example, SMT11 (.592), have lesser fitness and are closer to the lower threshold but within the limits. Items for physical exertion generally are of good fitness though not the case for PE1. The items for the medicine efficacy vary in their fitness ranging from ME1 to ME2 at 0.793 to that with .897 in ME3. Perceived efficacy in patient-physician interaction reveals high fitness across most items, although PPI5 (0.575) and PPI6 (0.609) show relatively lower but still acceptable values. Subjective sport performance satisfaction demonstrates similarly strong item fitness, such as on items like SPS5 (0.890), showing a strong fit to the construct.

Table 5: Measurement Items Fitness Statistics.

Variable	Indicator	Original Sample
Sports mental toughness	SMT1	0.820
	SMT2	0.810
	SMT3	0.722
	SMT4	0.780
	SMT5	0.839
	SMT6	0.865
	SMT7	0.890
	SMT8	0.801
	SMT9	0.952
	SMT10	0.880
	SMT11	0.592
	SMT12	0.722
	SMT13	0.732
	SMT14	0.877
Physical exertion	PE1	0.812
	PE2	0.862
	PE3	0.829
Medication efficacy	ME1	0.880
	ME2	0.592
	ME3	0.897
	ME4	0.808
	ME5	0.759
	ME6	0.887
Perceived efficacy in patient-physician interaction	PPI1	0.837
	PPI2	0.862
	PPI3	0.776
	PPI4	0.587
	PPI5	0.575
	PPI6	0.609
	PPI7	0.893
	PPI8	0.787
	PPI9	0.781
	PPI10	0.813
Subjective sport performance satisfaction	SPS1	0.831
	SPS2	0.676
	SPS3	0.654
	SPS4	0.865
	SPS5	0.890
	SPS6	0.801

Table 6 presents key model fitness statistics, which appraise how well the hypothesized model fits to the data. The saturated model has a standardized root mean square residual of 0.052, while the estimated model has a value of 0.069, which is below the threshold limit of 0.08. The chi-square statistics on the entire list, with values of the likelihood ratio being 13661.839 and the chi2_bs as 12723.552, also give a good p-value, both at 0.000 and 0.001, indicating that the model is suitable. Although chi-square is significant, one might suspect poor fit, yet this comes with such large sample sizes that it renders chi-square overly sensitive; with the assistance of low values for SRMR, one can assert that the goodness-of-fit is acceptable for the model.

Table 6: Model Fitness.

Fit Statistic	Value	Description	Saturated Model	Estimated Model
SRMR			0.052	0.069
Likelihood ratio	13661.839	model vs. saturated		
$p > chi^2$	0.000			
chi2_bs(2356)	12723.552	baseline vs. saturated		
$p > chi^2$	0.001			

Table 7 reports R-square, which represents the proportion of variance explained by independent variables for each construct. Sports mental toughness possesses the maximum R-square value, and that is 0.596, which means that approximately 60% of its variance is determined by the predictor variables. A moderate explanatory power is about 0.327 for physical exertion, an R-square of 0.483 for the efficacy of the medication, and an R-square of 0.550 for patient-physician interaction, which is relatively a high power of explanation. These results show that the independent variables in the model explain most of the variance of the constructs that are measured.

Table 7: R-square Statistics.

Variable	R Square
Sports mental toughness	0.596
Physical exertion	0.327
Medication efficacy	0.483
Perceived efficacy in patient-physician interaction	0.550

This table displays the outcome of the path analysis, considering the strength and significance of the relationships between variables. Sports mental toughness is found to have a high positive influence on the subject's sport performance satisfaction, with a coefficient of 0.269 and highly significant z-value of 12.541 (p = 0.000). Physical exertion also manifests a significant positive influence on subjective sport performance satisfaction (coefficient = 0.205, p = 0.000). Mediation analysis shows that physical exertion significantly mediates the relationship between sports mental toughness and subjective sport performance satisfaction (coefficient = 0.867, p = 0.000). The above results support the mediating role of medication efficacy.

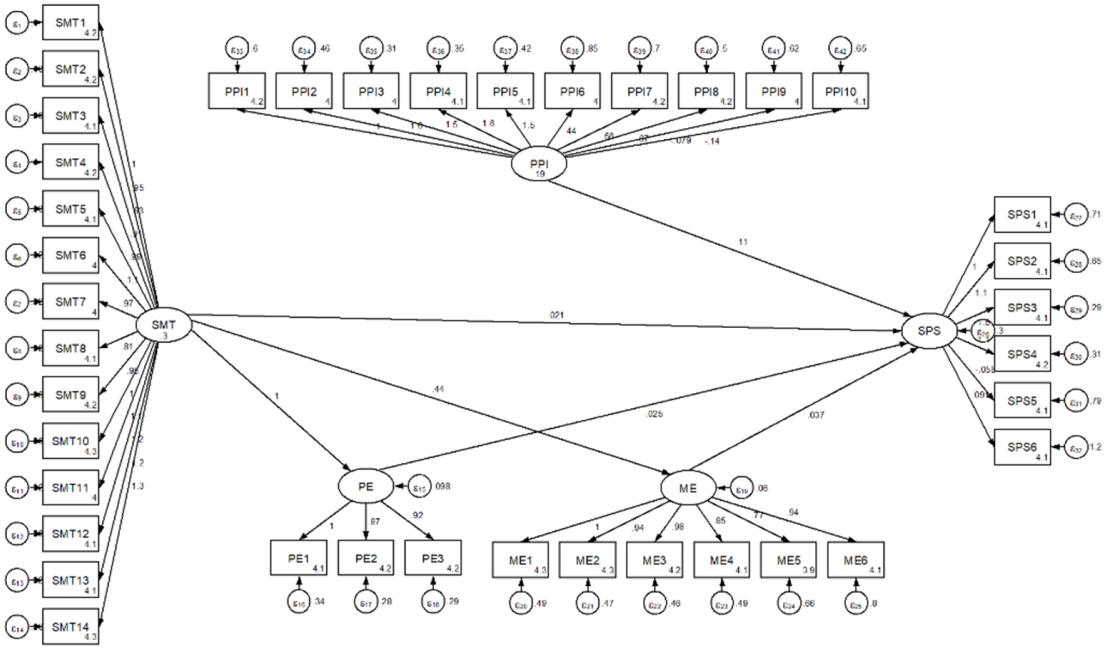

Figure 3: Structural Model for Path Analysis.

Medication efficacy also had a positive influence on subjective sport performance satisfaction; it was shown that it mediates the relationship between sports mental toughness and subjective sport performance satisfaction (coefficient = 0.879, p = 0.001). In conclusion, perception of effectiveness in the patient-physician interaction markedly moderates the relationship between sports mental toughness and subjective sport performance satisfaction (coefficient = 0.277, p = 0.000) in that this interaction actually enhances the effect of mental toughness on performance satisfaction.

Table 8: Path Analysis.

	OIM Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]	
Sports mental toughness significantly influences the subjective sport performance satisfaction.	0.269	0.069	12.541	0.000	0.740	0.813
Physical exertion significantly influences the subjective sport performance satisfaction.	0.205	0.088	11.126	0.000	0.485	0.734
Physical exertion significantly mediates the relationship of sports mental toughness and the subjective sport performance satisfaction.	0.867	0.162	2.827	0.000	0.685	0.767
Medication efficacy significantly influences the subjective sport performance satisfaction.	0.207	0.100	2.043	0.008	0.404	0.311
Medication efficacy significantly mediates the relationship of sports mental toughness and the subjective sport performance satisfaction.	0.879	0.490	1.977	0.001	0.179	0.547
Perceived efficacy in patient-physician interaction significantly moderates the relationship of sports mental toughness and the subjective sport performance satisfaction.	0.277	0.359	3.485	0.000	0.392	0.747

Discussion

This research intended to study these multifaceted relationships by including mental toughness, physical exertion, medication efficacy, and subjective sport performance satisfaction while considering the moderating role of perceived efficacy in patient-physician interactions. The outcome provides new insights into the dynamic interplay between the factors listed above, thus reinforcing the notion that a complex relationship exists between the psychological, physical, and medical experiences involving

the athlete, shaping his or her personal evaluations of performance. All six hypotheses were supported. Together, they culminate in a comprehensive understanding of relative contributions of internal psychological and external factors to the athlete's subjective satisfaction. As such, this discussion chapter examines implications of the findings alongside existing literature but offers new perspectives on the importance of holistic approaches to athlete well-being and performance. This section elaborates on each hypothesis in detail so that the study can delineate how it advances both theoretical as well as practical knowledge in the field of sports psychology and performance enhancement .

The first hypothesis was that sports mental toughness significantly influences subjective sport performance satisfaction. This hypothesis was supported by data: the importance mental toughness plays in terms of its impact on the performance evaluations made by the athletes comes to the forefront. This is, according to Chen *et al.*[21], consistent with already existing research because it emphasizes that athletes with higher levels of mental toughness would be better placed to handle stress, stay focused, and make more efforts in overcoming tough circumstances, hence becoming more satisfied with performance. Such athletes can better keep themselves composed under pressure and quickly recover from setbacks. This may often lead to a higher sense of achievement on their part, even in cases where objective outcomes might not be perfect. This also emphasizes the fact that subjective performance satisfaction is not merely a function of winning or extrinsic reinforcement but has very strong links to the athletes' internal psychological mechanisms and to their achievement of personal performance standards.

Again, acceptance of the second hypothesis, that physical effort exerts a robust influence on subjective sport performance satisfaction, further confirms how intrinsic the value is of effort and exertion for athletes. It is aligned with Hinman *et al.*[42], which indicates that the athletes who believe they exerted their utmost effort during practice or competition feel more satisfied regardless of whether they win or lose. The link between physical effort and satisfaction is based on the fulfillment athletes feel from knowing they performed to the best of their ability. This shows that efforts, though both psychologically and physically highlighting success, is seen to recreate the feeling of being exhausted or fatigued as a positive manifestation of effort, thus creating a greater sense of achievement. This has the impact of bringing efforts to light in determining the way performance is evaluated and essentially indicating that success is defined by outcomes but also, for many of the athletes, by how much they are investing with their bodies and in their minds.

Acceptance of the third hypothesis would bring about the idea that physical exertion significantly mediates the relationship between sports mental toughness and subjective sport performance satisfaction, thereby informing one on how both psychological and physical elements interplay in influencing the satisfactions of athletes. The results indicate that while psychological hardness is essential to facilitate athletes' tolerance for physical strain, the degree of such strain directly translates this psychological hardness into performance satisfaction. In short, the amount of physical efforts made by mentally tougher athletes would be through these efforts that they would gain improved satisfaction in their performance. The meditation relationship is grounded in the study of Paul *et al.*[26] that exposed the relationship between mental toughness and persistence. Showing that physical exertion acts as a mediator between mental toughness and satisfaction, the study elaborates the presence of psychological resilience in the physical efforts of athletes, thus portraying a more subtle view of the dynamics of psychological-physical satisfaction.

The fourth hypothesis is also supported, which stated medication efficacy significantly impacts satisfaction with subjective sport performance. This supports the role that perceived health and recovery have in influencing the ways in which athletes evaluate their performance. Athletes who perceive that their medication functions to alleviate pain, improve their ability to recover, or prevent an injury will be more likely to feel confident and capable of performance during competition. Satisfaction with performance would therefore be higher. This discovery harmonizes with Liaghat *et al.*[31], in which it was confirmed that athletes depend on the effectiveness of their drugs to prepare not only physically but also mentally. Medication with such effectiveness advances not only the physical function but even psychological concerns regarding health and recovery, allowing the athlete to focus more fully on his or her performance. It is in this bond between health management and satisfaction in performance that the presence of medical intervention in sports becomes crucial, with an emphasis on patient-centered, effective treatment plans that aim to promote both recovery from physical strain and psychological well-being.

Fifth, whereas the efficacy of medication would predictably significantly mediate the relation between sports mental toughness and subjective sport performance satisfaction, it is also seen as being proven by this study, which points to the role that medication actually plays in enriching psychological resilience among athletes. While mental toughness has prepared athletes to overcome the discomfort and trouble caused by physical suffering, the effectiveness of the medical treatment provided further strengthens this resilience by ensuring that their physical condition does not pull away their mental concentration. This mediation relationship deploys the work of Keating *et al.*[34], which found that athletes' confidence in their physical health would increase the effectiveness of mental toughness. Such findings would lead to a conclusion that medication is not just an enhancer of recovery but also the enhancement factor which keeps their mental clarity and focus in raising the best potential for their psychological strengths athletes entail. Management of physical symptoms allows the mentally robust athlete to devote himself fully to his performance leading to greater satisfaction.

The sixth hypothesis proposed that the perceived efficacy of patient-physician interaction significantly moderates the relationship between sports mental toughness and subjective sport performance satisfaction; thus, deriving critical insights into the importance of social and professional support in sports is very important. The belief of an athlete that his or her physician is competent and supportive is likely to enhance confidence in health management on the part of athletes, thus enhancing the impact of mental toughness on performance satisfaction. This is viewed from social support theory where interpersonal relationship quality greatly determines psychological outcomes.[19] As a moderator of the interaction between mental toughness and satisfaction, perceived efficacy in patient-physician interaction thus outlines the importance of trust and communication in health care contexts. The sportsmen who get their support from their physicians would be able to focus on their psychological strength and physical activities, knowing that their health is well taken care of. This means that doctors are very important, not only for recovery in physical form but also to heighten readiness and satisfaction amongst sportspersons psychologically.

In conclusion, in accepting all six of the hypotheses outlined, psychological traits, physical exertion, medication efficacy, and perceived efficacy of healthcare interactions all play roles in fashioning subjective satisfaction with sport performance. The study points out the need to approach the topic holistically, representing mental, physical, and medical factors as crucial contributors to satisfaction. In this regard, the direct driving forces of performance satisfaction come from mental toughness and physical effort, but the mediating and moderating role will be played by the efficacy of medication and healthcare support. Hence, this knowledge will have important implications for both the athletes and the professionals in sports, in the sense that better performance satisfaction demands more than psychological resilience or physical effort but also proper medical treatment and the support of the healthcare environment. From here, this study opens vistas for further studies towards the many-sided side of athlete satisfaction and the establishment of more well-rounded support mechanisms across the sports industry.

Conclusion

This research work, therefore, enlightened people on the critical roles sports mental toughness, physical exertion, medication efficacy, and perceived efficacy play in determining patient-physician interaction that influences subjective sport performance satisfaction. Subjective sport performance satisfaction is therefore demonstrated to be altered due to mental toughness in addition to its general significant impacts on athletic performances. Moreover, the mediating roles of exercise and treatment efficacy highlight the importance of holistic performance enhancement where psychosomatic well-being is deeply cared for. The moderation effect of patient-physician interaction suggests that support systems from outside, such as health care, play an important role in the strengthening of athletes' overall satisfaction as well as their wellness. Thereby, the studies used would deliver value-added insights but also come out with new approaches to further explorations mostly pertaining to the use of objective performance metrics, the effects of social support, and the role that technology plays in sports. In summary, this research derives theoretical and pragmatic implications whereby there would be a clear-cut roadmap for improving athletic performances and satisfaction via an all-inclusive grasping of psychological resilience, preparation of the body, and efficiency in healthcare service delivery.

Implications of the Study

This research significantly adds to the body of knowledge regarding the interrelation of sports mental toughness, physical exertion, medication efficacy, and perceived efficacy in patient-physician interaction within subjective sport performance satisfaction. Extending prior empirical findings, the study builds on an enhanced understanding of what has been traditionally viewed as a psychological advantage - that is, mental toughness - might truly be extremely influential in terms of determining an athlete's degree of satisfaction with their own performance. These mediation effects are a fresh theoretical insight in which a much more complex view of the interaction between both mental and physical factors can influence the performance outcome. Furthermore, the study introduces perceived efficacy as a moderator in patient-physician interaction; therefore, it will expand the scope by which external support systems, like healthcare, would affect the athletes' psychological well-being and performance satisfaction. These results make the case for holistic models that attempt to capture mental and physical health factors together and should urge upcoming theoretical frameworks in sports psychology to also take an integrative approach by not just individualistic traits, such as mental toughness, but also external features, including healthcare efficacy. This would open up more expansive models in sports performance, considering the tight interlinkage of psychological resilience, preparedness in the physical, and support health systems in predicting general athlete satisfaction and performance outcome.

This research thus has practical implications for athletes, coaches, and healthcare professionals, especially when trying to improve subjective sport performance satisfaction. It specifically necessitates mental preparation among athletes, not only to build their physical strength and mental toughness but also to develop it into a critical requirement for enhancing their satisfactory performance results. Hence, mental training skills in the form of visualization, stress management, and developing resilience should be included in daily training programs by the coaches. The results of the mediation of physical exertion also demand balanced exercise training in order to achieve optimal levels of exertion as athletes would work towards delivering optimal performance without burnout or injury. Understanding

perceived efficacy would enable sports physicians and other health professionals to enhance communication and establish trust with their athletes. This might lead to better compliance of the athletes towards medical advice thus contributing to better performance in general. Furthermore, the significant influence of drug efficacy suggests that athletes need to be educated clearly and scientifically on the manner in which drugs or supplements can help their recovery and performance. By integrating such results into practice, stakeholders involved in sports and health can facilitate athletes in producing better psychological satisfaction and physical results.

Limitations and Future Research Directions

Despite the myriad contributions of this study, it still has some limitations that need to be taken into account. For instance, the research is cross-sectional, thus not being possible to make strict inferences about causality between variables. Future studies should also make use of longitudinal designs to better capture the mental toughness, physical exertion, and medication efficacy dynamics over time in establishing more robust evidence for their effects over time on subjective sport performance satisfaction. The other limitation is that all the self-report measures are used throughout the study, which bear inherent risks of social desirability bias or recall bias. Future research should extend to include more objective measures of performance, such as physiological measures or third-party assessments, to cross-validate the self-reported outcomes. In addition, while the sample population for the research was composed of athletes, a difference may be in place among sports and competition levels, which may affect how results can be generalized. Beyond this, there is also a further need to investigate relationships differences that might prevail between individual versus team sports, or amateur versus professional athletes, for mental toughness, exertion in physical activity, medication efficacy, and performance satisfaction.

Potential avenues for research expansion as already hinted above include other psychological and environmental factors that would impact performance satisfaction. For instance, in future research, the impact on subjective performance satisfaction may be revealed for effects of social support from teammates, family, or coaches. Further studies may also widen the scope to cultural or geographical comparisons, which may also help understand how contextual factors shape relationships similar to those that were explored in this research. Other directions for future research are the investigation of whether the effect of mental toughness, as well as exertion, on the results of performance is conditioned by technological interventions, such as health devices in wearables or sports analytics. Once additional variables, such as these, are incorporated, the development of research based on existing knowledge within this current context would be possible and further unpack a more holistic explanation of what might cause subjective satisfaction in sport performance.

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Appendix 1

Medication Efficacy

1. My ability to perform my day-to-day activities.
2. The number of symptoms I experience.
3. The number of relapses/exacerbations I experience.
4. My ability to sleep.
5. My mood or level of happiness/depression.
6. My ability to exercise.

Sports Mental Toughness

1. Under pressure, I am able to make decisions with confidence and commitment.
2. I have what it takes to perform well while under pressure.
3. I have an unshakeable confidence in my ability.
4. I have qualities that set me apart from other competitors.
5. I can regain my composure if I have momentarily lost him.
6. I interpret threats as positive opportunities.
7. I get anxious by events I did not expect or cannot control.
8. I worry about performing poorly.
9. I am overcome by self-doubt.
10. I get angry and frustrated when things do not go my way.
11. I give up in difficult situations.
12. I am committed to completing the tasks I have to do.
13. I take responsibility for setting myself challenging targets.
14. I get distracted easily and lose my concentration.

Physical Exertion

1. Exercise tires me.
2. I am fatigue by exercise.
3. Exercise is hard work for me.

Perceived Efficacy in Patient-physician Interaction

1. How confident are you in your ability to get a doctor to pay attention to what you have to say?
2. How confident are you in your ability to know what questions to ask a doctor?
3. How confident are you in your ability to get a doctor to answer all of your questions?
4. How confident are you in your ability to ask a doctor questions about your chief health concern?
5. How confident are you in your ability to make the most of your visit with a doctor?
6. How confident are you in your ability to get a doctor to take your chief health concern seriously?
7. How confident are you in your ability to understand what a doctor tells you?
8. How confident are you in your ability to get a doctor to do something about your chief health concern?
9. How confident are you in your ability to explain your chief health concern to a doctor?
10. How confident are you in your ability to ask a doctor for more information if you don't understand what he or she said?

Subjective Sport Performance Satisfaction

1. Overall – to what extent are you satisfied with your sporting performance this week.
2. To what extent did you contribute to the success of the team this week.
3. To what extent were your capabilities truly reflected this week.
4. To what extent did you contribute to improving the performance of the players around you this week.
5. To what extent are you satisfied with your functioning during the challenging moments this week.
6. To what extent do you think the coach was satisfied with your performance this week.