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Original Article

THE ROLE OF RESILIENCE ON MOTIVATION AMONG BRAZILIAN ATHLETICS AND SWIMMING PARATHLETES

O PAPEL DA RESILIÊNCIA SOBRE A MOTIVAÇÃO DE PARATLETAS BRASILEIROS DE ATLETISMO E NATAÇÃO

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ABSTRACT
This cross-secctional study investigated the role of resilience on motivation among athletics and swimming parathletes. The subjects were 64 male (n=41) and female (n=23) parathletes from North and Northeast regions of Brazil. The parathletes were practitioners of athletics (69.5%) and swimming (30.5%), with mean age of 28.42±11.32 years. The instruments were the Sport Motivation Scale-II and Connor-Davidson Resilience Scale. Data analysis was conducted thorugh Kolmogorov Smirnov, Spearman correlation and Path Analysis ($p<0.05$). The results showed that resilience showed significant correlation ($p<0.05$) with all controlled and autonomous regulations: external ($r=0.29$), introjected ($r=0.40$), identified ($r=0.29$), integrated ($r=0.26$) and intrinsic ($r=0.42$). Path Analysis revealed that that resilience showed a significant (p 0.05) and effect on intrinsic, introjected and external regulations, explaining 16%, 11% and 11% of the variance of the variables, respectively. It should be noted that resilience had a moderate and positive effect on intrinsic ($\beta=0.40$), introjected ($\beta=0.33$) and external ($\beta=0.33$) regulations. It was concluded that in the context of the paralympic athletics and swimming, resilience seems to be an intervening factor on both autonomous and controlled motivation.
Keywords: Paralympic sport. Sports psychology. Motivation. Resilience.

RESUMO
Este estudo transversal analisou o papel da resiliência sobre a motivação de paratletas de atletismo e natação. Os sujeitos foram 64 atletas do sexo masculino (n = 41) e feminino (n = 23) das regiões Norte e Nordeste do Brasil. Os atletas eran das modalidades de atletismo (69,5%) e natação (30,5%), com idade média de 28,42 ± 11,32 anos. Os instrumentos foram a Escala de Motivação Esportiva II e a Escala de Resiliência Connor-Davidson. A análise dos dados foi realizada por meio de *Kolmogorov-Smirnov*, correlação de *Spearman* e a *Path Analysis* ($p<0,05$). Os resultados mostraram que a resiliência apresentou correlação significativa ($p<0,05$) com todas as regulações de motivação autônoma e controlada: externa ($r = 0,29$), introjetada ($r = 0,40$), identificada ($r = 0, 29$), integrada ($r = 0,26$) e intrínseca ($r = 0,42$). Path Analysis revelou que a resiliência apresentou efeito significativo ($p < 0,05$) sobre as regulações intrínseca, introjetada e externa, explicando 16%, 11% e 11% da variância das variáveis, respectivamente. Destaca-se que que o efeito foi moderado e positivo sobre as regulações intrínseca ($\beta = 0,40$), introjetada ($\beta = 0,33$) e externa ($\beta = 0,33$). Concluiu-se que, no contexto do atletismo e da natação paralímpica, a resiliência parece ser um fator interveniente na motivação autônoma e controladaa.
Palavras Chave: Esporte paraolímpico. Psicologia do esporte. Motivação. Resiliência.

Introduction

The growing prominence of the Brazilian Paralympic sport in the latest Paralympics Games[1] has aroused the attention of several areas of the sports sciences. Athletics and swimming are the type of sport that have won the most medals in the last editions of the competition[1]. In these sport, there is a predominance of technical capacity and a high intensity of effort, which demands high physical and psychological capacity from the athlete during training and competitions[2]. In this perspective, one of the main challenges for the athletes is to remain intrinsically motivated for sports practice to face the stressful demands and adversities throughout the season[3].

Motivation is one of the main aspects related to permanence in the sporting context, due to the status, skills and pleasure with the sport[4,5]. Self-Determination Theory SDT is a macrotheory that explains the role of extrinsic and intrinsic sources of motivation in the

human cognitive and social development[5]. SDT points out how social and cultural factors interfere on the sense of initiative, volition and well-being[4]. It is one of the most used approaches for the study of motivation in sport[6-8].

According to SDT, motivation is regulated through a *continuum* which varies from amotivation (the absence of interest in practice), to controled motivation (implementation of activities by reward, punishment, judgment or external pressure) and autonomous motivation (more self-determined motivation, which characterizes the subject by performing activities for the satisfaction, taste and pleasure in performing them)[5]. Controlled motivation is considered a form of motivation that does not contribute to personal development and may even cause adverse effects for the subjects involved, such as the abandonment of sports practice in long-term[6]. However, Balaguer et al.[9] state that some controlled attitudes, such as social support, involvement and development of autonomy also can help athletes to feel motivated to sports demands. Recent researches show it is desirable that the athletes be autonomously motivated for the sporting context, since this motivational regulation has a positive influence on the sport permanence, performance and development of the athlete[6-9].

Researchers have also examined how motivation facilitates participation in Paralympic sports[10]. Specifically, parathletes attribute motivation to the presence of other people (taking part in something that gives a person close contact with others) and to the opportunities for socialization with other parathletes[11]. Although there are few evidences about the motivation among Paralympic athletes, some studies have already used SDT in the context of Paralympic sport[12,13]. The autonomous engagement of paralympic athletes can be explained by personal psychological attibutes, such as resilience, that refers to the adaptation and resolution of risk situations within the cognitive, emotional and behavioral processes during the life[10]. Resilience is a dynamic and multifactorial process that involves the individual's skill to present a healthy development, even after experiencing risky situations[14,15].

Resilience is an essential component in the life of the individual with a disability, since the disability is directly associated to a process of agitation in adverse situations, which are characterized by unpleasant emotions and mental struggles. These agitations can take to positive outcomes, improving the psychological capacity of this individual and, consequently, promoting benefits in future agitation processes, and for the engagement in the most diverse tasks[16-18]. As an example, Lindsay and Yantzi[19] observed that young disabled people with high levels of resilience used a multitude of strategies to deal with winter times rain, snow to continue using their wheelchairs without affecting their daily demand.

According to the sport conceptual framework developed by Fletcher and Sarkar[20], resilience corresponds to the resources and protection against the potential negative effect of stressors developed from the athletes' mental and behavioral processes. Athletes with higher resilience are able to maintain good psychological functioning and motivation to perform their tasks[14,15]. Resilience also has a positive association with other protective factors, such as with self-esteem and interpersonal relationships[14,15].

Machida et al.[21] found that the social support of family members, teammates and coaches was fundamental for the development of resilience and motivation among wheelchair rugby athletes. Martin et al.[18] observed that wheelchair basketball athletes who reported high level of resilience tended to be the most involved in the sport and with the highest quality of life. Bačanac, Kasić-Marinković and Marinković[16] compared the psychological profile of athletes with and without disabilities, verifying that the psychological profile of athletes with disabilities is very similar to the profile of athletes without disabilities. This finding proves that sport can contributes positively to make individuals with disabilities able to obtain the best results in sport in the same way as athletes without disabilities.

In the face of this scenario, resilience and motivation are relevant components in the sport, since athletes must use and optimize a range of mental skills to withstand the pressures

they experience[14]. Thus, resilience arises as a psychological factor of paramount importance, since it assists athletes in the process of adapting and overcoming such stressful demands[14,15], and as a consequence, in the engagement of the athlete in the sporting context. Relating resilience and motivation in the paralympic sports context is something of extreme relevance, mainly due to the fact that these constructs are of great importance for this specific population and no studies have yet been found investigating the association between resilience and motivation in the context of Paralympic sport. In this way, this study intends to explore this gap, providing new evidences about the role of resilience on motivation in paralympic context. From a practical standpoint, this research can provide relevant information about how a personality disposition such as resilience can be a predictor of an attitudinal/behavioral variable such as motivation, showing the role of the capacity to adapt and overcome the adversities along life on the engagement of the person with disability in the sporting context.

In view of these considerations, this study aimed to investigate the role of resilience on motivation among athletics and swimming Brazilian parathletes. The hypothesis of this investigation is that resilience will show higher association with the regulations closer to the autonomous motivation (intrinsic, integrated and identified regulation).

Methods

Participants

This cross-secctional study consisted of 64 parathletes (male, n=41 and female, n=23), participants of North-Northeast phase of Brazilian Paralympic Circuit 2017 (Largest Parasport competition for athletics and swimming in the North and Northeast regions). Parathletes competed in athletics (69.5%) and swimming (30.5%), and showed mean age of 28.42 ± 11.32 years. Further, 75% of athletes had physical disability, 21.9% intellectual disability and 3.1% visual disability. Furthermore, 54,7% of the athletes reported having congenital deficiency.

The participants were selected for convenience and the inclusion criteria were the following: 1) To participate in regional and state competitions for more than 1 year; 2) To participate of Braziliam Paralympic Circuit 2017. Only the athletes who signed the consent term or had the term signed by the coaches (responsible for the athletes in the event), were selected to the research.

Instruments

Motivation. Sport Motivation Scale-II (SMS-II) was developed by Pelletier et al.[22] and validated for the Brazilian context by Nascimento Junior et al.[23]. SMS-II consists of 18 items distributed into six regulations (intrinsic, integrated, identified, introject, external and amotivation). Items are responded on a 7-points likert type scale raiging from 1 (Does not correspond at all) to 7 (Correspond completely). According to the categories proposed in the SDT *continuum*[5], the identified, integrated and intrinsic regulations are the components closest to autonomous motivation, while the introject and external regulations are the components closest to controlled motivation. Past researches has supported the factorial validity, test-retest reliability, and internal reliability of this scale with sport participants[6, 7]. The reliability of the dimensions of the scale for the present study ranged from $\alpha = 0.70$ to $\alpha = 0.83$, indicating strong reliability[24].

Resilience. Connor-Davidson Resilience Scale (CD-RISC-10) was developed by Campbell-Sills and Stein[25] and validated for the general Brazilian context by Lopes and Martins[26]. This scale consists of 10 items that are responded on a likert scale of five points. The result is a single-point score from 0 to 40 points, which indicates from the lowest to the highest level of resilience. Lopes and Martins[26] demonstrated the factorial validity and

internal reliability of this scale with sport participants. The reliability of the scale for the present study was $\alpha = 0.79$, indicating strong reliability[24].

Procedures

This study is integrated into the institutional project approved by the Ethic Committee of the Federal University of "Vale do São Francisco" (opinion 1.648.086). Initially, contact was made with the Brazilian Paralympic Committee to request permission to collect data at the North-Northeast phase of the Braziliam Paralympic Circuit 2017. Data collection took place in the hotels where the teams were housed, as well as in the place where the competition took place, lasting approximately 30 minutes. For athletes with visual and intellectual disability, the researchers read the items and marked the answers on the questionnaires. The order of the questionnaires was randomized among the participants and the application was performed individually by the researchers.

Data analysis

Preliminary analysis. The preliminary analysis of the data was carried out by means of the Kolmogorov Smirnov normality test. Pearson correlation was used to verify the relationship between variables. Such analyses were conducted in the SPSS v. 22.0 software.

Path analysis. In order to verify the percentage of explained variance of the motivation regulations for the athletes' resilience, a model of path analysis was conducted with all variables. The existence of outliers was evaluated by the square distance of Mahalanobis (DM^2) and the univariate normality of the variables was evaluated by asymmetry (ISkI<3) and uni and multivariate curtosis (IKuI<10). We conducted the Bollen-Stine Bootstrap technique to correct the value of the coefficients estimated by the maximum likelihood estimation method, implemented in the AMOS software version 22.0. No values of DM^2 indicators of the existence of outliers were observed, nor any correlations between variables indicating multicollinearity problems (Variance Inflation Factors <5.0). The interpretation of the paths was based on: small effect for paths up to 0.20; medium effect for paths between 0.21 and 0.49; and large effect for paths higher than 0.50[27]. The significance level adopted was $p<0.05$.

Results

Preliminary Analysis

The data was firstly screened for missing values. There were no missing values in the dataset as the lead researcher had ensured all surveys were completed during data collection. The data were then screened for univariate and multivariate outliers, with no outliers found within the sample. Finally, the data were screened for normality. The skewness values ranged from -0.05 to -0.85 and the kurtosis values ranged from -0.23 to 0.74, indicating reasonable normality[28].

Descriptive analysis

Table 1 presents the means, standard deviations and correlations for all variables. The mean scores on the 1–7 response scale of the SMS-II revealed that paralympic athletes perceived higher scores on the regulations closer to autonomous motivation. The mean scores from highest to lowest were as follows: intrinsic regulation (x=6.19; sd=0.90); identified regulation (x=6.17; sd=1.04); integrated regulation (x=5.88; sd=1.15); introjected regulation (x=5.39;sd=1.14); external regulation (x=3.94; sd= 1.80); and amotivation (x= 2.73; sd= 1.78).

Based on the resilience score (x= 31.78, sd=6.88), paralympic athletes perceived they were developing of resilience through Paralympic sport. In addition, Table 1 presentes the correlations between the variables, especially the correlations of resilience with the external (r = 0.29), introjected (r = 0.40), identified (r = 0.29), integrated (r = 0.26) and intrinsic (r = 0.42) regulations.

Table 1. Bivariate correlation between motivation and resilience of paralympic Brazilian athletes

Variables	Motivation						Resilience
	1	2	3	4	5	6	7
1. Amotivation	-	0.47*	0.10	-0.13	-0.13	-0.19	0.11
2. External Reg.		-	0.22	0.13	0.10	0.05	**0.29***
3. Introjected. Reg.			-	0.35*	0.35*	0.26*	**0.40***
4. Identified Reg.				-	0.63*	0.71*	**0.29***
5.Integrated Reg.					-	0.58*	**0.26***
6. Intrinsic Reg.						-	**0.42***
7. Resilience							-
x	2.73	3.94	5.39	6.17	5.88	6.19	31.78
sd	1.78	1.80	1.14	1.04	1.15	0.90	6.88

Note: *Significant Correlation - p < 0,05. Note: x = mean; sd= standard deviation; Reg. = Regulation
Source: Authors

Path Analysis

In order to verify the percentage of explained variance of the motivation regulations by athletes' resilience, a model of path analysis was conducted with all variables (Figure 1). It was found that resilience showed a significant ($p < 0.05$) and positive association with intrinsic, introjected and external regulations, explaining 16%, 11% and 11% of the variance of the variables, respectively. Regarding the individual trajectories, it should be noted that resilience had a moderate and positive effect on intrinsic ($\beta = 0.40$), introjected ($\beta = 0.33$) and external ($\beta = 0.33$) regulations, revealing a directly proportional association between the variables. These results indicates that each increase of 1 standard deviation in the unit of resilience, an increase of 0.40, 0.33 and 0.33 standard deviation occurs in the unit of intrinsic, introjected and external regulation, respectively. The paths of resilience toward amotivation ($\beta = 0.23$), identified regulation ($\beta = 0.27$) and integrated regulation ($\beta = 0.23$) were non-significant ($p > 0.05$).

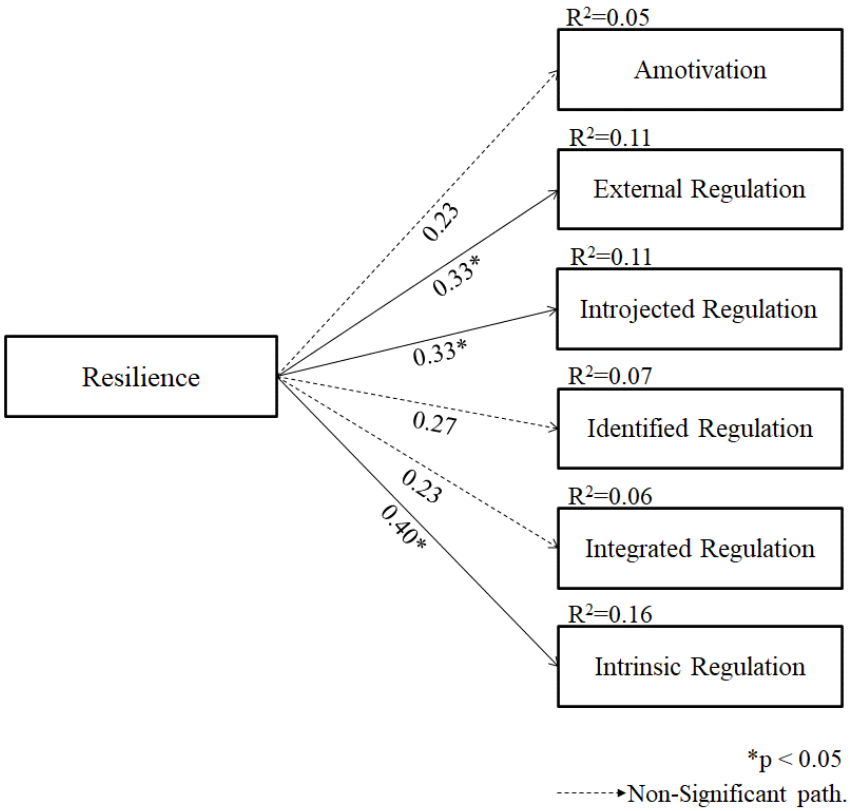

Figure 1. Path analysis model of the of resilience on motivation among Brazilian parathletes
Source: Authors

Discussion

The purpose of this study was to investigate the role of resilience on motivation among athletic and swimming Brazilian paratletes. The findings are relevant to the extent that more scientific evidence is needed regarding the role of psychological variables in the context of paralympic sport[1]. Our findings confirm partially our hypothesis, since it was found higher association between resilience and intrinsic regulation. Nevertheless, resilience also presented positive effect toward introjected and external regulations, however, with lower intensity (Figure 1).

The literature shows that resilience is of paramount importance within the high-performance sports context, indicating that the capacity to adapt and overcome adversity favors greater autonomous involvement in sports[14,15]. Fletcher and Sarkar[20] demonstrated that athletes with high levels of resilience are able to develop more competence and prove their values to others as a form of motivation for the training routine and competitive sport competition. In this way, high levels of resilience are regarded as a necessary psychological attribute for high levels of motivation and, consequently, a better performance[29].

In this perspective, the main finding of the study refers to the positive effect of resilience on the intrinsic regulation of the para-athletes, indicating that the ability to deal with problems, adapt to changes, overcome obstacles or resist the pressure of adverse situations favors the individual's autonomous engagement, promoting more pleasure and satisfaction with sports practice[14,15,20]. According to Cognitive Evaluation Theory, both social contexts and factors such as rewards, interpersonal controls and implications involving the ego influence motivation and intrinsic interest[5]. This theory highlights the critical role played by competence and autonomy-support in promoting intrinsic motivation, especially in educational, artistic and sporting contexts[5]. Thus, it can be inferred that the ability to deal with

problems and adverse situations favor the development of competence and autonomy, which, in turn, lead to an increase in self-determined motivation for sports practice.

Another micro theory that can explain this result is the Basic Psychological Needs Theory, which postulates that psychological well-being and ideal functioning are based on autonomy, competence and relationship satisfaction[5]. As resilience favors the increase of autonomy, competence and the strengthening of social relationships, it can be said that the development of resilience leads to the satisfaction of individual's basic psychological needs and, as a consequence, to autonomous engagement in sport[14,15].

Behavioral engagement is a psychological construct that is associated with personal enjoyment[30]. This engagement is the key construct within[31] Model of Motivational Dynamics (MMD), which states that social peers influence behavioral engagement levels, and that engagement is also associated with both coping and resilience, corroborating the findings of the presente study. This model is also grounded in SDT and it is a model of positive motivational development that postutlates that people will be engaged when their basic psychological needs are met32. SDT postutaltes that autonomy-supportive environments impact functioning and wellness, as well as performance and persistence[4,5]. In this perspective, supports for relatedness and competence are seen as interactive with volitional supports in fostering engagement and value within different domains of activity, such as sports[4,5].

Another result that support the hypothesis of the present study was the positive effect of resilience on the identified regulation, which is considered part of the autonomous motivation[14]. This finding shows that the resilience developed by the individual along life seems to favor greater identification and appreciation of sports practice and the consequent engagement with the demands of this context[14,15,20]. The identified regulation is already a self-determined form of extrinsic motivation, whereas the person, when considering external demand, accepts it as something really important[14,15]. This form of motivation is partially related to an internal locus of causality and a certain perception of autonomy[14]. In this perspective, it can be inferred that an individual with a disability can do the best in training because he/she wants to become a high-performance athlete. This individual's motivation is instrumental, consequently, extrinsic, but identifies with the reason for training, which is to become an athlete.

Corroborating the findings of this research, Szemes, Szájer and Tóth[33] observed that Hungarian paralympic swimming athletes demonstrated higher levels of intrinsic motivation than their non-disabled peers. The authors argue that the capacity to overcome the adversities and difficulties imposed by the disability can be a determining factor for the greater intrinsic motivation of the athletes. Martin et al.[18] found that wheelchair basketball American high performance athletes with higher levels of resilience also showed greater commitment to sports practice and higher quality of life.

A surprising finding that partially rejects the hypothesis adopted in this study was the positive effect of resilience on the regulations closest to controlled motivation (introjected and external regulations). This result indicates that more resilient athletes have a significant part of their motivation also resulting from the search for approval, pride, avoiding guilt and shame within training and competitions, in addition to the search for social recognition and financial reward[4,5]. According to the Organismic Integration Theory, in order to internalize extrinsic motivation and become it more self-determined, social peers (e.g. parents, coaches, partners) must act directly on the values, beliefs and objectives of the individuals, since social context is extremely important for the behavioral action exercised by individuals in the different contexts of life[4,5]. It is noteworthy that autonomous support and the search for social recognition are factors for internalizing external regulation[5]. The same theory points out supports for autonomy and relatedness as critical to internalization of extrinsic motivation[4].

In this way, high levels of resilience in Paralympic athletes may be related to the fact that these athletes create higher expectations for the search for expressive results (e.g. medals) and, consequently, achieve social recognition[14]. The literature points out that the work done by the coaches based on social support, autonomy development and social involvement is a form of controlled regulation of the athlete' behavior that may help in the maintenance of mental and physical health[7,34]. In support of our findings, Mallett and Hanrahan[35] observed in elite athletes that resilience seems to work to optimize the internalization and integration of more self-determined forms of extrinsic motivation. Fletcher and Sarkar[20] showed that olympic champions who valued and deemed external demands as important normally chose to act in challenging sporting environments. This process of internalizing and integrating regulations and values is central to SDT[5] and appears to be an important psychological asset that influences the assessment of challenges and metacognitions.

Mallett and Hanrahan[34] investigated the motivational processes among elite athletics athletes in Australia, verifying these individuals were characterized by multiple motivations of self-determined (intrinsic motivation) and non-self-determined (extrinsic motivation) nature. While some athletes revealed enthusiasm, pleasure and a sense of relationship with colleagues as important reasons, others pointed out less self-determined reasons like defeating opponents, money and social recognition as reasons to compete at the highest level. Thus, in the high performance sport context, athletes seem capable of internalizing and integrating more self-determined forms of extrinsic motivation. That is, they are gradually able to transform external and introjected regulations into self-regulation.

Our findings indicate that individual's capacity to better perceive, deal with, and overcome adversity can regulate the behavior by both external and internal factors. These results show that resilience is associated with pleasure and autonomous engagement, as well as with athletes' engagement in sport for financial support or social recognition[15]. Further, our evidences make possible to ensure that autonomous motivation is not the only one responsible for engaging in paralympic sport, as previous studies have indicated in conventional sport[4, 36].

Finally, despite the unprecedented contributions to literature, some limitations should be highlighted. First, the sample size and the recruitment of only individual sports prevent the generalization of the results to the whole paralympic context. However, the sample can be considered relevant because athletes competed at the main competition for their sports of the sports in Brazil. The second limitation refers to the transversal design used in the research, allowing no inferences of causality. Another limitation was that sex (male x female), sport type (individual x collective) and age group were not investigated. In this way, future investigations should continue to explore the relationships between such variables, analyzing parathletes from other regions of the country and adopting a longitudinal design, with the aim of establishing new evidence about the role of resilience on motivation in the paralympic sports and investigate also the relationships between resilience and basic psychological needs satisfaction.

Conclusion

It can be concluded that in the context of athletics and swimming paralympic athletes, resilience seems to be an intervening factor on both autonomous (intrinsic and identified regulations) and controlled (introjected and external regulation) motivation. However, it should be noted that the capacity to overcome the stressful demands and adversities showed more important role on autonomous engagement for sports practice. From a practical standpoint, we highlight the importance of professionals linked to paralympic sport in providing a pleasant yet challenging atmosphere during training and competitions, in addition to guaranteeing a quality relationship, since social support seems to be associated with the

development of psychological skills to face adversities, which, in turn, can favor autonomous engagement in sports.

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