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Published by the Athens Institute for Education and Research (ATINER)

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- Dr. Margo Apostolos, Academic Member, ATINER & Professor, University of Southern California -USC Kaufman School of Dance-USC Gloria Kaufman Dance Medicine Center- & Co-Director- Cedars-Sinai, USA. (Arts, Technology and Sports)
- Dr. Maria Kosma, Head, Sports Unit, ATINER & Associate Professor, Louisiana State University, USA. (Physical Education & Sport Science)
- Dr. Maria Konstantaki, Head, Sport, Exercise, & Kinesiology Unit, ATINER & Research Fellow, UK. (Sports Science)
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The *Athens Journal of Sports (AJSP)* is an Open Access quarterly double-blind peer reviewed journal and considers papers from all areas of sports and related sciences. Many of the papers published in this journal have been presented at the various conferences sponsored by the [Sport, Exercise, & Kinesiology Unit](#) of the **Athens Institute for Education and Research (ATINER)** & the [Panhellenic Association of Sports Economists and Managers \(PASEM\)](#). All papers are subject to ATINER's [Publication Ethical Policy and Statement](#).

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The current issue is the second of the eleventh volume of the *Athens Journal of Sports*, published by the [Sport, Exercise, & Kinesiology Unit](#) of the ATINER under the aegis of the Panhellenic Association of Sports Economists and Managers (PASEM).

Gregory T. Papanikos, President, ATINER.



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- Abstract Submission: **8 October 2024**
- Acceptance of Abstract: 4 Weeks after Submission
- Submission of Paper: **14 April 2025**

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- Abstract Submission: **18 June 2024**
- Acceptance of Abstract: 4 Weeks after Submission
- Submission of Paper: **1 July 2024**

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Dr. Maria Konstantaki, Academic Member, ATINER & Senior Lecturer,
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The Fair Inclusion of Intersex and Transgender Athletes based on Kinesiology, Physiology and Athlete Wellness

By Raymond Stefani*

Fair eligibility-requirements for intersex and transgender female athletes are sorely needed for Olympic competition. Those designated 46 XY DSD are usually judged to be intersex females at birth with Differences of Sexual Development (DSD), producing testosterone-creating testes instead of ovaries. Men who transition to female are defined as transgender women and have testosterone-creating testes. To quantify the role of testosterone, physics and kinesiology were applied to running, swimming, speed skating and rowing, to evaluate the female/male velocity ratio of Olympic Champions from 1980 through 2020/21 as driven by the relative lean-to-weight ratio of elite athletes. That velocity ratio now equals the relative lean-to-weight ratio of 90%. Since circulating testosterone drives the lean-to-weight ratio, higher testosterone gives men that 10% advantage over women. A definitive paper written when a limit of 10 nmol/L was used, concluded that 5 nmol/L was the lowest reasonable limit to impose, and then it was exceeded against Castor Semanya. Intersex athletes were born that way, suggesting that no limit or a limit of 10 nmol/L would be fair. Since transgender female athletes undergo therapy, 5 nmol/L might be achievable without medical or psychological side effects, instead of requiring transition before male puberty, which happens rarely.

Keywords: *intersex females, transgender females, testosterone limits, lean-to-weight ratio, gender inclusion*

Introduction

For 128 years, women have sought equity in Olympic competition. Although women were not allowed to compete in 1896, they began their Olympic journey in 1900. They began competition in swimming in 1912 and in athletics in 1928. Women have now earned equal representation in Olympic competition, compared to their male counterparts; but a major problem has emerged for two groups who identify as female athletes: those who were identified as female at birth but have had Differences of Sexual Development and those who were identified as men at birth but have transitioned to become female transgender athletes. There are few of these athletes but the need for fairness calls out loudly.

Fairness is fundamentally a subjective activity, but fairness is best achieved when it takes proper account of objective facts. We begin by identifying world record holders in various events and the advantageous physical traits which are admired and accepted. Physics and kinesiology are then applied to swimming, rowing, running and speedskating to identify the key physical traits that define the relative velocity ratio of elite female/male athletes and we compare the accuracy of

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using an evaluation based on those relative traits compared to the actual relative velocity ratios of Olympic champions.

We examine differences in sexual development especially for intersex female athletes. The relationship between testosterone and relative lean-to-weight ratio is covered. The history of some intersex and transgender athletes is examined as well as what happens when testosterone limitations are enforced. Unfortunately, implementation of testosterone reduction is shown to have serious physical and psychological side effects.

Based on this study, suggestions are made for dealing fairly with intersex and transgender female athletes who seek inclusion in the Olympics.

World Record Holders Who Were “Born That Way”

Although copyright laws make it difficult to include photos of the present or past world record holders that we are about to discuss, the reader can locate photos using Google or other similar online search engines.

Weight throwers are born with significant upper body and arm strength, allowing them to generate enough force to be successful. That strength is clearly visible in Valerie Adams (New Zealand) and Ryan Courser (USA), women’s and men’s shotput world record holders.

Carl Lewis (USA) in the long jump and Keni Harrison (USA) in the 60m hurdles possess the balanced strong lower leg, thigh and upper body strength needed to move their entire bodies upward.

Jamaican runners like Usain Bolt in the 100m and 200m are born with a combination of lean-to-weight ratio and fast-responding muscles, while living in an environment with the weather and nutrition to enhance those advantages, making them highly successful in sprint events. Sifan Hassan, world record holder in the women’s 10k, is typical of African distance runners who are extremely slender and have very high oxygen turnover, because of growing up at altitude. To illustrate their success, for the last seven Olympic Games, covering 1996 through 2020 (actually held in 2021), African runners in the 5k and 10k runs for men and women have won at least one medal in all those 28 events, Wikipedia-Olympic athletics winners-men (2024) and, Wikipedia-Olympic athletics winners-women (2024). We do not see action taken to handicap them or the others mentioned above for the various physical attributes they were born with.

In the next section, we quantify the measurable physical attributes that correspond with success. Having that objective knowledge, the goal will be to suggest fair answers to the difficult questions of deciding under what conditions intersex female athletes who were born that way and transgender female athletes can compete.

Derivation of the Relative Performance of Male and Female Athletes

Physics and kinesiology are used to derive the velocity ratio for women/men involving elite athletes competing in rowing, swimming, running and speed skating, Stefani (2006, 2014). The following abbreviations are used.

v = velocity, Cr = cranking coefficient, e = efficiency, LBM = lean body mass
 m = body mass, Cd = drag coefficient, Tr = training, LTW = lean to weight ratio

Rowing and Swimming

For rowing, the left side of (1) is the power that the rower applies to the water. The right side is the power with which the water pulls back on the boat due to drag, which affects the achievable velocity. In all the sports considered, training affects the amount of power the athlete can generate from LBM while efficiency affects how much of that generated power works to move the athlete forward.

$$LBM \times Tr \times e \times Cr = v^3 \times \text{surface area}(m^{2/3}) \times Cd \times \text{constants} \quad (1)$$

Next, (1) is written separately for women and men and divided, resulting in the velocity ratio in (2), affected by the relative women/men lean-to-weight ratio LTW_W/LTW_M , training, efficiency, and other terms.

$$v_W/v_M = [(LTW_W/LTW_M) (Cr_W/Cr_M)]^{1/3} (m_W/m_M)^{1/9} [(Tr_W/Tr_M) (e_W/e_M)]^{1/3} \quad (2)$$

For swimming, the left side of (3) is the power that the swimmer applies to the water, which differs from that of rowing because the swimmer is directly in the water. The right side of (3) is the power with which the water pulls back on the swimmer due to drag, which has the same form as for rowing in (1).

$$LBM \times Tr \times m \times \text{swim efficiency} = v^3 \times \text{surface area} (m^{2/3}) \times Cd \times \text{constants} \quad (3)$$

As was done in (2) for rowing, (4) for swimming provides the velocity ratio.

$$v_W/v_M = [(LTW_W/LTW_M)/(Cd_W/Cd_M)]^{1/3} (m_W/m_M)^{4/9} [(Tr_W/Tr_M) (e_W/e_M)]^{1/3} \quad (4)$$

Equations (2) and (4) can be simplified using a data base of 2286 elite athletes, taken from 10 papers used in Stefani (2014). The cranking (arm pulling) ratio, Cr_W/Cr_M , and the drag ratio, Cd_W/Cd_M , both are found to closely equal the relative LTW ratio, while the mass ratio, closely equals the square of the relative LTW ratio. By using those equalities to simplify (2) and (4), as shown in the top panel of Table 1, surprisingly, the velocity ratios for rowing and swimming are the same in terms of the relative LTW , relative training and relative efficiency.

Table 1. *The Velocity Ratio of Elite Rowers, Swimmers, Runners, and Speed Skaters in Terms of Relative Lean-to-Weight Ratio, Relative Training, and Relative Efficiency*

Sport	v_w/v_M	
	Lean-to-Weight	Training and Efficiency
Rowing and Swimming	$(LTW_w/LTW_M)^{8/9}$	$[(Tr_w/Tr_M) (e_w/e_M)]^{1/3}$
Running and Speed Skating	LTW_w/LTW_M	$(Tr_w/Tr_M) (e_w/e_M)$

Running and Speed Skating

The physics and kinesiology of running and speed skating both involve applying power to the ground to move against gravity as evaluated on the left of (5) while gravity pulls back, creating the right side of (5), affecting achievable velocity. By writing (5) for women and for men and then dividing and simplifying, we have the result in the lower panel of Table 1.

$$\text{LBM} \times \text{training} \times \text{efficiency} = m \times \text{velocity} \times f(\text{angles}) \quad (5)$$

The four sports are remarkably similar, all strongly affected by the relative lean-to-weight ratio. If training and efficiency are about the same for women and men, the relative lean-to-weight ratio would determine the velocity ratio. We now examine the average velocity ratio of female/male Olympic champions as compared to elite athlete values for LTW_w/LTW_M in Table 2 for rowing and swimming and in Table 3 for running and speed skating.

Lean- to-Weight Ratios and Velocity Ratios for Olympic Champions

Five periods of Olympic history are chosen for Tables 2 and 3, starting when women first competed in swimming in 1912. These periods separately include the dominating effects and recovery from WW1, WW2, the cold war, boycotting, and the current administration of anti-drug policies. The average velocity for the female and male Olympic champions of each era are calculated from winning times taken from the International Olympic Committee website. The velocity ratios are compared with available relative LTW ratios as per Table 1, from the sources in Stefani (2014).

In Table 2 for swimming, the female Olympic champions have increased their relative velocity ratio until we see equality in the most recent two periods with the 8/9 power of relative LTW. For rowing, we obtain the same values for the most recent period as for swimming: 90% relative velocity ratio and 90% predicted by the 8/9 power of relative LTW. That means women have achieved equity in terms of training and efficiency and that relative LTW is the main physiological determinant.

Table 2. Rowing and Swimming Comparisons of the 8/9 Power of Elite Athlete LTW Values with the Velocity Ratios of Olympic Champions

Period	Rowing		Swimming	
	Elite LTW %Ratios N=1789	Rowing Champions Velocity %Ratios N=49	Elite LTW %Ratios N=1815	Swim Champions Velocity %Ratios N=181
1912-1924 (WW1)				83
1928-1952 (WW2)				87
1956-1976 (Cold War)				90
1980-1988 (Boycotts)		90	91	91
1992-2021 (Anti-Drug)	90	90	90	90

In speed skating, the female Olympic champions' relative velocity increased until it was the same as relative LTW in the fourth period used. For running, women also improved their relative velocity ratio but for the most recent two periods their relative velocity ratios are each 1% lower than what we would expect based on relative LTW. As explained in Stefani (2014), there is a known inefficiency for women because their hip width relative to their height is wider than for men, creating a longer stride, probably causing the 1% inefficiency. Women have 6 times the ACL tears as men, likely the cumulative effect of those longer strides relative to height. We have seen women undergoing knee strengthening exercises, during visits to the Colorado Springs Olympic Training Centre.

Table 3. Running and Speed Skating Comparisons of Elite Athlete LTW Values to the Velocity Ratios of Olympic Champions

Period	Running		Speed Skating	
	Elite LTW Ratios N=156	Running Champions Velocity %Ratios N=103	Elite LTW Ratios N=51	Speed Skating Champions Velocity %Ratios N=46
1912-1924 (WW1)				
1928-1952 (WW2)		88		
1956-1976 (Cold War)		89		89
1980-1988 (Boycotts)	92	91	92	92
1992-2022 (Anti-Drug)	91	90		92

The two conclusions from the four sports above are that women have made advances in training and efficiency, equalizing with their male counterparts and that relative LTW is the dominant effect of velocity differences with men. Now that women have made these gains and now that we have great world record holders who are born with obviously useful LTW ratios for their sports, issues have emerged with female athletes who were identified as female at birth but who have had differences of sexual development that they were just born with. We now examine differences of sexual development.

Differences of Sexual Development

Humans typically have 46 chromosomes, two of which denote sex, Medline Plus-Differences of Sexual Development (2024). A male with normal development has XY chromosomes and is identified as 46 XY having male genitalia and testes. A female with normal development has XX chromosomes and it identified as 46 XX having female genitalia and ovaries.

Table 4. *Normal Sexual Development and Differences of Sexual Development (DSD)*

Chromosomes	Description	Genitalia	Gonads
46 XY	Male	Male	Testes
46 XY DSD	Intersex Female	Mostly Female	Testes
46 XX	Female	Female	Ovaries
46 XX DSD	Intersex Male	Mostly Male	Ovaries

A male or female with differences of sexual development is identified as DSD in Table 4 and is referred to as intersex because the normal genitalia and gonads are switched. An intersex female (46 XY DSD) has genitalia that are mostly female at birth causing identification as a female, but instead of ovaries, the person has testosterone-producing testes. An intersex male (46 XX DSD) has genitalia that are mostly male at birth, causing identification as a male, but instead of testes, the person has ovaries. Testosterone-producing testes for the intersex female triggers a great deal of consideration because that person will have much more testosterone, and as we will learn, a higher LTW ratio than a 46 XX female. Conversely, there are no sports-competition issues with a 46 XX DSD male competing against normal males, because the intersex male lacks the testosterone that 46 XY males would have.

A famous case in sports history relates to Stella Walsh, whom we would now identify as being 46 XY DSD.

Stella Walsh

Born in Poland in 1911 as Stanisława Walasiewicz, her parents emigrated with her to the US when she was young. She used Stella Wash as her Americanized name. Information on her life is available at Wikipedia-Stella Walsh (2024). As she grew up, she exhibited skill in athletics. Photos taken during her sports career show a masculine appearance. Due to her status as an immigrant born in Poland, she was unable to find a way to become eligible to compete for the US. Competing for Poland, she won a gold medal at 100m in the 1932 LA Olympics and silver at 100m in the 1936 Berlin Olympics. After WW2, she was still unable to become eligible to compete for the US so her athletics career ended.

Walsh was shot and killed resisting an armed robbery in 1980. An autopsy showed that she had an incomplete uterus and a non-functioning, underdeveloped penis. Chromosome analysis revealed she was what we would now call 46 XY DSD, having testes instead of ovaries, implying significant testosterone creation. Her birth record, stated that she was female. The Cuyahoga County coroner,

Samuel Gerber, stated that Walsh was "socially, culturally and legally" a woman. The IOC and the IAAF sports federation chose not to take away medals. Their lack of such action indicates an opinion that she was just born that way and no action was called for.

Male and Female Testosterone Levels and Issues with Controlling Them

Before puberty, males and females have very similar levels of testosterone. Sports competition in that age bracket allows both sexes to compete together equally. After puberty, male testosterone increases 20 times as fast as for females. The relative lean-to-weight ratio rises for males. As circulating testosterone rate grows for males, so too does the rate of haemoglobin growth which provides increased oxygen flow, enhancing running and swimming skills. Several references dealing with biological processes indicate that the advantage for males in running rises to 10% and the advantage in jumping rises to 20%. Those figures are consistent with Tables 2 and 3, in that a female/male velocity ratio of about 90% implies a 10% male advantage. As for jumping, kinetic energy proportional to the square of velocity equals potential energy created by vertical jumping height, required for both the high jump and to create long jump distance. The square of .9 equals .81, indicating men jump 19% better, close to the 20% quoted.

A definitive 60-page paper with 185 references, includes extensive discussion of the above biological processes involved with testosterone growth, Handelman et al. (2018). The paper includes a summary of studies of 3754 healthy men and 2655 healthy women, which was used to calculate 95% confidence intervals for men and women for circulating testosterone.

Women: 0 to 1.70 nmol/L

Men: 7.7 to 29.4 nmol/L

The paper was sponsored by the IAAF. Action taken by the IAAF after publication, regarding limitation on intersex athletes like Castor Semanya as discussed below, shows reliance on these values. The paper suggests that the then practice of limiting intersex and transgender athletes to 10 nmol/L was not strict enough. Neither was using 7 nmol/L. Given that many exceptional female athletes have above 1.7 nmol/L for legitimate medical conditions, such as having ovarian cysts, the paper concluded that intersex and transgender female athletes should be limited to <5 nmol/L to compete fairly and yet not to disenfranchise female athletes with legitimate medical conditions.

Those figures are based on the survey of 95% confidence levels and not on the effects on athlete wellness. There are significant physical side effects due to reducing testosterone for intersex female athletes: Karkazis et al. (2012), and Karkazis and Carpenter (2018). There are also significant psychological side effects when the intersex female athlete must undergo embarrassing physical examinations and when her physicality becomes public as she seeks certification. The papers point out that the intersex female was born that way, had sought no advantage and ought not to have experienced such an attack on wellness.

Next, we examine the experiences of a current-day intersex female athlete.

Caster Semenya

Caster Semenya was born in South Africa in 1991 and identified at birth as female, Wikipedia-Caster Semenya (2024). As a young female, she showed skill in athletics as did Stella Walsh years earlier. As was true of Walsh, Semenya showed a masculine appearance. She was designated as intersex, 46 XY DSD. The specific testosterone limits required of her clearly show the importance placed by the IAAF on Handleman et al. (2018).

From 2011 to 2018, as required by the IAAF for an intersex female athlete, Caster kept her testosterone level under 10 nmol/L, although she stated that the medications used to reduce testosterone made her feel ill. She won 6 medals in the world championships and Olympics (5 at 800m and 1 at 1500m).

From 2018 to 2023, the IAAF would not let intersex female athletes compete from 400m to 1 mile who were over 5 nmol/L, but they could compete at shorter or longer distances if their testosterone level was below 10 nmol/L. She could not comply with 5 nmol/L, so she tried 200m and 5000m but could not reach the finals.

From 2023, the IAAF requires intersex female athletes to be under 2.5 nmol/L for 2 years to compete from 400m to 1 mile and for 6 months for other events, even though Handleman et al. (2018) indicated that the limit ought not to be below 5 nmol/L. Her career was over, but she and other intersex female athletes were born that way but probably cannot reach 2.5 nmol/L without a gonadectomy.

Transgender Athletes

While limits on testosterone have been created for intersex female athletes, finding an objective method for including transgender female athletes has proven more difficult. The term sex refers to biology while gender refers to preference. A transgender athlete has one biological sex but chooses to follow the opposite gender. A male transitioning to become a transgender female does have an advantage against biological females due to testosterone-induced physicality. The proactiveness now exhibited in sports against transgender female athletes can be traced back to the situation surrounding the Press Sisters.

Questions Raised by Irina and Tamara Press

The Press sisters were born in Ukraine of Jewish parents. They went on to compete for the Soviet Union. Tamara Press (1937-2021), Wikipedia-Tamara Press (2024), won 4 medals in the shot put and discus during the 1960 and 1964 Olympics. Irina Press (1939-2004), Wikipedia-Irina Press (2024), won 2 medals in the 80m hurdles and pentathlon during the 1960 and 1964 Olympics. Together, they set 27 world records. In competition, they appeared to be female; however, when traveling and in other contexts, they dressed and appeared to be brothers, as in the photo in TransGriot-Press Sisters (2024).

These sexual identity questions raised serious issues about the very credibility of female competition in world and Olympic competition. It was reasonable, under these circumstances, for the IAAF to create gender verification. Acting in haste, part of that verification involved the invasive and embarrassing inspection of the athlete. When it became required in 1966, the Press sisters both retired from sports competition. We do not know if they were being evasive about their sex or if they were simply insulted. All prior-to-1966 and future-to-1966 designations of Tamara and Irina Press have been that they were female.

In today's world, we would like transgender athletes to be dealt with fairly and compassionately, without creating problems with their mental wellness.

IOC Fairness Followed by Federation Exclusion

The complex and interrelated decisions for dealing with the Press sisters, Stella Walsh and Castor Semenya were part of a history of attempts to deal with sexual questions in sports, Wikipedia-Sex verification in sports (2023). Along with defining sexual identity have been attempts to restrict testosterone levels for intersex female athletes and transgender female athletes, Wikipedia-Testosterone regulations in women's athletics (2024).

Through 2015, the IOC had required gender-affirming surgery for transgender female athletes. In 2015, they terminated that practice, IOC (2015). In 2021, the IOC published a policy statement showing great compassion for transgender female athletes, IOC (2021). Included were efforts to promote inclusion, prevention of harm, non-discrimination, fairness, no presumption of advantage, an evidence-based approach, and primacy for health and bodily autonomy. Having opened the doors to compassion and fairness, the IOC then asked the sports federations to use those principles to create their own transgender policies.

Two federations basically slammed the doors shut on transgender females. Hearings were held by FINA, which renamed itself World Aquatics, and by IAAF, which renamed itself World Athletics. Policies were then activated by World Aquatics in June 2022, World Aquatics (2022), and by World Athletics in March 2023, World Athletics (2023). Both federations reached the same conclusion: transgender female athletes could only compete if they transitioned prior to male puberty at about age 12 and if they maintained testosterone levels <2.5 nmol/L for one year. Many jurisdictions do not allow transition for pre-pubescent males or females at all. Further, those that provide health care for early transitioners, such as in Kaltiala (2023) and Durden (2023), are warning that many pre-pubescent transitioners are showing alarming signs of physical and psychological duress after making that decision. Kaltiala indicated that if they wait until about age 18 post-puberty, 80% who were questioning whether their birth sex is their preferential gender change their minds and remain with their sex of birth, rather than decide too late that they did not really want to transition. As these warnings are heeded, few if any elite transgender female athletes will transition before puberty and thus few if any would be eligible to compete in the Olympics or world championships under current World Athletics and World Aquatics rules.

If a reasonable level of testosterone would be required of all transgender female athletes, regardless of when they transitioned, it would be up to them to try to successfully make the attempt to meet the testosterone limit, rather than be denied that opportunity altogether. In this paper, we are dealing with elite athletes of Olympic caliber, but it is also very important for various jurisdictions to establish fair eligibility requirements for young transgender female athletes at any level who want to compete against those who have been females from birth. It is a matter of fairness for the transgender athletes to be able to compete and for the female athletes born female to be able to compete in a fair environment. Both are important for the integrity of sport in general.

Handelman et al. (2018) noted a study in which the reduction of testosterone for transgender female athletes resulted in a reduction of muscle mass by 9.4% and a reduction of hemoglobin by 14%, both of which would reduce performance. A testosterone limitation can achieve its goal, if the limit is reasonable.

As was mentioned related to intersex female athletes, a limit <2.5 nmol/L was considered too low by Handelman et al. (2018), because some biological female athletes might exceed any limit below 5 nmol/L due to legitimate medical issues, and unfairly be disqualified. They concluded that a fair limit would be <5 nmol/L. It is important to conduct actual tests to see if <5 nmol/L is achievable without requiring a gonadectomy or creating wellness issues.

Sociological affects upon Athletes Seeking Qualification in Sport

In addition to considering the objective technology used to establish rules for allowing intersex female athletes and transgender female athletes to compete, we must also examine the sociological affects upon the athletes who are sensitive individuals also seeking social acceptance.

For example, as Castor Semenya sought to have testosterone limits raised, she found herself having to describe embarrassing personal intersex anatomical features to the media. She said that the medications she was required to take to suppress circulating testosterone made her consistently ill. Since she and other similar athletes were just “born that way” I suggest her sociological status and that of similar athletes would be much improved by taking no action. If some value must be required to satisfy World Athletics and World Aquatics, and since Castor Semenya was able to achieve 10 nmol/L and compete successfully, that would be my suggestion for a workable value for all intersex female athletes, if one must be employed.

Regarding a transgender elite female athlete, she has her sports goals dashed with negative effects on her psychological wellbeing by learning that she must have transitioned prior to male puberty, which few if any have done. Instead, since World Athletics and World Aquatics once chose 5 nmol/L as a testosterone limit for intersex female athletes, using that value for all transgender female athletes, regardless of when they transitioned, would give them all a light at the end of their psychological and physiological tunnel.

Conclusions

We applaud the great world champions who have special physicality. We accept that they were born that way.

Sport strongly restricts intersex female athletes who were simply born that way and ought to have no restrictions like the world record holders. A limit of 10 nmol/L seems the fairest if a limit is needed. Any lower limit would have medical and psychological side effects.

Transgender women purposely changed gender from the sex assigned at birth. Few will be able to transition before age 12 due to needing parental approval and due to legal age restrictions. Following the very substantive paper mentioned earlier, to compete as an equal to female-born athletes, it is reasonable to limit testosterone level to <5 nmol/L for transgender female athletes, regardless of when they transitioned. since transgender athletes are undergoing significant hormone therapy aimed at avoiding side effects. It is important to conduct tests to see if <5 nmol/L is achievable without requiring a gonadectomy or creating wellness issues.

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Practice and Implications of Emerging Technology on Sport Management

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Sport has always been under pressure to change. Fortunately, we can see the pressures coming as emerging technologies are published online. This situation offers an advantage as sport management students can be taught to ponder such technological advancements. No one has the complete right answer(s) today - but we can speculate and begin to prepare sport for the emerging technologies. This paper outlines five (5) advancing technologies and proposes questions for debate on their potential impact on sport. The technologies include: sporting equipment and 4D printing; deep brain stimulation and competition anxiety; block chain management; human driven drones and long distance races; and preparing for races that are higher, faster, and further around the moon and back. It is important to begin to prepare so we 'get it right' as an example of potentially not getting it right is offered to start the discussion. Insights and debate can aid to devise strategies concerning the way forward in emerging times. This means we have an opportunity to contribute to leading edge education and advance management skills for the future of sport. Significant change is happening – and sport management educators can aid in getting ahead of the issues.

Keywords: *sport management education, emerging technologies and sport, management of sport challenges, sport policy*

Introduction

Sport has changed over time. The change has encompassed, for example, the sophistication of sport facilities, the modernization of sport equipment technologies, innovations in sport clothing and shoes, the progress of rules and regulations, along with the addition of a plethora of niche sporting events. There is currently pressure for sport to continue to change that stems from an influx of emerging technologies. These technologies have the potential to impact the future of sport.

Those in sport management need to prepare for a future of adaptations for the integration of -- or rules to prohibit -- emerging technologies in sport. This includes preparing sport management students today to be ready for sport of tomorrow. It is not too early to consider emerging technologies, along with their implications, and to begin making determinations concerning the way forward for the future of sport.

Researchers have recognized that insights concerning our uncertain future can aid in preparing for policy development and the act of policymaking for a field of

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endeavor (Rijkens-Klomp 2012, van der Steen and van Twist 2012). It has been noted that work to generate foresight aids to lay the groundwork for policies needed in the future (van Dorsser et al. 2020). Yet, preparations, or the development of foresight, have not been considered to the fullest – particularly when it comes to policy analysis and development (van Dorsser et al. 2020). This lack of preparation has been attributed to “an absence of well-defined links between the fields and a common unambiguous typology” (van Dorsser et al. 2020, p. 1). An application of this conclusion is that there is a lack of understandings and interpretations of emerging technologies and their potential impacts on the way forward in policies that will ensure fair and equitable competitions for the future of sport. Action to move forward to prepare for policies for emerging technologies can be implemented today.

Van Dorsser et al. (2020) developed a framework that aids in guiding an examination of one’s future with links to both policy analysis, along with policymaking. The framework which is based on the research of Walker (2000) and Voros (2003), encourages the consideration of the driving forces in our uncertain future and has three areas of focus. The first focus is on the identification of potential problems (in this case the potential problem is the integration of emerging technologies within sport). The second area of focus is on the identification of potential solutions that are not fixed statements but flexible options. The third area of focus is on understanding the impacts and trade-offs for the consequences associated with each solution.

To begin a study on the future of sport with emerging technologies, this paper offers an example of a controversy that illustrates the need for those in sport management to ‘get it right’ when applying technologies. Next, an examination of emerging technologies, or application scenarios concerning technologies, are presented to stimulate debate on their application within sport. The technologies include: (i) beyond 3D printing -- preparing for 4D printing and sport, (ii) deep brain stimulation and sport, (iii) blockchain management of sport competition registration and results, and (iv) robotic game officials. Finally, the discussion encourages preparing for additional emerging technologies.

The Need to Get it Right -- Technology and Sport!

When technology is introduced within sport, it is imperative that those in sport management ensure that the associated rules ensure fair and equitable competitions. But in some instances, there is controversy concerning the application of technology and the associated rules – and it can take years until all parties impacted agree that we “got it right”. For example, controversy has arisen concerning the starting blocks setting/policy established for false starts in Athletics sprint races.

Studies have indicated that the average start time out of the blocks is 115 milliseconds (Davis 2022), but that is only an average, the best in the world are faster than average. The rule for false starts in athletics involves any reaction to the starting gun earlier than 100 milliseconds (Davis 2022). Campbell (2022) noted

that “1-thousandth of a second can determine the difference between great start vs. illegal one” (para. 1). However, not all starting blocks are the same and their small differences in the technology may impact athletes.

When starting block technology for athletics was introduced, multiple companies began to develop and utilize different algorithms within their equipment (Davis 2022). This meant that there could be miniscule levels of difference between starting blocks - depending on which company manufactured the equipment being used at a competition (Campbell 2022, Davis 2022). These very small differences could have an impact on an athletes’ race as it has been noted that the algorithms do not:

measure a runner's exit from the blocks; just the pressure sprinters exert with their feet prior to taking their first step. If the equipment is more sensitive, it'll register that pressure sooner, and likely shave a few thousandths [of a second] off a lot of people's reaction times (Campbell 2022, para. 23).

This measurement of foot pressure could result in legal starts that are declared to be false starts and an athlete can be eliminated from a competition, despite years of training for the event (Campbell 2022).

When it comes to getting out of the starting blocks, very minor differences in reaction time or the algorithm can mean an athlete can continue to compete or they are thrown out of a race for a false start. For example, National Football League (NFL) wide receiver and sprint competitor, Devon Allen (from the USA), false started at the 2022 World Championships men’s semi-final 110-metre hurdles event with a time that one thousand (.001) of a second below the established threshold (Campbell 2022, Davis 2022, Schad 2022, Sutter 2022). His false start was noted as being “completely undetectable to the human eye” (Schad 2022, para. 4). Another example involves TyNia Gaither (from the Bahamas) with a false start at the 2022 World Athletics Championships 110-meter women’s event that was 0.093 seconds too fast compared to the threshold (Davis 2022, Hassenfeld and Resnick 2023). These individuals were thrown out of their race for a false start – despite years of training/competing to get to the event. It has been suggested that the current “increase in the number of [elite] sprinters trying to jump the gun is probably just a more accurate picture of their hair-trigger reflexes in action” (Campbell 2022, para. 24).

Reaction times (RT) of sprinters have been studied. For instance, Haugen et al. (2012) examined 571 international sprint athletes that competed between 1997-2011 and concluded “that world class sprinters’ reaction times and thereby their 100m performance can vary 0.03–0.05 [seconds] depending on false start regulations and holding time” (p. 1). Also, Harrison et al. (2018) in their study found:

that in all trials, the hand plate RT [reaction time] occurred significantly before the IAAF RT with an average difference of 64 ms [milliseconds]. The consistent differences in RT’s suggested that the two systems measured separate events. A re-evaluation of false start detection technology based on measuring hand RT is recommended (p. 1).

A call for the starting blocks to measure the hand plate (instead of the foot plate) was proposed by Davis (2022). This call was made with the caveat that adapting to testing the hand movement was a better test of a false start - as that is what moves first (Davis 2022). Calls for World Athletics to change their false start policy have been made (Campbell 2022, Schad 2022).

Meanwhile, World Athletics hired scientists to examine start times and the starting block technology (Campbell 2022). These scientists suggested that the algorithms could adapt the allowable start time to 80 milliseconds [or .08 seconds] to account for extremely fast - but feasible - reactions to a starting gun (Campbell 2022). So, do those in sport management for athletics have starting block technology management correct or not?

Other technologies that emerge in the marketplace will challenge those in sport management to “get it right” for athletes. Currently, there are several known emerging technologies, and we can begin to prepare today by considering their implications and debate the way forward for their use within sport.

Beyond 3D Printing -- Preparing for 4D Printing and Sport

Three-dimensional (3D) printing (or additive manufacturing) options are advancing. A host of sport-related items have been developed with 3D printing techniques, including the examples of sport shoes (Deng 2018), badminton shuttlecocks (Lin et al. 2014), baseball leg guards (Lee et al. 2016), hurling gloves (Harte and Paterson 2018), and American football helmets (Schwaar 2023). The 3D printed sports equipment has been noted by Novak and Novak (2020) as providing “improvements in performance of [the]products” (p. 1). This was reiterated by Scott (2018) when discussing the 2018 Winter Olympics men’s 500 metre short track speedskating gold medal winner, Daijing Wu, from China. This medal win could have been, in part, attributed to the novel 3D printed gloves with metal fingertips that were used to touch the ice with less friction when navigating the curves on the track (Scott 2018).

Monitoring any 3D printed sport equipment adaptations is challenging for those in sport management seeking to ensure fair and equitable competitions. While novel equipment is being developed with 3D options, 4D printing techniques are emerging.

4D printing techniques add another dimension to personalized sporting equipment options. The 4D printing technique allows for “outside energy inputs” (Haleem et al. 2021, p. 311) with stimuli such as temperature or light that can be added. This technology can

“...reimagine building, production, assembly of products, and performance” (Haleem et al. 2021, p. 311). An imagined example of 4D printing involves the potential advance of skis and snowboards that can be made to be temperature activated ... to adapt for temperature changes during a competition. This means the ski or board can sense the temperature and adapt to be efficient for the conditions to obtain optimal speed. Another issue for those in sport management could be that hackers could impact the 4D printing process of a board of a competitor - perhaps the world champion!

Those in sport management need to determine the way forward with the advance of 3D and 4D printing. When is the appropriate time to consider arising questions concerning the advance of 3D and 4D printing of sport equipment and the impacts on sport? The authors of this study promote that sport managers need to debate the potential implications and begin the process today of deciding the rules and regulations for such potential sporting equipment options with an effort to support fair and equitable sporting contests. Starting with research on advancing printing techniques - that is currently under-represented in the body of sport management manuscripts (Novak and Novak 2020). It is not too early to consider how emerging printing innovations could impact sport and the rules that may need to be implemented.

Deep Brain Stimulation and Sport

Sunnybrook Health Science Centre (in Toronto, Canada) has been completing studies and clinical trials on deep brain stimulation, or what has been referred to “as a new scientific discipline called neuromodulation” (Mitchell 2021, para. 13). In one clinical trial, two electrodes were permanently placed deep within the brain of a live patient (that was also a scientist), a battery pack was linked to the electrodes and placed in range of the collarbone, and an electric current was run from the battery to the electrodes (Mitchell 2021). Why did they do this? The electrodes were positioned in a section of the brain that controls feelings and actions (Mitchell 2021). They were trying to interrupt the regular brain activity to eliminate the patients’ anxiety and cravings for alcohol (or alcoholism) with targeted electrical current. It was not a ‘cure’, but did result in reducing the cravings.

Over time, if this technology is perfected, it could be utilized in curbing other addictions, such as smoking and gambling. An extension is that, in sport, the technology could aid elite athletes to manage pre- and during competition anxiety/jitters. Those in sport management may not know that the technology is being utilized if an athlete’s hair covers the wires and battery pack. Now is the time to start the debates on the technology and its use in sport – or should it be prohibited?

Further, Elon Musk started clinical trials with brain implants in 2023. His implant technology focuses on patients with paralysis (Reuters 2023, Vance 2023) with the aim “to enable people to control a computer or keyboard using thoughts alone” (Reuters 2023, para. 3). The hope is to advance the ability to obtain brainwaves onto a computer through thought. The technology is open for additional purposes (Vance 2023). Application of brain implants for the purpose of overcoming anxiety with respect to sport performance, thus, is not far-fetched!

So, questions arise: Whom in sport management should begin to debate and determine the way forward in sport for neuromodulation (when clinical human trials on brain stimulation have already begun)? Should we wait to see if such technology gets used in sport and then develop rules/regulations, or, debate and determine the way forward prior to the first athlete being caught with such technology? If caught, should this technology be considered as legal, or should it be prohibited in sport? If legal, what are the impacts on fair and equitable sport

competitions? If illegal – or not - how could it be monitored, managed, and penalized? Debate questions/issues swirl as the potential implications and strategies for moving forward concerning the potential for neuromodulation technology to be in the marketplace and its application to those in sport. We now address another emerging technology.

Blockchain Management of Sport Competition Registration and Results

Blockchain technology involves recording data in a closed system (Li et al. 2023). A large amount of data can be stored simultaneously on all computers in the system for a consistent data display (Liu et al. 2023) that will be resilient over time (Gad et al. 2022). This software technology is an “alternative to databases” (Gad et al. 2022, p. 6738) that provides up-to-the-minute accuracy, along with a time stamp stating when the data was recorded within the system and by whom (Gad et al. 2022). The data cannot be changed without pre-determined permission/access, and if approved, keeps track of any changes made (Gad et al. 2022). Overall, the “advantages of blockchain include its distributed ledger, decentralization, information transparency, tamper-proof construction, and openness” (Xu et al. 2019, para. 1). The technology has been utilized in various fields, such as music (O’Dair and Beaven 2017), exporting (Ipek 2019), along with healthcare and financial practices (Kim and Sarin 2018), including cryptocurrency (Xu et al. 2019). Improvements in this technology are advancing, for example with “cross-chain technology [that] has a significant impact on improving blockchain performance” (Liu et al. 2023, para. 1).

Today, sport managers and students can debate the use of blockchain technology and its potential within sport. For instance, blockchain technology could be used to develop a revolutionary system for sport registration and performance management. An example scenario is football registering every player into a blockchain system, starting at the grassroots and up to the elite level. This registration system would, thus, follow every player as they moved up the competition ranks. Individual leagues could be combined into one blockchain system from each city/town, province/state, country, and then be interconnected databases that has a record of players worldwide. This would result in a one-stop, longitudinal, sport registration/results system.

The player registration data could be standardized and cover the usual requirements that would be maintained forever in the blockchain system. Such data includes an annual record of an athlete’s address, proof of birthdate, height, weight, a headshot/photo, along with the team in which they were a member, their position, the coach, etc. All data for registered athletes and coaches in the sport is then in one place and builds over time - if they continue in the sport. Some of this type of data can currently be found within online sites that offer historical data for many individual athletes – but, generally, starting at higher levels of sport, not from the grassroots levels. Additionally, the current data is incomplete and a blockchain system would be advanced.

A player blockchain system could also include the registration date, a record of an athlete’s performance results, including statistics for each season played, a

link to a video of each game, video recordings of each players highlights, such as each goal, save, key plays, penalties, interviews, any coaching reports on the player, etc. The system could be open to allowing athletes to present postings/video clips for approval to be added to the database. Once approved, they could be uploaded to provide evidence that each player desires to promote their achievements. Overall, this blockchain registration and performance management system provides an in-depth history for scouts with data from a global body of athletes, along with their statistics and video data that illustrates each athlete's progress over time. Additionally, it can record the performance results of every coach in the system. The data can offer a one-stop global system that builds over time and does not lose any previous data.

A comprehensive player database generates a recruiting tool that can be seen, potentially, by any scout, from any league or team around the world. It could advance the predictive future with, for example, what Wickramasinghe (2020) worked on for cricket whereby all-rounders were classified into four categories to aid in the prediction of new all-rounders. This means a specific algorithm could be generated to predict the next top players in a sport. This could provide an advantage to athletes that could be overlooked, for example, due to the lack of scouts in their part of the world.

Another scenario is a blockchain fan registration system. This would generate a one-stop site of support for a sport from the grassroots fan to the international and professional level fan-base. An all-inclusive system could aid sport organizations, leagues, and football clubs as they seek to generate targeted communications “to booster the emotional and mediated connections with fans, creating a strong community” (Borges 2018, p. 263). Further, it could advance a targeted reach that is open to events “which comprises [both] online and presence times [as well as those that] can be placed in the category of ‘hybrid events’” (Gebler-Branch 2018, p. 293).

Importantly, the blockchain fan registration system could be used to establish statistics concerning the performance of club fan behaviour – aiding in reducing stadium violence – including pinpointing individual perpetrators. It could include a record of those that have been involved in violent incidents surrounding football – starting at any age. Further, it can be used to aid in reducing fan violence as those caught committing such violence can mean their whole fanbase could get punished. This could promote a fan self-management system. This may aid authorities to manage such individuals and incidents.

Early adopters of a blockchain sport systems for players and/or fans may obtain widespread media coverage, recognition, and advantages from an all-inclusive database. They will also be tasked with overcoming any issues that arise. Today, those in sport management can consider potential issues and can debate the way forward with respect to questions that stem from the potential multiple perspectives when considering the use of blockchain technology for sport registration and performance results.

Issues from an athletes' perspective include examples of questions that arise concern the confidentiality of the data and, specifically, if each athlete owns their personal data. The owner of the data gets to determine who has access and how the

data will be utilized – so this is a critical point to resolve. Further, the safety and security features for their data is a concern. If a player must be added to the database when they register to play, is this leading to an invasion of privacy? If players are minors, where does parental approval come into play? An advantage is that players could have the opportunity for their data to be seen by scouts – despite where they live in the world. Will there be a way within the system for players to see which scouts have accessed their data? Or will scouts need an athlete's permission/consent prior to accessing data? What about the issue if a player wants a particular item in the data deleted as it could hurt their career path (i.e., a dirty/illegal play). Can they request alterations, or have it removed? Or ... is sport data in a blockchain truly irreversible? Additionally, how will the data be protected from computer hacks that could pilfer data and hold it for ransom or steal one's identity?

From a team and scouting perspective, examples of questions that arise concern the construction of a process for accessing data, the specific data that can be accessed, the requirements to gain approval(s) to be able to utilize the data, and any restrictions concerning the usage of the data (i.e., to ensure confidentiality). Will this database save teams time and money as scouts could sift through the data (in particular, the videos) and not attend as many games, including national and international travel to games? Or will there be fees for every accessing the data and no financial advantages will be obtained? With respect to leagues, additional questions arise concerning the data being retained that relates to the league, the associated teams, coaches, schedule, history, etc. Further, what access will media have to obtain data? An overall critical question is: Who manages the data? Additionally, if data is only changeable by qualified individuals (when an error has occurred), then, who are those individuals?

From a fanbase perspective, questions arise concerning the use of the data by sport organizations, leagues, and clubs. Also, and particularly important, are the boundaries for security and police to utilize the data for their advantage.

Research needs to be completed to reveal insights on blockchain technology and sport (i.e., the cost to startup and then to manage the system, and where is the best place to store the data, onshore or offshore)? It is not too early to debate the use of blockchain technology and its application to sport, in this scenario, an application to sport registration and performance management. There are additional emerging technologies as well.

Robotic Game Officials

Sport has a problem concerning game officials – there are not enough well-trained and experienced game officials staying in the role at all levels of sport (Pierce et al. 2020, Seippel et al. 2020). These individuals are critical for ensuring fair sporting competitions (Hancock et al. 2020), yet their numbers have been dwindling due to one key reason – abuse. This abuse causes individual officials to not want to officiate, or to quit, and is generating issues from recruiting to retaining officials (Clegland et al. 2017, Downward et al. 2023, Mojtahedi et al.

2022, Pierce et al. 2020, Webb et al. 2019a, b). The abuse crisis (Pierce et al. 2020) has led to mental health issues for some game officials (Brick et al. 2022).

Emerging technology may assist with the provision of game officials for sport. According to Kittel et al. (2021, p. 1), “decision-making has commonly been cited as the most important skill for successful performance in sport officials, however, insight into how this critical skill is improved through off-field training has lagged”. These authors concluded that decision-making training for sport officials should be advanced by including three key aspects – including “constraints faced in competition such as match context, fatigue and the perspective used to make decisions” (p. 8); training for “the adequacy of decisions in relation to the wider context” (p. 8); and “reflective learning [that] ... allows officials to reflect on their decisions with consideration to the wider context, rather than assessing the accuracy in comparison to one putative ‘correct’ decision” (p. 8).

Web-based training resources have been around for game officials for well over a decade (Put et al. 2013). According to Schweizer et al. (2011), along with Kittel et al. (2019a), a valid measurement of one’s decision-making can be observed with video-based strategies. Simulators have been generated to aid game officials in decision making (Samuel et al. 2019).

Kittel et al. (2019b) supported their previous conclusion further by conducting “the first study to examine the reliability and validity of 360⁰ VR [virtual reality] footage as an off-field decision-making assessment tool in sport” (p. 1). VR was defined by Craig (2013) as involving both real and imaginary simulations. When such simulations are applied to game officials, it allows them to perceive player actions and to interact with these players as they make officiating decisions. Spitz et al. (2021) research on VAR (video assistant referees) reported that there was an increase in the accuracy of game calls from “92.1% to 98.3%” (p. 147) when utilizing the technology.

Video-based officials training (Schweizer et al. 2011), has given way to new technologies. The use of VR and VAR technology has implications concerning training robots to be game officials to solve the lack of game officials’ issue for sport. The sport managers of today can begin to debate how this could work. For instance, should the VAR technology be advanced to become an off-field referee making calls in real time. This could involve a movement from the technology analyzing video to live analysis and decision-making as a referee. Decisions concerning the placement of the technology (i.e., on the sidelines, running on the field or court, or suspended above the play) needs to be determined. If above the field of play, the robot does not need to run, eliminating the exhaustion issue for officials, and perhaps, providing a better position to see more of the playing surface and action compared to being on the field. This could then be advanced to operate with robots that act as game officials - to augment human game officials. Devising how this could work is one step in alleviating the officials’ situation.

Metaverse technology allows a participant to experience an alternative or virtual world. In this scenario, the metaverse could aid the development of game officials in their training real game setting. This could build the confidence and skill of game officials and aid in reducing abuse as officials learn their craft. The metaverse technology could include videos of games in which the trainee game

official must make decisions – and their decisions impact the game/athletes (i.e., if a player is ejected from the game). A database of thousands of scenarios could be developed for multiple sports, such as from football/soccer, hockey, field hockey, water polo, etc.

If non-professional and professional players enter the metaverse they can practice shooting on any one of the goalies. This scenario allows players to test their shooting skills and to learn about the tendencies of any goalie in the metaverse system.

Those in sport management can debate the ethics of this scenario from multiple perspectives. Such perspectives include the goalies, the players shooting on goalies from grassroots to the professional level, coaching staff, leagues, sponsors, fans, and the developers of the metaverse technology.

Preparing for Additional Emerging Technologies

There are many emerging technologies that those in sport management can begin to debate. Examples include the requirements for hosting races that are higher, faster, and further – including rockets and drones and their implications for sport events. Such races could include people in rockets that race around the moon and back. If a competitor ‘moons’ those watching the race via satellite as they circle the moon, will there be pre-established rules for such scenarios? Humans in drones could race to another continent and back. Implications include determining the requirements for staging the technology prior to races, technicians that need to be on site for monitoring and maintenance requirements, the rules and regulations that ensure safety and support for performers, as well as the management of media access (will it be a satellite feed or can they be in the sky?).

Also, the use of video drones placed on a racing drone offer “the view from the top of a sports event also provides new information that cannot be generated otherwise and whose use significantly changes the staging of sports, sports reporting and sports training” (Hebbel-Seeger and Horkey 2018, p. 279). The drone races may, thus, include a two-fold experience – one whereby the drone is the race vehicle, and two, whereby the drone offers a video experience of the in-air race. Drones are highly rated for their potential for sport communication (Hebbel-Seeger et al. 2017) – but also offer more for sporting purposes.

Beginning to develop operational plans for races with emerging technologies can flush-out the implications and adaptation requirements and can promote preparations that begin today for sport of tomorrow. This includes determining the place of drones as race vehicles and for video purposes along with “the aesthetic, journalistic and economic aspects [that] must be taken into account as well as data-and-security-level concerns and psychological effects” (Hebbel-Seeger and Horkey 2018, p. 279). Such debates are needed for each emerging technology to determine the implications and to decide on the equitable and fair way forward in sport. Additionally, such debates are also important to determine the skills needed to manage sport into the future. Keeping tabs on emerging technologies, some that we cannot conceive of today, is important for the future of sport.

Conclusion

Van Dorsser et al. (2020) provided a framework that aids examinations of the future for linkages to both policy analysis and policymaking. An application of the framework, that was based on the work of Walker (2000) and Voros (2003), encourages three aspects when applied to the scenario of emerging technologies and sport. The first is to identify the potential emerging technologies and their potential application to sport. The second is to identify potential flexible-option solutions. The third is to develop understandings of the impacts and trade-offs for the consequences of each emerging technology if applied to sport into the future.

Additionally, Peters (2018) noted that predicting and planning the future is a fundamental human activity that aims at the development of public policies based on careful design through cooperation between public policy practitioners and scholars of public policy. Hence, the significance of identification of potential problems in any policy field, should be enforced by linking policy designs to theory and politics (Bobrow and Dryzek 1987).

Those in sport management can prepare – and prepare their students - to guide sport forward into the future with respect to the integration of emerging technologies within sport. We can begin to advance insights today with discussions/debates on the topic(s). It is not too early to develop foresight for policy development and policymaking for leading sport management in emerging technologies in sport.

Multiple emerging technologies are being discussed online. Given this, these technologies and can be discussed in relation to possible challenges and opportunities that arise in the framework of policy making with identification and participation of all sport stakeholders involved in the process.

This paper sought to stimulate debate by outlining a few emerging technologies and offered a look at potential scenarios should they be applied to sport. The time is now to get ready for the future of sport with discussions/debates on the potential way forward for the future in sport management.

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Country-of-Origin Effect in the Marketing of Sports Shoes among University Students

By Alexiaa Sim* & Ho Keat Leng[‡]

The aim of this study is to examine the Country-of-Origin (COO) effect in the marketing of sports shoes among university students. 156 university students were randomly distributed into three groups and exposed to a fictitious sports shoes' advertisement. COO information was not provided in the Control Group (n = 53). The experimental groups were provided information on COO from either a country with high COO scores (n=50) or low COO scores (n=53). A one-way ANCOVA found that there was a significant difference in Perception of Quality of the sports shoes between groups, $F(2,152) = 2.98, p < .10$ with respondents exposed to the advertisement featuring a country with high COO scores reporting the highest level of perceived quality. However, there was no significant difference across the groups for purchase intention. This suggests that COO effect exists for perception of quality but does not translate to purchase intention.

Keywords: *perception of quality, purchase intention, advertising, sports, footwear*

Introduction

The sports footwear industry has grown from a simple industry catering to sporting needs to a multibillion-dollar industry with sophisticated marketing campaigns focused on profits (Kurtzman 2005). It has been estimated that the revenue of athletic footwear globally will reach US\$53 billion in 2023, dominated by brands from a small number of Western countries such as Nike which is from the United States (Statista 2023a). This may be due to a rise in sports participation among the general population and the increasing acceptance of sports shoes in daily wear. Sports shoes are highly popular with university students as daily wear due to their physically active lifestyle and higher levels of participation in recreational sports (d'Astous and Chnaoui 2002, Tong and Su 2014). Consequently, marketers of sports shoes are interested in understanding the consumer decision-making process of this demographic segment.

Consumers are influenced by a myriad of factors in their consumption decisions. Specific to sports shoes, these factors include brand image, perceived quality, design aesthetics, type of material used, and country-of-origin (COO) (Dickson and Pollack 2000, Ko et al. 2008, Zhou et al. 2018). University students who are using sports shoes for daily wear and recreational sports may not be highly involved when purchasing sports shoes. As such, they may be more likely to be persuaded through peripheral cues such as COO (Petty et al. 1983). As the

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sports shoe industry is dominated by brands from a handful of countries, it is unclear whether athletic shoe manufacturers from other countries are disadvantaged by COO effects.

Many brands originate from one country, while its supply chain or place of manufacture are in other countries. While COO can be viewed as a multi-dimensional construct, a "Made in Country X" is sometimes considered a sufficient cue on COO (Johnson et al. 2016). Despite several authors arguing that COO is unimportant and not predictive of consumer behaviour (Herz and Diamantopoulos 2017, Samiee et al. 2005, Liefeld 2004), other studies have shown that exposure to a COO cue can affect consumers' perceptions and behaviours (Herz and Diamantopoulos 2013, Liu and Johnson 2005, Martin et al. 2011). Hence there is a need to further study whether a simple cue such as COO, can potentially affect quality perception and purchase intention. Understanding this could help marketers develop more effective marketing communications in changing potential consumers' attitudes or beliefs towards their brands.

The aim of this study is therefore to examine whether information on COO can affect the perception of quality and purchase intention of sports shoes among university students.

Literature Review

Consumers' decision-making process can be affected by many factors such as perception of quality and brand image. However, the importance of these factors varies across different segments of consumers. For example, consumers who are highly involved in sports are more likely to focus on seeking information on sports products as they would be concerned about the quality and performance of the sports equipment (Chew and Leng 2016, Dickson and Pollack 2000, Tsotsou 2006). Conversely, consumers who are unfamiliar with a product category may depend on extrinsic cues to make consumption decisions. These extrinsic cues include brand name, packaging, and COO (Chew and Leng 2016, Dickson and Pollack 2000, Ko et al. 2008, Petty et al. 1983, Tsotsou 2006).

COO is defined as the country where the product has been developed, built, or made (Thakor and Katsanis 1997). The COO effect is used to describe a situation where the consumer's decision-making process is affected by information on the COO of a given brand (Andéhn et al. 2016). In such situations, consumers use COO as additional information in evaluating a product, attributing value to the consumer decision-making process (Durand 2016, Lee and Lee 2009a, Pappu et al. 2006, Usunier and Cestre 2007, Verlegh and Steenkamp 1999). Consumers assume that innate factors like geographical location, climate, and availability of resources could lead to a country producing better quality of a specific product category. They may thus develop an overly positive image of products produced in the country that is biased and unjustified, particularly when other information is absent (Dagger and Raciti 2011, Koh and Leng 2017, Pappu et al. 2006, Pharr 2005, Phau and Chao 2008, Rasoul et al. 2015, Usunier and Cestre 2007, Wang and Yang 2008). Eventually, this may lead to purchase intention (Haque et al.

2015, Lin and Chen 2006). However, this is a complex process as COO can vary across demographic segments (Chand and Tung 2011) and product categories (Balabanis and Diamantopoulos 2004, Usunier and Cestre 2007).

The literature suggests that COO reputation can positively impact the creation of strong brands, while certain countries are also associated with stereotypes and characteristics of certain products, known as the “product-country-image” (Fournier 1998, Lefkoff-Hagius and Mason 1993, Pappu et al. 2006). The COO effect has been found in many studies across a wide range of product categories (Ghalandari and Norouzi 2012, Magnusson et al. 2011, Pappu et al. 2006, Pharr 2005). For instance, made in Germany items are associated with superior quality and reliability versus made in China items which are associated with inferior quality and low cost, despite China being one of the world’s largest manufacturers (Lee and Lee 2009b, Lew and Sulaiman 2014). As such, the manufacturing process of sports goods can impact the perceived quality of the product (Ahmad et al. 2023, Baydal-Bertomeu et al. 2015).

The poor perception of made in China products has started to shift. Consumers from developing countries such as Malaysia, showed a favorable perception of quality as well as purchase intention of mobile phone brands from China (Yunus and Rashid 2016). This suggests that the perception, association, and stereotype of COO are dynamic and can change over time.

Most studies on COO were conducted on goods with only a small number of studies conducted on services (Han and Kwon 2009, Javalgi et al. 2001, Lin and Chen 2006). Services are distinct from goods due to their characteristics of intangibility, heterogeneity, inseparability, and perishability (Wirtz and Lovelock 2021). Despite this, there is some evidence that the COO effect can be found in services as well (Javalgi et al. 2001).

Specific to the sports industry, it has been suggested that countries can develop an association with sports when they possess the geography to support sports participation and host sports events. When coupled with resources such as athletes with sporting achievements and supportive sports media, consumers may transfer the country’s association with sports to sporting goods produced by the country, creating a positive COO effect (Gerke et al. 2014, Koh and Leng 2017).

There are few studies examining the COO effect on sports products (Gerke et al. 2014). A study found that among Korean university students, the COO affected the perceived quality of ski products. The COO effect in this study was also comparatively higher than other product categories such as electronic products (Han and Kwon 2009). Another study on sports shoes was conducted with samples drawn from university students in China and Korea and found that the perceived quality of sports shoes was affected by COO information among Chinese students. However, the Korean students’ perception of the quality of sports shoes was unaffected by information on the COO (Ko et al. 2008).

The above suggests that there is a COO effect on sports products although the extent of this effect may differ across product categories and consumer segments. Specifically, COO can affect the perception of the quality of the product. Perception of quality is defined as the general quality or superiority of the product, as perceived by customers as compared with other similar products (Keller 2012).

In other words, COO information can cause consumers to perceive that the product is of higher or lower quality when compared with other similar products. This leads to the first hypothesis in this study.

H1: Sports shoes from a country that is assumed to be producing better quality sports shoes will be perceived to be of higher quality when compared to similar products.

Earlier studies have established a positive relationship between perceived quality and consumers' purchase intention. When consumers perceive that a product is of high quality, there is a corresponding higher level of purchase intention (Giovanis et al. 2013, Ko et al. 2008, Yoo and Kim 2014). While perceived quality may be correlated to purchase intention, they are conceptually different (Tsiotsou 2006).

Purchase intention is defined as an individual's action tendencies regarding a potential purchase of a product or service (Rezvani et al. 2012). It can indicate an individual's motivation to fulfill a purchase decision and acts as a proxy for actual purchase behavior in research studies (Ghalandari and Norouzi 2012). As such, perceived quality is the consumer's evaluation of a product's overall excellence or superiority while purchase intention is related to buying behavior.

Information on COO has been suggested to have a larger effect on consumers' perception of quality as compared to purchase intention (Javalgi et al. 2001). This suggests that it may be necessary to measure the COO effect on purchase intention and not assume that any effect on perceived quality will be translated into purchase intention. As earlier studies did not examine COO effect on purchase intention (Han and Kwon 2009, Ko et al. 2008), this study will examine both perceived quality and purchase intention. In other words, while COO can affect the perception of the quality of sports products, it is not evident that it can affect purchase intention. This leads to the second hypothesis.

H2: Consumers will have higher purchase intention for sports shoes from a country that is assumed to be producing better quality sports shoes when compared to similar products.

The present research focuses on university students and the purchase intention and quality perception of sports shoes through viewing an advertisement with a fictitious brand and only COO (for experimental groups) as an extrinsic cue. A factor that could impact their intention and perception is the level of sports involvement. In sports management research, a multitude of definitions of sports involvement exists, with studies that consider the term as a multidimensional construct, and others that view as a unidimensional (Beaton et al. 2011). This study defines the concept of sport involvement as the love, interest, and affinity with and for sports (Gwinner and Swanson 2003) and as suggested by Chew & Leng (2016), when one is highly involved in sport, the consumers may possess greater knowledge on the shoes hence less likely to be persuaded by marketing materials (Chew and Leng 2016).

Method

After obtaining approval for the study by the university's institutional review board (IRB-2015-10-010), participants were recruited from students studying in Singapore universities through social media and physical flyers.

In this study, COO is conceptualized as being associated with the country of manufacture of sports shoes. In preparation for the main study, 30 respondents were first recruited via social media and given a list of ten countries that manufactured sports footwear for popular brands such as Reebok (Barff and Austen 1993, Statista 2023b). The respondents had a mean age of 21.10 years and 18 (60%) of them were of female gender. The countries chosen were Bangladesh, Canada, China, Indonesia, Japan, Korea, Sri Lanka, Thailand, United Kingdom and United States. Respondents were asked to indicate the quality of sports shoes produced in the countries on a 10-point Likert scale which ranged from 1 (inferior quality) to 10 (superior quality). It was found that Japan had the highest mean score of 7.47 while Bangladesh had the lowest mean score of 4.57. Consequently, it was determined that Japan and Bangladesh will be used in this study to represent countries with high and low COO scores respectively.

In the second phase of the study, 156 respondents were recruited via printed flyers distributed to students in Singapore universities. The participants were then randomly allocated to one of three groups to view an online advertisement featuring a fictitious brand of sports shoes, Lauf Athletic (Appendix). A randomized list was generated prior to participant recruitment through the RAND function on Microsoft Excel. The respondents had a mean age of 21.79 years and 86 (55%) of them were of female gender. It was decided that a fictitious brand would be used instead of an existing brand as this limit the potential confounding effects from pre-existing attitudes, beliefs, or bias towards a specific brand (Thakor and Lavack 2003).

The advertisements across the groups were similar except that in the control group, there was no information on the COO. The advertisements in the remaining two experimental groups included information that the products were produced in either the country with the high COO score i.e., Japan or low COO score i.e., Bangladesh. As such, any difference in response across the groups is due to the COO information. There were 53 respondents in the control group. The number of respondents in the experimental groups with high COO score and low COO were 50 and 53 respondents respectively.

After viewing the advertisement, respondents completed an online survey instrument that took approximately 15 minutes. The survey instrument included two dependent measures, the perception of quality and purchase intention of the advertised sports footwear. These items were previously used in an earlier study on the marketing of sports shoes on social media (Chew and Leng 2014).

The perception of quality was a single item on a 10-point Likert scale (1: Extremely Low Quality, 10: Extremely High Quality) adapted from earlier studies (Burnkrant and Cousineau 1975, Pincus and Waters 1977):

I perceive Lauf Athletic shoes to be of a 4-item, 7-point Likert scale (1: Strongly Disagree, 7: Strongly Agree) adapted from earlier studies was used to measure consumers' purchase intention (Coyle and Thorson 2001, Prendergast et al. 2010). The scale was found to have good internal consistency in earlier studies (Coyle and Thorson 2001, Prendergast et al. 2010). For this study, the Cronbach's alpha coefficient for the purchase intention scale was .88, suggesting good internal consistency. The items are detailed below.

- (1) It is very likely that I will purchase Lauf Athletic shoes
- (2) I will purchase Lauf Athletic shoes the next time I need a pair of running shoes
- (3) I will definitely try on Lauf Athletic shoes
- (4) Suppose that a friend called you last night to get your advice on a pair of running shoes. Would you have recommended him/her to purchase Lauf Athletic shoes?

The survey instrument included sport involvement as a covariate measure. This was measured using a 3-item, 7-point Likert scale (1: Strongly Disagree, 7: Strongly Agree) adapted from earlier studies (Gwinner and Swanson 2003).

- (1) Participating in sports is important to me
- (2) I think about sports all the time
- (3) I watch sporting events whenever I can

The scale had a Cronbach's alpha coefficient reported at .87 and was thus considered to be reliable (Gwinner and Swanson 2003). Similarly, this study found the scale to be reliable with a Cronbach's alpha coefficient of .85.

Findings

The relationship between perceived quality and purchase intention was investigated using Pearson product-moment correlation coefficient. There was a strong, positive correlation between the two variables, $r = .69$, $p < .01$. This concurs with earlier research that perceived quality is positively correlated with purchase intention (Giovanis et al. 2013, Ko et al. 2008, Yoo and Kim 2014).

A one-way between-groups analysis of covariance was conducted to compare the perception of quality across the groups with sport involvement as the covariate. Preliminary checks were conducted to ensure that assumptions for the analysis were not violated. There was a significant, moderate relationship between sport involvement and perception of quality, $F(1, 152) = 19.16$, $p < .01$, $\eta_p^2 = .11$. After adjusting for sport involvement, there was a significant difference in the scores for perception of quality between groups, $F(2,152) = 2.98$, $p < .10$, $\eta_p^2 = .04$. The adjusted marginal means displayed in Table 1 show that respondents exposed to the advertisement with the country with a high COO score reported the highest level of perceived quality ($M = 5.97$) when compared to the control group with no information on COO ($M = 5.13$) and the group exposed to the advertisement with

the country with a low COO score ($M = 5.11$). Post hoc comparisons for the adjusted means showed that there was a significant difference between the high COO and low COO groups only ($p < .10$).

Table 1. *Estimated Marginal Means of Perceived Quality with Sport Involvement as Covariate*

	Unadjusted Mean	SD	Adjusted Mean	SE
Control Group ^a	5.08	2.23	5.13	.28
High COO score (Japan) ^b	6.08	2.21	5.97	.29
Low COO score (Bangladesh) ^c	5.06	2.01	5.11	.28

^a $n=53$, ^b $n=50$, ^c $n=53$

A one-way between-groups analysis of covariance was conducted to compare the purchase intention across the groups with sport involvement as the covariate. There was a significant, strong relationship between sport involvement and purchase intention, $F(1, 152) = 26.03$, $p < .01$, $\eta_p^2 = .15$. The adjusted marginal means for purchase intention after adjusting for sport involvement is shown in Table 2. Respondents exposed to the advertisement featuring a country with high COO score reported a higher level of purchase intention ($M = 3.64$) when compared to the control group with no information on COO ($M = 3.60$) and the group exposed to the advertisement featuring a country with low COO score ($M = 3.36$). However, this did not reach statistical significance, $F(2,152) = 1.00$, $p > .10$.

Table 2. *Estimated Marginal Means of Purchase Intention with Sport Involvement as Covariate*

	Unadjusted Mean	SD	Adjusted Mean	SE
Control Group ^a	3.57	1.21	3.60	.15
High COO score (Japan) ^b	3.71	1.18	3.64	.16
Low COO score (Bangladesh) ^c	3.33	1.16	3.36	.15

^a $n=53$, ^b $n=50$, ^c $n=53$

The analysis above shows that H1 was supported. Respondents exposed to advertisements with information on a country with high COO score perceive the sports shoes to be of higher quality. However, H2 was not supported. This suggests that perceived quality alone is not sufficient to affect purchase intention. This concurs with earlier studies that COO has a larger effect on perceived quality when compared to purchase intention (Javalgi et al. 2001).

Discussion

Consumer decision making is affected by many different factors including COO. Verlegh and Steenkamp (1999) suggested that while COO is likely to affect attitudes towards a brand, it may be more limited in its effect on purchase behaviour, owing to additional and external factors such as access and financial constraints (e.g., unable to purchase product due to insufficient funds). This is found to be true in this study.

The result from this study supports H1. Respondents exposed to an advertisement featuring sports shoes from a country with high COO scores in producing sports shoes reported the shoes to be of higher quality when compared to respondents exposed to advertisements featuring shoes from a country with low COO scores or an advertisement without information on COO. This concurs with earlier research that consumers use COO as an indicator of a product's quality (Lee and Lee 2009b).

However, the findings did not support H2. While respondents exposed to an advertisement featuring sports shoes from a country with high COO scores in producing sports shoes reported higher purchase intention when compared to respondents exposed to advertisements featuring shoes from a country with low COO scores or an advertisement without information on COO, it did not reach statistical significance. This concurs with earlier studies which suggested that the effect of COO may not extend to purchase intention (Magnusson et al. 2011).

Earlier studies have established the correlation between perceived quality and consumers' purchase intention (Giovanis et al. 2013, Ko et al. 2008, Yoo and Kim 2014). Consequently, some studies have only examined perceived quality. In this study, concurring with earlier studies, it was also found that there exists a correlation between perceived quality and purchase intention. However, this study went further to examine the effect COO had on purchase intention. The findings suggest that it is not sufficient to only examine perceived quality as it does not necessarily translate into purchase intention. In particular, the study concurs with earlier studies that information on COO has a more limited effect on purchase intention and it is necessary to examine this independently.

The current sports shoes industry is dominated by a few manufacturers from a small number of countries. The findings from this study suggests new sports shoes brands operating from a country with a favorable COO image should provide COO information in their advertising and marketing communications to positively influence consumers' perception of quality of their products amongst university students (Gerke et al. 2014). However, this alone will not translate into sales. Consequently, marketing communications must be accompanied by an effective marketing campaign.

Conversely, new sports shoes brands operating from a country without a favorable COO image should not provide COO information in their advertisements. Instead, the marketing communications should focus on product attributes such as functional properties, aesthetics, packaging, or any other information that may help university students evaluate and make a purchase decision.

Conclusion

The aim of this study was to examine whether COO could affect university students in their purchase of sports shoes. It presented that while COO can affect the perception of quality, it was more limited in affecting purchase intention.

As this study is on university students, future research should examine whether the findings can be generalizable to other similar consumer segments such as the growing athleisure segment.

As there are other extrinsic cues such as brand name, product pricing, and consumers' income levels that may affect perceived quality and purchase intention of sports shoes, these should be examined in future studies as well. In addition, the study of respondents' domestic COO along with variables such as ethnocentrism can contribute to a better understanding of the literature.

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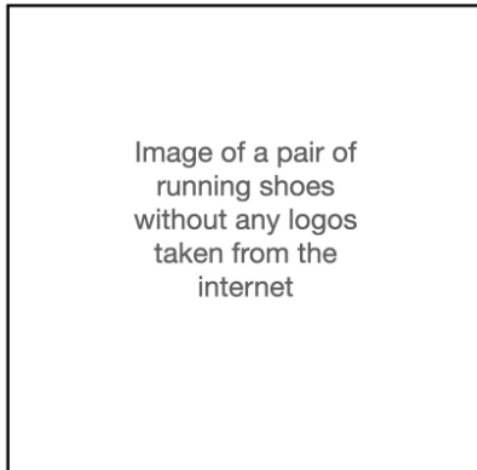
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Appendix



Best Athletic Shoes Ever

By LAUF

Made in Japan

On the Re-Alienation Experiences of the Amateur Runners in Istanbul

By Burak Polat* & Mehmet Serhan Tezgeç[‡]

In contemporary mass culture, individuals are increasingly subjected to standardization, homogenization, and objectification, leading to experiences of alienation within the societal framework shaped by it. Despite efforts to fortify connections with oneself, the environment, society, and meaning, individuals may still find themselves immersed in alienation within the societal structure they inhabit. Through heightened awareness, individuals strive to reclaim their authentic identities, utilizing various means to distance themselves from alienation. However, this pursuit may paradoxically result in renewed ruptures in connections, as individuals encounter re-alienation, finding themselves ontologically identical yet formally distinct within the alienation process. Amidst the complexities of modern life, individuals often seek self-realization through recreational pursuits like running. Hence, this study endeavors to examine the phenomenon of re-alienation, particularly among amateur runners. By conducting semi-structured, in-depth interviews with runners in Istanbul, the study explores both the process of distancing from alienation and the experience of encountering re-alienation through running. Through its investigation, the study aims to contribute to scholarly discourse on alienation, self-realization, and re-alienation with the lens of critical communication studies. By analyzing the lived experiences of individuals, the research seeks to deepen our understanding of the intricate dynamics of alienation and resilience in contemporary society. Research findings show that running as a recreational activity strengthens individuals' connections with themselves, nature, their social environment, meaning, and values, thereby allowing for a sense of autonomy to be achieved; however, due to social infrastructure and individual psychological tendencies, subject and object fetishes can be developed in relation to running activities, leading to experiences of re-alienation.

Keywords: *alienation, self-realization, mass culture, sports and recreational studies, critical communication studies*

Introduction

The concept of alienation has been used by many different disciplines over time and is of great importance for social sciences. Since it is a conceptualization on which important debates continue, especially in the fields of sociology and psychology, drawing the contours of the concept carries certain difficulties in itself. In this study, the concepts of sports and alienation will be discussed especially within the context of the act of running.

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The commercialization and superficialization of human relations and efforts by consumer culture and capitalism is seen as one of the reasons for the emergence of alienation. This situation, which also permeates sports culture, results in individuals seeking ways of escaping from it. Running functions as a symbol of escaping from the monotony and mediocrity of modern life, establishing a relationship with nature and searching for meaning in life, and is evaluated by individuals in this way. Nevertheless, factors such as fetishization of equipment, sponsorship relations, fetishization of the individual's own subject which are reflections of the commercialization of sports culture, can cause re-alienation of individuals seeking a way of getting away. In line with this aim, this study investigates whether the experience of re-alienation occurs by using semi-structured in-depth interviews with 33 amateur runners residing in Istanbul. In addition, it will be tried to reveal whether individual efforts and escape strategies can be used to break free from the pincer created by the duality of consumer culture and alienation.

Within the scope of the study, alienation as a concept will first be discussed and its boundaries will be tried to be drawn. After the alienation narrative in classical sociology, the relationship between the science of psychology and alienation will be revealed. This section will also include the effects of consumption on alienation. In the next section, studies on running and the experience of alienation will be included in the literature. Whether running can function to get rid of the negative effects of alienation experience will also be included in this section. Then, after the method used in the research and the purpose of the research are stated, the findings and results of the study will be examined. In the conclusion part of the study, in the light of the data obtained as a result of the research, it will be discussed that whether running can be used as a tool to get away from alienation or not.

The Concept of Alienation

It is possible to evaluate the concept of alienation as a theory that has been given importance within the fields of classical sociology and psychology which has also been handled from different perspectives. This makes it more difficult to explain the conceptualization and sharpen its contours. Hence, as in many studies focusing on alienation, this study will first try to trace the origins of the concept and clarify its meaning. When we go through the areas where the word has been used; As stated by Fromm (1990), the word alienation used to describe the mentally ill. "Aliene" in French and "alienado" in Spanish depicted psychosis, that is, a person who was completely detached from himself/herself. It was Hegel and Marx who used the word in different senses and argued that the individual, though sane in his daily actions, was in a state of distortion and limited detachment in social events (Fromm 1990, pp. 134–135). The use of the concept in everyday life demonstrates that it is highly related to the science of psychology from its point of origin. Marx, who treated the concept as a social phenomenon and made it one of the key concepts for social sciences, carried out his work in a period when the

foundations of factorization and capital accumulation were laid and acted from an economic basis.

As claimed by Marx, the phenomenon of alienation arose as a consequence of the order created by capitalism and cannot be addressed without it. Cevizci (1999) argues that according to Marx, the essence of human beings is revealed in creative activities that can enable them to change the world collectively or individually during work or study. As stated by Marx, the production process corresponds to an objectification, and material objects emerge with the concretization of product and labor independent of their creator. It is on this note that alienation arises, when the same man no longer recognizes himself in his product, which no longer appears as his own and stands in front of him as a separate force. Alienation occurs only under capitalism, because at the root of alienation is the appropriation by capitalists of the products created by others (Cevizci 1999, p. 907). According to Marx's understanding of alienation, the essence of the man could be revealed by work and labour. According to Kanungo (1979), as declared by Marx, labor is an existential issue. It is not merely an activity that one has to endure in order to feed oneself and survive (Kanungo 1979, p. 13). The fact that work becomes an obligation and therefore could be seen as one of the causes of alienation. This whole process, which takes place against the will of the individual, causes him to lose control over the most basic actions of his life and to become alienated layer by layer.

The most fundamental factors leading to alienation could be considered as the loss of autonomy and control. Barakat (1969) argues that alienation, taken in a Hegelian and Marxist context, is fundamentally related to powerlessness (Barakat 1969, p. 1). This corresponds to the first dimension of alienation mentioned by Marx, namely the process of alienation of man from his labor. As Demir (2018) points out, in Marx's understanding of alienation, people are alienated in four stages. In the first stage, people are alienated from the act of production, in the second stage they are alienated from their products, in the third stage they are alienated from themselves and in the fourth stage they are alienated from others in society. Alienation creates a chain process that affects both the individual and society (Demir 2018, p. 65). Although the first two stages are predominantly based on economic grounds, they also have psychological reflections due to the emphasis on the loss of power over one's labor and power. The closest stages resulting with psychological effects could be considered as the third and fourth stages. According to Cevizci (1999, p. 907), in the third stage of alienation, the worker is alienated from his nature, essence or species being, since the first two aspects of alienation deprive his productive activity of human qualities. And human beings are finally alienated from others because capitalism transforms human relations into market relations and therefore people are evaluated not by their human qualities but by their place or status in the market.

Even though there is an emphasis on the alienation of human beings from themselves and others, and this brings to mind psychological influences as mentioned, Marx's theory stands on a socialist line rather than an individualist imagination. Thus, it is essential that a study that endeavors to reveal the problem of alienation within single individuals and their small groups should include alienation in its psychological dimensions.

Psychology and Alienation

Erich Fromm, a member of the Frankfurt School which can be considered the cornerstone of critical communication studies and also known as one of the leading figures with his studies in the field of alienation claims that the objects worshipped by people in the industrial society have changed. Furthermore, the concept of idolatry should be reconsidered in this context. According to him, in the modern period, the individual has become an object of the blind economic forces that govern his/her life. Man now worships the product of his own labor and transforms himself/herself into an object. In this process, it is not only workers who are alienated, but everyone as a whole. As it destroys all political, religious and spiritual structures, alienation is the root of modern man's illnesses, as identified by Marx (Fromm 1989, p. 72). The emphasis here on the forces governing his/her life and objectification brings to mind powerlessness, one of the dimensions of alienation. In another work, Fromm, while describing the experience of alienation, says that the alienated individual is a person who has no control over his or her own actions and worships these actions and their results. A person in this state does not see himself/herself as the center of his world; he/she becomes increasingly distant from himself/herself and society. The act of production, which he/she uses as a creative power, is no longer at the center of his relationship with the world (Fromm 1990, p. 134). The point distinguishing work of Fromm the study of Marx which emphasizes that the focus of the alienation should not only be on just workers; but also be on individuals from all layers of society. The individual's loss of his/her work, which he/she sees as a creative power, and the loss of the meaningfulness associated with it leads to alienation.

In an attempt to categorize the studies on alienation and clarify the theory, Malvin Seeman (1959) mentions four more basic dimensions of alienation: meaninglessness, normlessness, isolation and self-estrangement in addition to the dimension of powerlessness. Powerlessness, as mentioned earlier, describes the individual who, as Marx argued, has no influence as a decision-maker about his or her life. Meaninglessness describes the loss and incompleteness of the system of values that is expected to come into play in the moments when decisions need to be made about life. Isolation is used to describe intellectuals who are culturally and socially isolated. Normlessness, by the way, refers to Durkheim's concept of anomie and refers to the collapse of the norms that regulate social codes. Self estrangement in Seeman's work in order to describe the alienation of the individual from his/her own existence and work in line with Fromm (1990, pp. 784–789). While Marx finds the emergence of the individual who is alienated from his own existence, feels isolated from society and lost his/her connection with norms in capitalism, Fromm comes up with a similar evaluation. As mentioned by him, modern man has an artificial freedom. He has been offered a choice among products delivered by forces beyond his power, and tragically he believes that he is consciously making his choice (Fromm 1990, p. 22). There is a point to be noted here. It is not necessary that the relationship patterns that modern or postmodern people establish while being alienated are solely related to the production process.

Individuals who design their identity and self through consumption codes suffer a loss in their essence and become alienated.

Hinshelwood (2000) makes a similar observation, stating that the illusion of choice permeates even the relationship between psychologist and patient. Accordingly, treating the individual as a person with autonomy and constantly emphasizing the freedom allowing preferences in his/her decisions means being unfair to individuals. This order, which seems to be based on preferences, is on the one hand a false consciousness (Hinshelwood 2000, p. 27). When individuals realize that they do not have autonomy as a result of this order built on the legitimately free choices of the postmodern individual, they may encounter the problem of alienation by realizing that their identities are shaped only around passive consumerism.

Rainer Funk, Fromm's assistant, had similar thoughts on the effects of marketing, advertising and consumption on alienation. According to him, in market orientation everything revolves around the strategy of selling and marketing. This order coverts even seemingly disparate concepts such as goods, services, works of art or human personality into similar things just composed of images. Consequently, the real desires and search for meaning of people would be pushed into the background. Such pursuits are seen as obstacles to the harmony, flexibility and "cool" fitting into all roles that postmodernity demands. As a result, people become alienated from their own powers (Funk 2013, p. 135). This naturally causes people to lose the connection with their lives and society. Again, as stated by Funk (2013), in the alienation created by marketing, there is no room for meaningful relationships and bonds with oneself and others. Only superficial relationships with products that are demandable for the good of the market are allowed. This relationship is far from being a symbiotic relationship and manifests as a one-sided indulgence (Funk 2013, p. 136)

Studies have also shown that this superficialized form of relationship in the consumer society leads to depression. Hari (2019) reveals that a total of 34 studies conducted in many different geographies and countries around the world have demonstrated that individuals who only focus on consumption, achievement and act only in line with materialistic goals have much higher levels of anxiety (Hari 2019, p. 120). These studies, which reveal that the path to a satisfying and successful life in the search for meaning couldn't be found through capitalism and consumption are meaningful in terms of showing that individuals who experience alienation cannot get rid of it through consumerism. The next section will try to explain the activity of running and its relationship with alienation and consumption.

Running and Re-alienation

Running and other recreational activities can be considered as an extension of individuals' deep search for meaning and their efforts to take control over their lives. Although the motivations that drive people to run vary from person to person, a study on the subject reveals the pattern between running and the search for meaning. According to Gorichanaz (2016), the research conducted by Hanson

et al. (2015) categorizes the motivations that drive individuals by their running distances. While half marathon runners are mainly motivated by health and weight-related reasons, marathon runners aim to achieve their goals and ultra marathon runners aim to make their lives meaningful. Therefore, it can be reconciled with Heidegger's principle that a meaningful life should only be shaped in an authentic way and must be outside the box of what others call life (Gorichanaz 2016, p. 366). When considered in this context, it is possible to consider running as an activity that makes life meaningful and an appropriate tool for detract individual from the negative consequences of alienation by getting rid of the feeling of powerlessness.

Although it does not focus on running, a study on outdoor activities, which are sports practiced with similar motivations, claims that these activities can be considered as an effort to reconnect with nature for individuals who are overwhelmed and alienated from their daily and boring lives. It states that running can be used for purposes such as returning to nature and feeling nature in a sense within seemingly meaningless lives. Nevertheless, sportive activities that set out with this purpose, when it comes to outdoor activities, are commercialized as a result of elements such as the presentation of equipment as an indispensable element by advertisements and media, marketing activities emphasizing the brand rather than functionality etc. (Cater and Dash 2013, pp. 15–17). As a result of the fetishization of equipment, these sports could cause individuals who strive to return to nature and get rid of the feeling of alienation to enter a cycle of alienation again. The introduction of the commercialized relations into the field of sports means the re-emergence of alienation.

Again, a study conducted in the field of sports came to similar conclusions when considered in this context. The fetishization of equipment is not the only dimension of the industrialization of sports. Another point that needs to be addressed and considered in this direction is the presence of sponsors. When sponsors start to offer financial support to support a group or an athlete, points such as the health or happiness of the athlete become secondary and the financial interests of the sponsor come to the fore (Ozdemir 2018, p. 384). Even an activity that athletes intend to carry out as an amateur can become commercial when the sponsorship relationship is involved. Even if an athlete who is conscious about alienation can avoid the fetishization process in terms of equipment, he/she can enter into a spiral again when he/she is included in the group with which he/she is connected to sponsorship relations.

As long as commodity fetishism and commercialized relations continue to persist, it seems unlikely that sport, or more specifically running, can be seen as a way out. In his study questioning whether this culture can be eradicated through individual effort and on a personal scale, Sadler (1977) focused on the relationship between creative endeavor and sport. He argued that such creative endeavors, especially those that allow one to rediscover oneself in nature and achieve inner freedom, such as running, can be used to escape the sharp consequences of alienation. Being performance-oriented, focused on the outcome and achievement rather than the process, can hinder this creative endeavor and prevent it from functioning as an antidote to alienation (Sadler 1977, pp. 88–91). Following a

similar path, this study aims to reveal the impact of external factors such as performance anxiety, commodity fetishism and commercialization on an activity such as running, which has the potential to liberate and return to nature. Through running, the possibility of finding an individual way out of alienation, which is an inevitable consequence of capitalist society, will be tried to be explored.

Methodology

In order to examine the role of running as a recreational activity to get away from the experience of alienation and the potential of running culture to reproduce the experience of alienation in consumer culture, semi-structured in-depth interview method was preferred. It is possible to define this method as follows; it is to obtain detailed information by asking deep and qualified questions related to the subject in order to obtain the interviewee's opinions on the subject (Aziz 2011, p. 86). The model preferred during the organization of the questions of the interviews was "semi-structured interviews". In semi-structured interviews, the interviewer has predetermined questions, but may choose to reveal different dimensions of the subject by asking extra questions where necessary (Altunışık et al. 2010, p. 84). In order to gain insights from the experiences of runners in Istanbul through this method, 33 runners were interviewed through snowball sampling. As can be seen in Table 1, the participants have different demographic characteristics and all of them are actively involved in running activities.

Interviews were conducted via online and face-to-face. Audio recordings were made for each face-to-face interview and video recordings were made for each online interview. Approximately 36 minutes were allocated per participant. The semi-structured questions posed to the participants are basically categorized under three main headings: (i) descriptive data about the participant, (ii) the contribution of the running experience to their psychological well-being, and (iii) the experience of re-alienation.

The interview records were transcribed and the answers given according to the coding chart were analyzed. As presented in Table 2, the experience of re-alienation within the framework of the coding chart was examined within the framework of three basic behavioral decisions of alienation (retreatism, compliance, and active involvement) and five basic reasons for alienation (powerlessness, meaninglessness, normlessness, isolation, and self-estrangement).

Table 1. Characteristics of Participants

Participant	Age	Gender	Income Level	Education Level	Interview Medium	Interview Duration (Min)	Running Experience (Years)	Weekly Running Load (km)	Running Crew Experience (Years)	Accomplished Race Distance	Desired Race Distance
1	29	M	Mid	Bachelor	Face-to-face	43	3	35	2	Half Marathon	Marathon
2	36	M	Mid	PhD	Face-to-face	37	7	100	4	Marathon	Marathon
3	42	F	High	Masters	Face-to-face	73	5	75	4	Marathon	Ultramarathon
4	33	F	Low	Highschool	Online Meeting	33	9	30	8	10K	Marathon
5	35	M	Low	Bachelor	Face-to-face	42	5	80	4	Marathon	Ultramarathon
6	38	M	High	Bachelor	Online Meeting	32	5	80	4	Marathon	Ultramarathon
7	37	F	High	Bachelor	Online Meeting	27	4	45	4	Half Marathon	Ultramarathon
8	34	F	Low	Masters	Online Meeting	45	6	50	6	Marathon	Ultramarathon
9	23	F	High	Bachelor	Online Meeting	32	12	25	2	10K	Ultramarathon
10	32	F	Mid	PhD	Face-to-face	62	6	35	6	Half Marathon	Marathon
11	35	F	Mid	Bachelor	Face-to-face	32	8	50	8	Marathon	Ultramarathon
12	39	M	High	Bachelor	Online Meeting	43	11	35	3	Half Marathon	Marathon
13	28	M	High	Bachelor	Online Meeting	28	3	80	2	Marathon	Ultramarathon
14	32	F	Low	Bachelor	Face-to-face	31	3	25	3	Half Marathon	Ultramarathon
15	34	F	Mid	Bachelor	Online Meeting	27	8	20	2	Half Marathon	Marathon
16	26	F	Mid	Bachelor	Online Meeting	34	3	40	3	Half Marathon	Ultramarathon
17	44	M	Mid	Highschool	Online Meeting	39	6	50	6	Half Marathon	Ultramarathon
18	37	M	High	Bachelor	Online Meeting	29	3	60	3	Marathon	Ultramarathon
19	28	F	Mid	Bachelor	Face-to-face	32	2	50	2	Half Marathon	Ultramarathon
20	29	F	Mid	Bachelor	Online Meeting	44	5	25	5	Half Marathon	Ultramarathon
21	29	F	Low	Bachelor	Online Meeting	32	3	30	2	Half Marathon	Marathon
22	27	F	High	Bachelor	Online Meeting	28	4	25	3	Half Marathon	Marathon
23	26	M	High	Bachelor	Online Meeting	45	6	20	6	Half Marathon	Ultramarathon
24	32	F	High	Bachelor	Face-to-face	34	6	35	6	Half Marathon	Marathon
25	34	F	Mid	Bachelor	Online Meeting	31	7	25	6	Half Marathon	Ultramarathon
26	29	M	High	Bachelor	Online Meeting	29	7	45	5	Marathon	Marathon
27	39	F	Mid	Masters	Online Meeting	37	9	35	9	Half Marathon	Ultramarathon
28	37	F	Mid	Bachelor	Face-to-face	28	5	30	4	Half Marathon	Marathon
29	33	M	High	Masters	Online Meeting	47	4	50	3	Marathon	Ultramarathon
30	43	F	Mid	Bachelor	Online Meeting	42	5	30	4	Half Marathon	Marathon
31	28	F	Mid	PhD	Face-to-face	26	9	30	5	Half Marathon	Ultramarathon
32	46	M	Mid	Masters	Online Meeting	32	9	50	5	Marathon	Ultramarathon
33	44	M	High	Masters	Online Meeting	28	16	40	4	Marathon	Ultramarathon

Table 2. Research Coding

Code Categories	Codes
Participant Demographics	Age Gender Income Level Education Level
On Running Activity	Running Experience (Years) Weekly Running Load (Km) Running club experience (Years) Running Motivations Fitness (Weight control, losing weight, performance improvement, etc.) Escapism Socialization Entertainment Running Goals and Desired Accomplishments
Running and Psychological Well-Being	Bonding with <i>Body</i> <i>Nature</i> <i>Society</i> <i>Meaning</i> <i>Norms</i>
Realienation Experience	Realienation Sources Economic Factors Performance Anxiety Peer-pressure Power relations in Running Clubs Alienation Experiences Powerlessness Meaninglessness Normlessness Isolation Self-estrangement Post-alienation Negative Outcomes Retreatism Compliance Positive Outcomes Active Involvement

Findings

The study on the re-alienation experience of runners was analyzed in three main finding clusters. Under the title of participants and running experience, the participants' running history, purpose and goals were shared. Under the heading of running and psychological well-being, the contributions of running to the ties that runners establish with themselves, nature and their environment in terms of access to a sense of autonomy through the sport of running are presented by the experiences of the participants. Patterns of re-alienation within the running culture are included under the title of re-alienation experience.

Running Experience Motivations and Contributions to Psychological Well-Being

Each of the participants is an active runner and all runners aim to run marathon or ultramarathon distances strongly as their ultimate goal. When the meaning that the participants attributed to running and their running goals were analyzed, it was seen that various motivation sources were effective together. Participants engage in running to both escape from the burdens of daily life, relieve stress, or seek an escape experience, and to maintain or improve their physical bodies; additionally, they also build social relationships. Based on the answers of the participants, it can be said that running increases psychological resilience and thus supports psychological well-being by establishing connections with one's own body, meaning, nature, society and values, or by repairing or strengthening existing connections.

Most of the participants find running meditative. Participant 28 emphasizes that *"Running is a sport that increases mental endurance as well as physical endurance."* Similarly, Participant 15 emphasizes the meditative role of running by saying *"I see running as a means of mental exercise as well as physical, I think it teaches patience, staying calm, not getting angry and staying in the moment while physically testing yourself."* Running is an activity that contributes both physically, socially and psychologically for the participants. Most of the participants reported that they managed their various experiences of alienation through running. Participant 13 emphasizes the importance of running for repairing past disconnections and achieving or maintaining an autonomous life with the following words: *"After I quit my old life and smoking, I started running to help me ... I can say that it is one of the best choices I have made in my life. I try to see it as something indispensable at the same time, especially since it is a habit that I consciously established and a part of a lifestyle. I enjoy running a lot, no doubt, but I care more about maintaining a lifestyle as if I am always running ... I think that running has a very educational aspect that can make people ask themselves questions if they want to see it and I find it very meditative."* In a similar vein, Participant 2 said *"When I started running, I used to motivate myself by saying -keep your head up-, I consider running as a kind of resistance tool by associating the effort I put into running with daily life."* Participant 2 stated that he had a history of obesity and instrumentalized running to combat obesity: *"Thanks to running, I live away from obesity. It keeps my weight in a certain range. As of now, I am in the normal weight range, I am happy with my body. During my obesity period, there was almost a distance between me and my body, now I am at peace with myself."* According to his responds Participant 2 moved away from alienation from his own body through running. As much as it is for weight control, running is also functional for discovering the limits of one's body and increasing endurance. Participant 14 summarizes the impact of running on physical her own physical development with these words: *"At first I focused on running to maintain my weight, but over time, as running became more commonplace, it turned into seeing my own limits. As running became more commonplace, I felt stronger and more resilient, the more I push my physical limits, the better I get to know my body and I almost surpass myself"*.

The act of running creates a hormonal surge in the body and creates a positive affect called *runner's high* (Boecker et al. 2008, p. 2523). A significant number of the participants also referred to this and saw running as, in the words of Participant 9, *"the simplest and easiest way to be happy"*. When this positive affective potential is combined with the experience of escape, running becomes a functional tool for participants to gather themselves, to take a break from problems and to find themselves. Participant 29 says, *"I run away from the things I have problems with, and as I run away, at some point the meaning of the problems becomes lighter."* and adds, *"On the one hand, I run away from the things I have problems with; besides, I learn not to worry too much about the things I have problems with by running."* Participant 29 states that especially the troubles in his work life easily take over his daily life before running; he emphasizes that running offers stress management and psychological resilience in addition to the experience of escape. Participant 18, who builds a semantic bridge between the challenges in running and the challenges in life, says: *"I match the challenges in everyday life with the challenges I face in running. Just as I overcome challenges in running, I try to approach everyday challenges in a similar way."* When Participant 18 was asked for an example, he replied: *"For example, when I am gaining distance, I need to be calm and patient, I equate overcoming distance with solving a problem in my mind, and I tell myself that I can only resolve the problem if I maintain my calmness."* Participants both create new connections through running in their mind and find meaning again in issues they had previously experienced disconnection with just as Participant 12 states *"When I was young, I used to love playing games in the street and doing sports, then school, work, physical activity became meaningless, but soon after I gave running a chance, I fell into a childish love [for sports]"*.

Participants also stated that trail running is a refreshing way to escape from the concretization and highly populated and unplanned urbanization in Istanbul. Participant 7 said, *"I love trail running. I feel like a free animal in the forest, it makes me forget the chaos of Istanbul and I find peace."* Participant 13 said, *"I go for a run in the forest every chance I get to get away from the city and the identity of a city person... The forest is good for you, it both makes you feel free and remind your place."* Participant 6 said, *"Running reminds you of your humanity."* and he adds, *"It reminds you that you have limits, that you are fragile, that you are an animal in nature. In the monotony of city life, we can forget our limits, I think running makes us remember of these limits."* Participant 6 expresses his belief that not only running in the forest but also the whole running experience reminds one's relationship with nature and increases the awareness of being human.

All participants have experienced running groups. 13 participants started running by directly joining a running group and continue to run with running groups. Among these participants, Participant 27, who has been experiencing running groups for the longest time, described running with groups and the role of these groups in her life by saying, *"Thanks to the running group, I first learned to run, and then I placed running at the center of my life with the relationships I built there. We don't just run, we almost live together"*. These participants emphasized that they were able to run in a much more sustainable way by running together.

Aral and Nicolaides (2017, p. 1) analyzed data from Strava, a popular app among endurance athletes, and found that runners who run together run longer and for longer distances. Participant 7 supports the finding of Aral and Nicolaides (2017) by stating *"Thanks to the relationships I have established in my running group, I run with someone from the group every time I fall into a gap and we both motivate each other and overcome distances together."* Participant 6 also stated in a similar direction, *"The desire to socialize is actually an important factor in my running experience. I have good friendships that I have made through running. I really enjoy going on an adventure with these friends, chatting while running and spending time afterwards. Running with friends is more fun and satisfying than running by yourself"*. Running groups enable participants to find themselves with the sense of belonging, social approval and acceptance they offer. Participant 2 said, *"The experience of being a team is really satisfying. You overcome difficulties together, you laugh together, you feel sad together. When running groups create this state of togetherness, the satisfaction they get really refreshes one's self-love, self-esteem and self-confidence"*. Running groups that bring together people with different backgrounds, different tastes and different dreams around the sport of running can also be effective in repairing the disconnects in social values. Participant 24 said, *"In running groups, I made friends with people I would not normally communicate with. My prejudices on various issues were broken. We live in a very polarized society, I could not tolerate those who were against my point of view, but after listening to the different opinions of my friends in the running group, I started to be more tolerant ... My opinions have not changed, I still have the same political position, but I am more tolerant to listen to the argument of the other side."* and stated that she became more resistant to social conflict through the relationships he established around running.

Experience of Re-Alienation

Participants may encounter re-alienation experience as a result of fetishized attitudes and false consciousness tendencies in the process, as well as positive effects on their psychological well-being with various motivation sources for running. While examining the experience of re-alienation, we first tried to identify the sources that triggered this experience, the affective tendencies in this experience and the attitude change afterwards. Basically, economic inadequacies, performance anxiety, social pressures and power relations within the running group were found to lead participants to re-alienate. Each of these experiences was a combination of powerlessness, meaninglessness, normlessness, isolation and self-estrangement. As a result, the participants made a positive or negative attempt. Recognizing re-alienation, assessing the situation and focusing on correcting or eliminating the source of alienation was called a positive intervention. Similarly, remaining in the process of alienation and not being able to achieve inner peace by compromising oneself was considered as a negative intervention category.

Economic inadequacies appear as a source of alienation frequently mentioned by the participants. Especially when the economic climate in Turkey is taken into

consideration, participants with high incomes as well as those with middle and low incomes stated that economic bottlenecks are challenging for runners. Participant 19, who thinks that *"running seems like a low-cost sport to most people but the opposite is true"* stated: *"If you are going to do it once in forty years, the cost is low, but if you run regularly and especially if you take it seriously, the costs are high. Race shoes, clothes, race registration fees, transportation and accommodation costs add up to a very serious budget. It is not possible for everyone to afford it"*. Emphasizing that the financial burden tires people mentally, Participant 19 adds, *"For myself, I got tired due to the financial burden and I reduced the number of races I participated in. Since I don't compete often, I reduced my training load a little bit and automatically the financial burden decreased. Otherwise, I would have quit running, which I find meaningful, altogether."* Similarly, Participant 6 said *"There are more invisible costs of running than visible ones. I wish one shoe was enough as everyone thinks. When you go over 2000 kilometers a year, several pairs of shoes are inevitable. Your friends around you go to races and you want to go too. When you get caught up in costs and don't go, you feel left behind. Sometimes you get into debt and take out loans. This time you are crushed under the burden of debt. In this way, the whole value of the run can start to fade away."* Participant 23 turned a similar situation into a positive initiative. He expresses how he started running coaching in order to overcome the financial burden as follows: *"I run serious distances, I participate in many races. As an amateur, it is not possible for me to keep up with all of these financially. I was already providing training support to my relatives, writing running programs and following their performances. When the costs became too high, I started to do it for anyone who wanted to. It is not a huge source of income, but it is still enough for me to continue running, which I love very much"*.

Financial burden seems to be a common source of stress among amateurs who practice running as if they were professionals. When this source of stress is combined with the fetishization of running, equipment or races, alienation is inevitably experienced. Participant 2 clearly expressed that runners tend to spend in order to polish their self-presentation with these words: *"I actually spend money in order to show myself, to say that I am different. For example, I buy a different color of a piece of equipment I already have because it looks stylish. Or I choose a big fancy race as my target race."*

Bauman (2023, p. 24) explains the situation of exaggeration in order to shout out one's subjecthood in the chaotic social order we live in with the concept of subject fetishism. At some point, the transformation of self-presentation into excessive and subject fetishism prepares the ground for alienation for the participants. When Participant 2 was asked whether he felt any discomfort from these purchasing decisions, he said: *"Of course, it is disturbing. I spend on things I don't need when I could spend on more meaningful things. My budget is not unlimited, after all, I feel like a fool when I spend just to look cool."* When Participant 2 was asked what he did in order not to continue spending in this direction, he replied, *"I try to make more consistent purchases, but I cannot claim that I have succeeded. I just have a budget limit in my mind, I try not to exceed it"*. In order to alleviate the financial burden of running, runners or running groups can

establish partnerships with brands. Brands require runners to use and promote their products as an extension of their marketing communication activities; in return, they provide runners with financial gain, equipment assistance or fundings for races. Participant 23 expresses that the financial burden on him has been eased thanks to the support of sponsors with these words: *"With brand collaborations, my equipment cost has been zeroed, I feel lighter with the economic burden lifted off me."* but adds *"On the other hand, brand collaborations make me see running as a business. I get away from work and daily life troubles with running, but I spend a serious amount of time for the continuity of brand collaborations. I feel like I am working a double shift and sometimes it is tiring"*. Like Participant 23, Participant 8 also stated that brand collaborations can sometimes turn into a source of anxiety by saying *"I provide economic support through sponsorships, but on the other hand, I think that I tire myself extra for the continuity of the sponsorship ... Sometimes I feel like I need to train even more, produce more content, run more races, and reach more recognition in order for the sponsorship to continue or for the conditions to improve further, and when you get caught up in such thoughts, stress builds up and people get tired."*

Performance anxiety stands out as a source of stress that all runners experience in one way or another. When the meaning attributed to running is exaggerated, alienation can be experienced in different dimensions. Participant 21 stated that she routinely suffered from performance anxiety before the race and said, *"I have been stressed and stolen sleep a lot, as if I was not the one who did all those trainings, saw those distances, those speeds."* She also stated that anxiety caused self-estrangement at some point. Participant 33 said, *"I get nervous before races or important key training sessions. I lock myself at home early the night before so that nothing wrong happens. I guess I think I should be alone so that I don't make a mistake that will affect the run. ... From time to time, I think that I overdo this sport that I do for fun and become lonely and miss out on life when I overdo it like this."* and associated performance anxiety with social isolation. Participant 23, on the other hand, stated that he can get very nervous on race mornings and hurt the people he loves, this state is alien to him and he said, *"I get so nervous that sometimes I lose control and then I am surprised at myself."*

Another source of re-alienation among the participants was identified as social pressure. These social pressures stem from both the participants' non-running or sedentary environments and the relationships within the running group or power relations within the group. Referring to the marathon training period, Participant 8, who had run a marathon once, said: *"I used to do the key training on Saturdays, I could not go out on Friday evenings because these trainings were too challenging for me, and on Saturdays I was trying to rest because I was extremely tired. Normally I would spend Friday and Saturday evenings with my friends, I was really tired of constantly rejecting my environment for almost three months for training. No one openly reproached me, but I had the feeling that I was sacrificing my friendships for what I was doing to be good for myself."* Participant 28 said, *"I had arguments with my wife from time to time because of the central role of running in my life. It started to feel like I was spending more time with my runner friends than with my family, and I had a serious tension that my*

relationship would be turned upside down. Since my family is more prioritized than anything else, I ultimately preferred to put running and performance in the second plan. I adjust my time according to my family, if they need me, I don't run, I was worried about this at first, but now I don't mind it because my mind is at ease."

As can be seen in these two examples, the possibility of damaging or breaking the relationships that the participants have established with their social circles can cause stress on the individual. Another source of social stress stems from the communication dynamics within running groups. Participants mentioned that the micro power relations within running groups negatively affected them. Participant 2 tried to summarize the stress caused by micro power conflicts in running groups with these words: *"We do run to get away from the stress of daily life and to enjoy it, running groups put socialization into the equation and can increase the satisfaction many times over. When things like sponsorships and branding come into play, our priority shifts away from supporting each other and enjoying ourselves. When the first priority of those in charge of the running group is to make money, your priority as a group member is to enjoy yourself, which creates conflict. When this conflict is not managed properly, relationships break down as a result. As a result, there are breaks from the group and joy is replaced by sadness"*. Participant 16 supported Participant 2 by saying *"Sometimes the captains of running groups can miss the difference between demand and request. He tends to see the group member as his employee. As a result, we come to running groups to escape from work life. This conflict really tires people out and puts them off running."*

Conclusion

Recreational activities, or in the case of this study, running, can be evaluated as a search for meaning in life and an escape from alienation. In order for this experience to be sustained and not to be degraded, it is necessary to be able to show an individual resistance against the commercialized sports culture, in other words, to take a rebellious stance. Whether it is possible to get away from the experience of alienation, which is frequently questioned in studies dealing with the phenomenon of consumer culture and alienation together, was also tested in this research.

For this purpose, a semi-structured in-depth interview study conducted with 33 runners yielded various insights on the experience of re-alienation. First of all, it was found that runners instrumentalize running in order to repair or create new bonds with themselves, nature, the place where they live, others, meaning and values. Running is used for stress management and escape from stress, helping runners to achieve a sense of autonomy. Although running contributes positively to psychological well-being, the various commodity fetishes that the runner develops within the consumer culture in which he/she lives and the weakened social bonds that are mediated by these fetishes can lead to the re-emergence of the experience of alienation.

The false consciousness practices learned within the mass culture we live in cause runners to both fetishize their own subjects and produce various fetishes within the subculture of running. Running equipment, races, running performances and running groups can become fetishized and the runner may over-value them both economically, socially and psychologically. As a result of this exaggerated valuation, even though the runner tries to use running for psychological well-being, at some point, running with its fetishized dimension can turn into a new source of psychological stress. In the face of this re-alienation experience, the runner can either move away from alienation by redesigning the creative endeavor or making a positive attempt to cope with these fetishes, or they can choose to remain alienated and have to take a negative position.

The fact that the psychological evaluation of various traumas experienced by the runners could not be analyzed in depth should be considered as a limitation of the study. It would be meaningful as future research to examine the effect of traumas on the experience of alienation in relation with running through a detailed clinical study.

As a result of the study, it is possible to say that the experience of alienation is suppressed by running instead of eliminating alienation altogether or creating an escape space for the person. Since the person will continue to fetishize both his/her subject and various objects as long as he/she does not realize himself/herself and his/her reality within the social structure, the escape experience created by running inevitably leads to re-alienation at some point.

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