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ORIGINAL ARTICLE

Mass-participant sport events and sustainable development: gender, social bonding, and connectedness to nature as predictors of socially and environmentally responsible behavior intentions

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Abstract
The integration of sport and sustainable development can positively enhance social and environmental outcomes to encourage a sustainable future. Only a limited amount of knowledge exists regarding the sustainable behavior perceptions of sport participants. Specifically, this study examined gender differences for active sport event participants' socially (SRBI) and environmentally responsible behavioral intentions (ERBI), social bonding, and connectedness to nature. This inquiry also explored the relationship between SRBI and ERBI in a mass-participant sport event (MPSE) context. The data collected through web surveys from registered runners of an MPSE in the Southeastern United States. The results revealed that women have significantly higher perceptions of connectedness to nature, SRBI, and ERBI than men. Also, findings suggested that the MPSE context could play a crucial role as a platform for sustainable development interventions. Finally, this research supported that social bonding and connectedness to nature perceptions play an essential role in cultivating SRBI and ERBI for both men and women.

Keywords Sustainable behaviors · Sport participation · Gender · Social bonding · Connectedness to nature

Introduction

Over the past decade, mass-participation sport events (MSPE) are considered to be the most popular active sport participation events and have experienced increased popularity over the previous decade (Buning and Walker 2016; Triantafyllidis and Davakos 2019). Annually, millions of people across the globe participate in MPSE. Typically, there are several options for the MSPE participants, such as running races of 5 k, 10 k, relay races, half marathons, and marathons (Buning and Walker 2016; Filo et al. 2011; Funk et al. 2009; Triantafyllidis and Kaplanidou 2019). In 2019, MPSEs that incorporate running and racing (i.e., traditional MPSE) remained the most dominant market in the event industry, with 9.78 million finishers and approximately $900 million in revenue (Triantafyllidis and Davakos 2019; Triantafyllidis and Kaplanidou 2019).

Based on the previous literature, sport as an institution may be a mechanism to encourage positive values and services, as it operates as a milestone for worldwide promotions of development and peace (Schulenkorf 2010). Sport is a mechanism that contributes to community development and social responsibility. Organizations and individuals involved in sport are becoming more concerned about social issues and their communities (e.g., Trendafilova et al. 2013; Waas et al. 2010). In the MPSE market, several races support sustainable community development, social support services, and charity (Filo et al. 2011; Trendafilova et al. 2013). Sport event entities have started to address the crucial role of reducing their negative impacts on the environment, and they have begun to engage in environmentally sustainable initiatives (Trail and McCullough 2019). Furthermore, scientific reports have shown that sports entities that communicate and promote environmentally friendly practices can positively influence their sport consumers' behavioral

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involvement in recycling and purchases of reusable and sustainable sport products (Sato et al. 2017).

Moreover, Triantafyllidis and Kaplanidou (2019) found that active sport event participants have positive intentions towards carbon dioxide (CO_2) offsetting schemes when those schemes are spearheaded by the sport event they are attending. Regarding sport consumers' traveling behaviors, it has been reported that active sport participants prefer to travel with other people to a sport competition as they found it less costly and environmentally friendlier than driving alone (Triantafyllidis 2018). Beyond that participants of MPSE have reported spending hours per week in the outdoor environment to physically and mentally be prepared and trained for the races (Triantafyllidis and Kaplanidou 2019). Also, most of the MPSE take place outdoors, and most often, they have natural environmental characteristics. Therefore, resource quality plays a critical role in participants' experiences with the race. This constant exposure of participants with the natural environment can enhance their connectedness to nature and proenvironmental perceptions (Triantafyllidis and Kaplanidou 2019).

According to the previous literature, people are actively participating in sport competitions at an increasing rate (Buning and Walker 2016; Filo et al. 2011; Funk et al. 2009; Triantafyllidis and Kaplanidou 2019). One rationale for this increase is due to the social interactions between active sport event participants. For example, previous investigations have determined that social bonding motives are a primary factor for those committed to participating in MPSE (Buning and Walker 2016). Also, Triantafyllidis and Kaplanidou (2019) reported that the natural environment surrounding the course of a race plays a vital role in an individual's decision to participate in sport events that include natural environment characteristics, such as mountains, lakes, ocean, and national parks.

In the expansive body of research on gender and sport, there is evidence that women have different motives than men regarding active sport events (Funk et al. 2009; Robinson and Trail 2005). Considering the crucial role of MPSE on sustainable community development, it is critical to find effective ways to promote sustainable behaviors by identifying why many MPSE are still not providing their participants with the opportunity to contribute positively to the communities and the natural environment. To this end, several studies have focused on the realm of social and environmental psychology. They have aimed to explain why individuals do or do not engage in sustainable behaviors, such as the socially and environmentally responsible behaviors (Corral-Verdugo et al. 2011; Kasser 2009; Park and Ha 2012). For example, previous research evidence has shown that social bonding, connectedness to nature, and sociodemographic variables are factors that play a crucial role in predicting people's sustainable behaviors (Kasser 2009; Kissane and Winslow 2016; Park and Ha 2012). However, there is limited evidence of participants' gender differences in sustainable behaviors in an MPSE context. Therefore, it would be critical to identify if and how social bonding, connectedness to nature, socially, and environmentally responsible responses differ among subgroups of the target populations to consider practical strategies for promoting sustainable development practices.

Based on the proposed connection between active and sustainable living, women and men may have different motives and perceptions towards social and proenvironmental stimuli (Lipowski et al. 2019). For example, research suggests that social bonding motives play a more critical role for men than women sport participants. On the contrary, women present a more reliable emotional connection with nature than men (Stern et al. 1993; Vicente-Molina et al. 2018). Although the previous research has generally explored the factors that influence men and women to participate in sport, it is not known how those factors that relate to active sport event participation (i.e., social bonding and connectedness to nature) may influence sustainable behaviors of those participants, such as the socially responsible behavioral intentions (SRBI) and the environmentally responsible behavioral intentions (ERBI) (Kissane and Winslow 2016).

Purpose of the study

Based on the gaps in the current literature, there is limited evidence to explain the connections between sport and sustainable development related to the socially responsible and proenvironmental responses of the active sport event participants. Furthermore, there is a lack of research aimed at investigating the potential differences in social bonding and connectedness to nature between men and women in an MPSE context. Therefore, this study sought to fill these gaps by investigating MPSE participants' social and environmental attachments on their sustainable (i.e., SRBI and ERBI) behavioral intentions. The following research objectives served to guide the purpose of this study:

1. Investigate the gender differences in participants' SRBI and ERBI, social bonding, and connectedness to nature.
2. Explore the role of social bonding and connectedness to nature on participants' SRBI and ERBI.
3. Examine the relationship between participants' SRBI and ERBI.

Literature review

Measuring sustainable behaviors in mass-participant sport events

Sustainable development is a process that plays an essential role in the current state of the world because

it addresses solutions for social and environmental problems. Also, sustainable development allows future generations to satisfy their needs and desires properly (Baumgartner 2011; Midgley and Reynolds 2004; Waas et al. 2010). Recent findings in the areas of sport and development support the idea that active sport event participation may be a powerful mechanism to bolster positive efforts in sustainable development (Trail and McCullough 2019; Triantafyllidis and Kaplanidou 2019; Waas et al. 2010). In the literature, active sport event participation is often referred to as sport event consumption that targets individuals who are actively involved with a sport (i.e., running) (Triantafyllidis and Kaplanidou 2019). In contrast, there are types of sport event consumption that focus on spectator's consumption, such as football and motorsports (Triantafyllidis et al. 2018). Spectator sports attract a higher number of participants than active sport events (Triantafyllidis et al. 2018). For example, active sport events often attract a range of a few hundred to a few thousand participants (Triantafyllidis and Kaplanidou 2019). Spectator sports attract an average of 90,000 participants (Triantafyllidis et al. 2018). Research has shown that spectator sport participants usually travel more than 200 miles to attend the sport event. The consumption of sport products, food, and drinks is significantly higher than that of active sport events (Triantafyllidis 2018).

Also, recent reports support the notion that individuals' engagement with socially responsible and proenvironmental practices play a vital role in the strategic planning of sustainable development processes (Luchs and Mooradian 2012). Overall, the positive human behaviors that have identified as sustainable behaviors refer to people's actions that have positive impacts on social and environmental changes (Baumgartner 2011; Midgley and Reynolds 2004). Based on the previous literature's cumulative findings, sustainable behaviors defined as a set of actions that focus on protecting the social–ecological resources of the world (Briscoe et al. 2019; Luchs and Mooradian 2012; Scannell and Gifford 2010). More specifically, sustainable behaviors are used as outcome variables to emphasize people's behavioral intentions to protect the human–social capital and environmental resources (Luchs and Mooradian 2012).

Several studies reported that sustainable behaviors capture people's psychological tendencies to engage in practices that would benefit other people's quality of life and the natural environment (e.g., Spaaij and Jeanes 2013). Accordingly, sustainable behaviors express the willingness of people to act on behalf of social and environmental responsibilities. Therefore, these actions often capture the cognitive psychological components of people's attitudes towards the natural environment (Ajzen 2001). Based on the Brundland Report (1986), sustainable development aims to protect the natural resources of the planet and meet people's needs by conserving human resources. Based on the gaps in the current literature, this study uses the outcome variables of socially and environmentally responsible behavioral intentions as the two main types of sustainable behaviors. Accordingly, an investigation of gender differences for these components focused explicitly on the two behavioral aspects of sustainable behaviors.

Moreover, the normative concept of sustainable development claims that the satisfaction of needs among all people living on this planet should be achieved (Broman and Robèrt 2017). Accordingly, research has shown that behavioral outcomes influenced by altruism are associated with people's actions that benefit others and society (Stern et al. 1993). Consequently, the behavior that aims to benefit other people defined as socially responsible, and it includes individuals' actions related to community service, philanthropy, and financial aid (Spaaij and Jeanes 2013).

Confounding sociodemographic factors

Based on the sociodemographic background of people, studies have supported that annual household income, educational background, marital status, age, and race can have a confounding role in predicting proenvironmental behavioral intentions (Diamantopoulos et al. 2003; Dolnicar et al. 2008). For example, in Western countries, it has been determined that people from higher social classes (i.e., higher income and college degree holders) are more concerned about environmental issues as compared to individuals from lower classes (Ghvanidze et al. 2016). Also, Diamantopoulos et al. (2003) found that gender, marital status, age, education, and social class determined the levels of environmental consciousness. However, several studies have shown that only people with higher annual income and better education are more often willing to engage in proenvironmental actions (Abrahamse and Steg 2009; Dolnicar et al. 2008; Ghvanidze et al. 2016). Accordingly, age and race have not been previously found as playing a significant role in proenvironmental attitudes and behaviors.

In the context of active sport event participation, a recent study indicated that only the gender was a critical sociodemographic factor that can positively explain environmental concerns and environmentally responsible behavioral intentions (e.g., Triantafyllidis and Kaplanidou 2019). In support of the previous literature, Triantafyllidis and Kaplanidou (2019) found that annual household income, age, race, education, and age did not predict environmental concern and behavioral intentions of runners that participate in MPSE.

Moreover, previous scholarship regarding the gender differences in (1) SRBI and (2) ERBI supports the notion that men and women may think and behave differently towards

the natural environment (Strapko et al. 2016; Raymond et al. 2010). Research has determined that women express more significant environmental concerns and proenvironmental responses early in the lifecycle than men (Zelezny et al. 2000). Later in a woman's lifecycle and following reproduction, women often show an increase in their environmental concern based on feeling more connected to nature and the natural environment (Mobley and Kilbourne 2013). These alignments bolstered by previous findings that show women score higher on all three factors of environmental concern, including (1) egoistic, or ecological concern focused on the self, (2) social–altruistic or environmental concern focused on other humans, such as children, and (3) biospheric, or environmental interest focused on the biosphere, such as plants and animals (Schultz et al. 2000; Zelezny 1999).

Gender difference in socially responsible behavioral intentions (SRBI)

Socially responsible behavior refers to one's actions and choices that prevent or minimize social problems. Concern for social welfare often motivates individuals to become more socially responsible based on their current and future social issues (Rim et al. 2016; Strapko et al. 2016). Therefore, people who are socially concerned about the welfare of the society or their community, and are more knowledgable about socially responsible practices, tend to present positive behavioral intentions to engage in such behaviors. It has been discussed that women are more concerned about social issues and more knowledgeable about socially responsible practices than men. Although the associations between women's socially responsible knowledge, concern, and actual behavior may be inconsistent, sociopsychological variables and socialization processes have likely contributed to higher levels of overall sustainable development understanding (Zelezny et al. 2000).

In sociological literature and gender research, scholars have introduced gender socialization as a variable that men and women learn how to adapt and develop masculinity and feminity values and orientations (Xiao and McCright 2015; McCright et al. 2016). For example, research has determined that women tend to socialize towards a feminine identity due to feelings of attachment, empathy, and care. In contrast, men tend to socialize towards a masculine identity stressing detachment, control, and mastery (Xiao and McCright 2012). Several studies support the notion that women are more socially concerned than men because they are often socialized to adapt to a caregiving social role (Xiao and McCright 2012; Zelezny et al. 2000). Given the context of MPSE, there is an increased social interaction between the participants of both genders. However, there is limited knowledge of the differences between women and men regarding their socially responsible responses. Given the previous knowledge related to gender and society, it was anticipated that women would be more likely to engage in SRBI than men; therefore, we hypothesize the following:

H_{1a}: There are significant gender differences in participants' SRBI in the MPSE context.

Also:

H_{1b}: Participants' gender influences significantly positive their SRBI.

Gender difference in environmentally responsible behavioral intentions (ERBI)

Studies on gender issues and sustainable behaviors have not concluded whether men or women are more likely to engage in socially and environmentally responsible practices (Sovacool et al. 2018; Strapko et al. 2016). Many studies have revealed conflicting results about the role of gender in sustainable behaviors (e.g., Collado et al. 2019; Lange and Dewitte 2019; Stern 2000). In the literature of environmental psychology, proenvironmental behaviors include the purposeful and useful practices that aim to conserve natural resources (Stern 2000). When people's actions have a positive outcome on the environment, they are considered environmentally responsible (Collado et al. 2019; Lange and Dewitte 2019). Previous investigations have reported that effective environmental practices include (1) recycling, (2) energy-saving research for environmental issues, (3) the use of alternative transportation, and (4) actively reducing carbon dioxide emissions. Within the climate change literature, gender has assessed as a factor that potentially contributes to one's ERBI and actual behaviors. However, the relationship between gender and ERBI has not been assessed explicitly for sport participants or social events.

Outside of the sport industry, the majority of analyses concerned with gender and ERBI have found that women tend to show higher levels of environmental concern than their men counterparts. Accordingly, the significant differences between men and women regarding environmental concerns may often be overlooked. Specifically, previous researchers have determined that while women often convey greater assessed scientific knowledge of environmental issues than men, they often underestimate their environmental knowledge more frequently (Mobley and Kilbourne 2013).

Previous evidence has shown that gender is an additional component that presents differences in this variable's interaction with environmental degradation. More specifically, based on the United Nations Framework Convention on Climate Change, women represent the majority of the world's poorest inhabitants. As a result, the damaging outcomes of climate change often affect women more severely than men (Sachs et al. 2019). Furthermore, women have unequal

participation in decision-making processes and market planning, policy-making, and implementation. Thus, suggesting that a lack of gender equity within leadership positions may further contribute to environmental degradation.

Although women maintain inequitable participation in decision-making processes across the world, it has determined that women often play a critical role in responses to ecological issues. For example, women have presented higher levels of environmental knowledge than men (Vicente-Molina et al. 2018). Subsequently, women are motivated and have higher levels of perceived effectiveness in response to ERBI (Vicente-Molina et al. 2018). These findings and associations contributed to the second proposed hypothesis:

H_{2a}: There are significant gender differences in participants' EBRI in the MPSE context.

Also:

H_{2b}: Participants' gender influences significantly positive their ERBI.

Social bonding

In the MPSE context, participants can develop more reliable connections with other participants as they share similar experiences through a common interest (Buning and Walker 2016). The social relationships among sport event participants identified as social bonds, and when people connect with others in a specific place, it is referred to as social bonding (Perkins and Long 2002). Specifically, social bonding defined as the feeling of belongingness to a group of people and the emotional connections based on the shared experiences, interests, and concerns (Raymond et al. 2010; Scannell and Gifford 2010). In the literature of sport management, in an MPSE context, social bonding is the attachment between the participants' and explained by the positive interpersonal relations and social interactions (Buning and Walker 2016).

Therefore, social interactions become meaningful for the participants because they are firmly attached to the place and the sport event's characteristics. According to the social bonding theory, there is evidence that men present stronger bonds with their peers than women (Özbay and Özcan 2008). Within the context of sport, there is limited knowledge regarding the social bonding differences between men and women. Based on the tenants of social bonding theory, this study hypothesized that men active sport event participants would present higher social bonding levels with other active sport participants of the place of the event compared to females. Therefore:

H_{3a}: There is a significant gender difference in participants' social bonding in the context of MPSE.

Also:

H_{3b}: Gender will influence significantly positive participants' social bonding perceptions.

According to Raymond et al. (2010), social bonding predicts ERBI in a particular place. However, what remains unknown is whether or not those people could adopt a proenvironmental lifestyle in their everyday lives. Also, Ramkissoon et al. (2013) investigated the extent to which participants who stated that behaved proenvironmentally at a national park where they were attached to the place and to the people of that place continue engaging in proenvironmental behaviors the next 12 months. Accordingly, the current study aims to explore the influence of the social bonding of the active participants of an MPSE on the proenvironmental behaviors and precisely their ERBI. The supportive literature assisted the generation of the following hypothesis:

H_{4a}: Participants' social bonding perceptions at the MPSE setting influences significantly positive their SRBI.

Also:

H_{4b}: Participants' social bonding perceptions with the MPSE context influences significantly positive their ERBI.

Connectedness to nature

In the literature, there is evidence that emotional connections between people attached to a particular place are more reliable when they are in this specific place compared to areas that are not connected. For example, in an MPSE, participants present a connection with the course of the race and the external characteristics of that place, such as the natural environment (Lipowski et al. 2019). In addition, people who are actively involved with sport often present an increased environmental connection (Lipowski et al. 2019). According to green mind theory, individuals who care for their health, body, and self, are more likely to show a heightened connection with the natural world and behave responsibly towards nature (Pretty et al. 2017; Triantafyllidis and Kaplanidou 2019).

As discussed, previous research illustrates that women had developed environmental values that reflect on their increased interest in environmental issues, which makes them more concerned with the natural environment than men. Based on the value–belief–norms theory, women can present stronger bonds with the natural environment than men due to their biospheric values (Schultz et al. 2000, 2005). In an MPSE context, there is limited research on the gender difference in connectedness to nature. Previous studies have explored the connectedness to nature of active sport event participants, determining that people's connection with the natural resources of the sport event location, impacts their decisions towards participation and time spent in nature (Triantafyllidis 2018). Based on the previous literature, women participants may have higher rates of

connectedness to nature than men, so we hypothesize the following:

H_{5a}: There will be a significant gender difference in participants' connectedness to nature perceptions.

Also:

H_{5b}: Gender will influence significantly positive participants' connectedness to nature perceptions.

Research in place attachment has shown that people who were emotionally bonded with nature are willing to engage in environmentally friendly practices (Carfora et al. 2017; Halpenny 2010; Ramkissoon et al. 2012). Findings illustrated that people commit to preserving the natural environment where they lived or exposed to it in early childhood (Halpenny 2010). Also, a person involved in specific activities in a particular situation, such as running and recreation would be more likely to protect it as compared to those who do not (Dono et al. 2010; Halpenny 2010).

Regarding the socially responsible behaviors, people who relate themselves with the environment of a context would have positive intentions to help other people and the natural environment based on their philanthropic values. Accordingly:

H_{6a}: Participants' connectedness to nature perceptions with the MPSE context significantly influences positive their SRBI.

Also:

H_{6b}: Participants'connectedness to nature perceptions with the MPSE context significantly influences positive participants' ERBI.

Relationship between socially and environmentally responsible behavioral intentions

Sustainable development works as a tool for solving social and environmental problems (Broman and Robèrt 2017). For example, sport contributes positively towards an individual's physical, psychological, and subjective well being regardless of their gender, age, race, or ethnicity (Schularkof 2010). Previous literature has provided evidence to support the notion that countries from around the world have used sport as a platform for educating local communities and solving social issues, such as racism, sexism, and other types of discrimination (Schulenkorf 2010; Schulenkorf et al. 2016; Smith and Westerbeek 2007). The positive influence of sport has been a source of inspiration that unites individuals and nations and can enhance positive social changes (Coalter 2010).

Moreover, in 2015, the Commonwealth Secretariat (2015) indicated the essential role of sport for development and peace in our modern world. It encouraged the assessment of sport as a context that could contribute to sustainable development. Explicitly, the Agenda 2030 for Sustainable Development stated that sport could play a crucial role in implementing sustainable development outcomes and can be a platform that promotes peace, tolerance, respect, empowerment, community development, health, environmental stewardship, and conservation. The recent recognition of sport as a platform for social and environmental change and the empowerment of minority populations supported the initiation of a new field of study. It investigates the ways that sport can be utilized as a tool for contributing to sustainable development objectives. Before these advancements, however, a more thorough understanding of sport participants' sustainability perceptions is required across a range of sociodemographic variables, such as gender (Spaaij and Jeanes 2013).

H_7: There is a significantly positive relationship between participants' SRBI and ERBI at the MPSE context.

Method

Procedure

This study included running event participants from an annual event that takes place in the southeastern United States. In 2019, the MPSE was the 42nd race hosted for the forty-second consecutive year, and the registered participants were 34,924. This event included 10 km (10 K) run. The data collected through web surveys. The link of the web survey posted before the beginning of the race to the race's website, where participants would check their results. From the 34,924 registered participants who visited the website for their results, the 2014 participants completed the web survey, accordingly, for the statistical analyses, the $N = 2014$ responses used by the researchers in the Statistical Package for Social Sciences (SPSS) software 25.0.

Participants

Respondents were 1313 women (65.2%) and 701 (34.8%) men, with an average age of ($M = 47.8$, SD = 13.03, $n = 1977$). From the $N = 2014$ participants who answered the sociodemographic questions, the 57.9% had a Bachelor's or Associate's Degree from college, ($n = 1166$), the 71.1%, ($n = 1432$) were married or partnered, the 74.6% presented an annual household income of $60,001 or more ($n = 1503$), and the 84.7% were Caucasian ($n = 1705$) (see Table 1).

Data analysis

The web-survey questionnaire included items that captured participants' social bonding and connectedness to nature on a 7-point Likert scale (from 1 = strongly disagree to 7 = strongly agree). For the measurement of the social bonding, three-items adapted by Scannell and Gifford (2010) and connectedness to nature measured with two-items adapted by Mayer and Frantz (2004). Besides, the web-survey questionnaire captured participants' SRBI an ERBI on a 7-point Likelihood scale (from 1 = very unlikely to 7 = very likely), and they measured with five- and eight-items, respectively, and adapted by Tapia-Fonllem et al. (2013) (see Table 2).

The previous research in the context of active sport event participation has shown that sociodemographic variables, such as income, age, education, marital status, and age, did not significantly affect environmentally sustainable behavioral intentions (Triantafyllidis and Kaplanidou 2019). Also, on the same research by Kaplanidou and Triantafyllidis (2019), it was found that only the gender had a significant effect on environmentally responsible behaviors. Consequently, this study focused on gender differences and influences on social bonding, connectedness to nature, SRBI, and ERBI.

Hypotheses testing

For testing hypotheses (i.e., $H_{1a\text{ and }H1b}$, $H_{2a\text{ and }H2b}$, $H_{3a\text{ and }H3b}$, $H_{4a\text{ and }H4b}$, $H_{5a\text{ and }H5b}$, $H_{6a\text{ and }H6b}$, and H_7), four-independent *t* tests and four-hierarchical regression analyses conducted to examine participants' gender differences and its predictability on social bonding, connectedness to nature, SRBI and ERBI, as well as to examine the potential effects of social bonding and connectedness to nature on SRBI and ERBI (Fig. 1).

According to Hair et al. (1998), for executing regression modeling, the nonmetric variables should be recoded to metric. Therefore, for gender, the variable was recoded from nonmetric to a metric variable (0 = males and 1 = females). In support of the literature, the following five sociodemographic characteristics of the participants were recoded to include confounding factors in the hierarchical regression models. Precisely, the variables that recoded included participants' annual household income (0 = less than 80,000 dollars per year and 1 = more than 80,000 dollars per year), educational background (0 = no college degree and 1 = college degree), marital status (0 = partnered or married and 1 = single or widowed), age (0 = eighteen to forty-seven years old and 1 = forty-eight to eighty-nine years old), and race (0 = White, not the Hispanic origin and 1 = Other, not White with not Hispanic origin).

The first and second HRA tested the influence of gender, social bonding, and connectedness to nature on SRBI and ERBI, when controlling for the five confounding sociodemographic factors (i.e., annual household income, educational background, marital status, age, and race). The third and fourth HRA tested the influence of gender on social bonding and connectedness to nature when controlling for the five confounding sociodemographic factors. Finally, for testing H_7, a Pearson correlation (*r*) test was conducted to explore the relationship between SRBI and ERBI.

Assumptions for statistical analyses

Regarding the four-independent *t* tests, the scales of measurement for gender, social bonding, connectedness to nature, socially, and environmentally responsible behavioral intentions evaluated to check for the first assumption (Hair et al. 1998). Accordingly, scales met the requirements, as gender measured in a nominal scale and the dependent variables on a metric scale. Furthermore, normality of the data met, as results indicated a standard bell-shaped curve. Homogeneity of variance was satisfied as the standard deviations of the responses were approximately equal (Hair et al. 1998). For the hierarchical regression analyses, linearity, and multicollinearity assumptions met. There was a linear relationship between the independent and the dependent variables. Multivariate normality was satisfied as the residual of the regression models were normally distributed (Hair et al. 1998). Multicollinearity was not a problem as the independent variables did not present high correlations ($r < 0.5$), and the variance inflation factor (VIF) was (< 0.10) (Hair et al. 1998). The data tested for homoscedasticity. It was found that the error terms were similar across the values of the independent variables (Hair et al. 1998). A plot of the standardized residuals showed the points equally distributed across all values of the independent variables.

Results

Descriptive statistics

Descriptive statistics for the metric variables showed for all $N = 2014$ participants that gender ($M = 0.65$, SD = 0.48), had (social bonding had ($M = 5.03$, SD = 1.31), connectedness to nature ($M = 5.16$, SD = 1.35), SRBI ($M = 5.29$, SD = 0.99), and ERBI ($M = 4.84$, SD = 1.25). Descriptives are illustrated in Table 3.

Independent *t* tests

For H_{1a}, H_{2a}, H_{3a}, and H_{5a} employed four-independent *t* tests to test the gender differences for social bonding, connectedness to nature, socially responsible, and environmentally responsible behavioral intentions. Specifically, the first independent *t* test conducted to compare social bonding in females and males' conditions. The results illustrated that there was not a significant difference in the scores for women ($M = 5.05$, SD = 1.32) and men ($M = 4.98$, SD = 1.31) conditions; t (2012) = 1.23, $p = 0.22$. Accordingly, the H_{1a} was not supported. However, women presented higher mean scores than men. Furthermore, the second independent *t* test conducted to compare connectedness to nature in women and men. The results indicated that there was a significant difference in the scores between women ($M = 5.27$, SD = 1.29) and men ($M = 4.95$, SD = 1.43) and conditions; t (2012) = 5.11, $p < 0.001$. Based on the results, H_{2a} was supported. The third independent *t* test calculated to compare socially responsible behavioral intentions in women and men. Results demonstrated that there was a significant difference in the scores of females ($M = 5.36$, SD = 0.96) and men ($M = 5.17$, SD = 1.02) conditions; t (2012) = 4.16, $p < 0.001$, and thus H_{3a} was supported as females presented higher mean scores regarding their SRBI as compared to males. The fourth independent *t* test for H_{5a} calculated to compare ERBI in females and makes. The results demonstrated that there was a significant difference in the scores of females ($M = 4.97$, SD = 1.19) and males ($M = 4.60$, SD = 1.32); t (2012) = 6.48, $p < 0.001$. The results supported H_{5a}.

Hierarchical regressions

For H_{1b}, H_{2b}, H_{4a}, H_{4b}, H_{6a}, and H_{6b}, four HRA were conducted. After controlling for education, marital status, age, and race, the first HRA tested H_{2b} and indicated that gender did not significantly affect social bonding ($\beta = 0.03$, $p = 0.20$). Thus, H_{2b} was not supported. The second HRA tested $H_{5b,}$ and the results showed that gender influences significantly positive effects on connectedness to nature ($\beta = 0.11$, $p < 0.001$) when controlling for the education, marital status, age, and race. Thus, H_{5b} was supported (see Table 4).

The third HRA tested H_{1b}, H_{4a}, and H_{6a}. The third HRA results revealed that in Block one, social bonding and connectedness to nature contributed significantly to the regression model one, F (2, 1974) = 71.83, $p < 0.001$, and accounted for 68.0% of the variation in socially responsible behavioral intentions. In Block two, when gender and the confounding factors entered in regression model two, they explained an additional 25.0% of the variation in socially responsible behavioral intentions. This change in R^2 was significant, F (6, 1968) = 9.05, $p < 0.001$. In regression model two, when all the variables were present in the model, gender, social bonding, and connectedness to nature presented a significantly positive influence on environmentally responsible behavioral intentions. Specifically, gender ($\beta = 0.07$, $p < 0.05$), social bonding ($\beta = 0.09$, $p < 0.001$) and connectedness to nature ($\beta = 0.21$, $p < 0.001$) (see Table 5). Accordingly, H_{1b}, H_{4a}, and H_{6a} were supported.

The final and fourth HRA tested for H_{2b}, H_{4b}, and H_{6b}. The results revealed that in Block one, social bonding, and connectedness to nature contributed significantly to the regression model one, F (2, 1974) = 86.35 $p < 0.001$, and accounted for 80.0% of the variation in environmentally responsible behavioral intentions. In Block two, when gender and the confounding factors entered in regression model two, they explained an additional 22.0% of the variation in environmentally responsible behavioral intentions. This change in R^2 was significant, F (6, 1968) = 8.07, $p < 0.001$. In regression model two, when all the variables were present in the model, gender, social bonding, and connectedness to nature presented a significantly positive influence on environmentally responsible behavioral intentions. Specifically, gender ($\beta = 0.12$, $p < 0.001$), social bonding ($\beta = 0.08$, $p < 0.05$) and connectedness to nature ($\beta = 0.23$, $p < 0.001$) (see Table 5). Accordingly, H_{2b}, H_{4b}, and H_{6b} were supported. Also, the results of all HRA are presented in Fig. 2.

Pearson correlation test

For H_9, an r correlation test calculated to explore the relationship between socially responsible and environmentally responsible behavioral intentions. Explicitly, the results of the bivariate correlation r illustrated a significantly positive relationship between socially responsible and environmentally responsible behavioral intentions, r (2012) = 0.50, $p < 0.001$. Therefore, H_9 was supported.

Discussion

In the literature of sport and sustainable development, gender plays a central role in the study of active sport event participation perceptions and behavioral intentions towards sustainabibity practices. Given the support of the literature, this study explored the gender differences of participants (1)

social bonding, connectedness to nature, SRBI, and ERBI, (2) the influence of gender, social bonding, and connectedness to nature on SRBI and ERBI, and it also explored (3) the relationship between SRBI and ERBI to determine if there is a connection towards sustainable development practices in the MPSE context.

The findings demonstrated significant gender differences in participants' connectedness to nature, SRBI and ERBI, but not on social bonding. Also, the results illustrated that the contextual variables of social bonding and connectedness to nature positively influenced participants' SRBI and ERBI for both males and females. Accordingly, social bonding and connectedness to nature variables provided evidence for theoretical implications in MPSE consumers. They added to the literature new insights on how MPSE marketers can promote sustainable development practices (Table 5).

Finally, the current study explored the relationship between SRBI and ERBI to understand their connection within the MPSE context further and examined the proposition of a link between sport and sustainable development. The results indicated that MPSE provides a positive conceptual relationship between social, environmental realms of sustainable development.

Gender differences

The findings regarding gender differences in SRBI provide evidence that females are more likely to engage in SRBI compared to males (Rim et al. 2016; Zelezny et al. 2000). Specifically, the results of this study indicate that females in the MPSE context are more likely than males to financially contribute towards humanitarian programs such as those that (1) help people in low income and conflict areas, (2) support elderly and people with mental and physical disabilities with resources that would facilitate their quality of life, and (3) blood donation programs that would benefit individuals with health-related issues.

Moreover, the results related to gender differences in social bonding in the MPSE context support previous findings. Specifically, these results support the notion that females maintain higher levels of emotional connection to people outside of their immediate networks, compared to men (Özbay and Özcan 2008; Perkins and Long 2002). According to the social bonding theory, females' feelings of belongingness, and people who share similar interests, concerns, and experiences, enhance their emotional connection towards other individuals (Raymond et al. 2010; Scannell and Gifford 2010). Also, gender socialization and identity theory further support the idea that females have a higher openness to social interactions with both genders. They tend to socialize towards a feminine identity due to feelings of attachment, empathy, and care. In contrast, men tend to socialize towards a masculine identity stressing detachment, control, and mastery (Xiao and McCright 2012).

Although the results of the current study did not present significant differences between females' and males' social bonding levels, the females presented higher levels than males. Based on the literature, females' openness to social interactions concerns both females and males. In contrast, males are more socially open to other males than females. More specifically, females are more socially concerned individuals than males because socialization is an aspect of their identity that is expressed as a caregiving social role (Xiao and McCright 2015; Zelezny et al. 2000). Overall, while the literature is still is limited on evidence that illustrates gender differences regarding social interactions and connections to other participants at an MPSE context, these findings indicate that within an active sport event participation environment, females presented higher levels of social bonding and a higher likelihood to engage in prosocial actions as compared to males.

This study's findings support previous research illustrating the existence of gender differences in proenvironmental perceptions and behaviors (Schultz et al. 2000, 2005; Zelezny 1999, 2000). Based on the previous literature, females are more likely to engage in proenvironmental actions as compared to men because they present a higher level of concern toward frugality of nature (Triantafyllidis 2018). Accordingly, it was found that females present higher rates of connectedness to nature compared to males within an MPSE context and its natural resources. In turn, females intend to (1) offset CO_2 emissions more frequently than males, (2) discuss environmental issues, and (3) act responsibly at the household levels by taking actions, such as reducing the usage of energy and water, recycling, and composting. Regarding their transportation intentions, females are more likely to walk and bike compared to males. Thus, the results supported the previous literature that defined walking and biking as carbon neutral and significantly proenvironmental practices.

Sustainable behavioral intentions

In the literature, it is still unknown how sustainable behaviors can be interpreted in the sport context (Baumgartner

2011; Midgley and Reynolds 2004; Waas et al. 2010). Precisely, the results of the current study indicated that in the MPSE context, SRBI and ERBI of the participants are highly correlated. Therefore, positive social and environmental practices can be interpreted as sustainable behaviors and actions. Through the current research, it can be supported that MPSE has an excellent potential to contribute on the sustainable development and the goals that aim to implement social and environmental purposes, such as Goal 1: No Poverty, Goal 3: Good Health and Well-Being, Goal 5: Gender Equality, Goal 10: Reduce Inequalities, Goal 12: Responsible Consumption and Production and Goal 13: Climate Action (Sachs et al. 2019).

Practical implications

Based on the results of the current study, several practical implications that the sport industry and MSPE stakeholders should consider. To begin, local city governments may wish to utilize MPSE as a change agent to promote and shed light on the subsequent social injustices within various communities. Accordingly, MPSE may have the capacity to serve as an effective platform for social change and empower women through sport to contribute positively to sustainable development outcomes at the local community level. Furthermore, based on the United Nations' seventeen Sustainable Development Goals, MPSE may be an effective tactic for nations across the globe that aim to implement goal number five (Sachs et al. 2019). Specifically, Sustainable Development Goal Number Five strives for gender equality and the empowerment of all women and girls across the nations of the world.

These results may also indicate an additional need to promote women to stakeholder positions in sport, especially within the MSPE context, based on the continuous support that women engage in environmentally friendly practices more frequently. On a broader level, men substantially outnumber women throughout sport leadership roles (Acosta and Carpenter 2014; Darvin and Sagas 2017; Lapchick 2016). Based on these findings, it would appear that by increasing the number of women in decision making positions throughout the sport industry, additional efforts may be taken to promote sustainable initiatives and procedures. Although these findings may be specific to the MSPE context and participants therein, the findings suggest women may maintain a higher likelihood of similar sentiments throughout the sport. Previous research has indicated that women are more likely to leave sport occupations than men (e.g., Darvin 2020), leading to a leaking pipeline of women leadership candidates. Given the results of the current study, it would appear that by further diversifying sport industry leadership roles, a more significant effort to align with sustainable initiatives may ensue.

Limitations, future research, conclusion

Similar to previous investigations of sustainable behaviors, this investigation was not free from limitations. It provided unique opportunities to expand this research via future investigations. First, the number of female participants was higher than in males. Future research on sustainable behaviors and the MSPE or general sport context should ensure that the participant numbers match the current trends. This would undoubtedly provide more robust support for the findings.

Moreover, while the behavioral intentions of the MSPE participants explored, the actual behaviors were not examined or recorded. Future research may wish to implement a time-diary approach to examine the actual and real-time sustainable behaviors of sport participants. This would provide a complete picture of the state of sustainability within the sport context.

Also, MPSE harm the natural environment. This negative impact on the environmental quality comes from nonresident participants, who travel more than 80 miles to participate in the event (Triantafyllidis and Davakos 2019). Specifically, the impact is an outcome of participants traveling with single-occupant vehicles (SOV). However, evidence shows that active sport event participants have more levels of environmental awareness than spectator sport participants regarding their traveling behaviors (Triantafyllidis and Kaplanidou 2019; Triantafyllidis and Davakos 2019). For example, mass-sport event participants travel more often with family members and friend (i.e., carpooling) compare to a spectator sport, such as collegiate football, where the most significant quantity of carbon dioxide emissions generated from the people who travel alone (i.e., SUV) more than 200 miles to watch in-stadium the football games (Triantafyllidis et al. 2018).

Overall, the current study sets the platform for future research in the sport context. Additional investigations should aim to understand further how sustainable development goals can be implemented through sport participation and events.

Appendix A

See Tables 1, 2, 3, 4.

Table 1 Demographic characteristics for ($N = 2014$) Participants

Characteristic	Category	*n*	%
Gender	Male	701	34.8
	Female	1313	65.2
Annual household income in US dollars	20,000 or less	72	3.6
	20,001 to 40,000	147	7.3
	40,001 to 60,000	291	14.4
	60,001 to 80,000	307	15.2
	80,001 or more	1197	59.4
Education	High school or less	184	9.1
	Bachelor's or associate degree	1166	57.9
	Master's degree	523	26.0
	Doctoral or/and postdoctorate degree	141	7.0
Marital status	Single	547	27.2
	Partnered or married	1432	71.1
	Widow/widower	35	1.7
Age	$M = 47.68$ years old	1977	
	SD = 13.03		
	Minimum age = 18		
	Maximum age = 89		
Race	White/Caucasian	1705	84.7
	African American	190	9.4
	Asian	25	1.2
	Native American	12	.6
	Hispanic	38	1.9
	Other	44	2.2

Age was calculated based on the 1977 responses; 37 participants did not indicate their age. Accordingly, for the hierarchical regression analyses, there were used $N = 1977$ cases, as case excluded listwise

Table 2 Descriptive statistics and intercorrelations for tested variables

Variable	*M*	SD	1	2	3
Dependent variable					
SRBI	5.29	0.99	0.09***	0.16***	0.24***
ERBI	4.84	1.25	0.14***	0.16***	0.27***
Predictor variable					
1. Gender	0.65	0.48	–	0.03	0.11***
2. Social bonding	5.03	1.31		–	0.37***
3. Connectedness to nature	5.16	1.35			–

$N = 1977$. $^{***}p < 0.001$

M mean, *SD* standard deviation, *SRBI* socially responsible behavioral intentions, *ERBI* environmentally responsible behavioral intentions

Table 3 Results of first and second hierarchical regression analysis predicting social bonding and connectedness to nature

Variables	Dependent variable			
	Social bonding		Connectedness to nature	
Control	*B* (SE)	Beta	*B* (SE)	Beta
Income	0.005	0.002	−0.05	−0.02
Education	−0.03	−0.007	−0.01	−0.003
Marital status	0.09	0.03	0.04	0.01
Age	0.07	0.03	0.17	0.06**
Race	−0.05	−0.02	0.00	0.00
Independent Variable				
Gender	0.09	0.03	0.34	0.12***

$N = 1977$. $^{**}p < 0.01$, $^{***}p < 0.001$

Table 4 Results of third and fourth hierarchical regression analysis predicting socially and environmentally responsible behavioral intentions

Variables	Dependent variables			
	SRBI		ERBI	
Control	*B* (SE)	Beta	*B* (SE)	Beta
Income	−0.002 (0.05)	−0.001	−0.01 (0.06)	−0.003
Education	0.06 (0.07)	−0.007	0.28 (0.09)	0.07**
Marital status	−0.27 (0.05)	−0.12***	−0.04 (0.07)	−0.02
Age	0.08 (0.04)	0.04	0.23 (0.06)	0.08**
Race	0.21 (0.06)	0.08***	0.05 (0.08)	0.01
Independent variables				
Gender	0.17 (0.05)	0.08***	0.35 (0.06)	0.13***
Social bonding	0.07 (0.02)	0.09***	0.07 (0.02)	0.08**
Connectedness to nature	0.15 (0.02)	0.21***	0.21 (0.02)	0.23***

$N = 1977$. $^{*}p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$

SRBI socially responsible behavioral intentions, *ERBI* environmentally responsible behavioral intentions

Appendix B

See Table 5.

Table 5 Items used for measuring the variables of the study

Variable	Items	Cronbach's alpha (α)	Mean (M) score of combined items	Standard deviation (SD) of combined items	Total cases (N)
Socially responsible behavioral intentions	1. Help older or handicapped cross the street 2. Treat rich and poor equally 3. Donate blood 4. Contribute financially to humanitarian organization 5. Educate my children on how to live simply	0.67	5.29	0.99	2014
Environmentally responsible behavioral intentions	1. Offset the carbon footprint that you generate from your consumption of products and services 2. Talk with friends about environmental problems 3. Turn down air conditioning when leaving place 4. Encourage friends and family to recycle 5. Conserve gasoline by walking and bicycling 6. Study about environmental issues 7. Live lightly 8. Rather walk that drive	0.91	4.84	1.25	2014
Social bonding	1. I have a special bonding with the people participate on the event 2. The bonding between me and the other people is stronger when we meet on the event 3. I feel that I can share common experiences and interests with the people participating on the event	0.86	5.03	1.31	2014
Connectedness to nature	1. I am very attached to the natural environment of the [MPSE name] 2. Natural environment of [MPSE name] makes me feel happy and peaceful	0.87	5.16	1.35	2014

Items of socially and environmentally behavioral intentions measured in a Liker Scale where 1 = very unlikely and 7 = very likely

Appendix C

See Figs. 1, and 2.

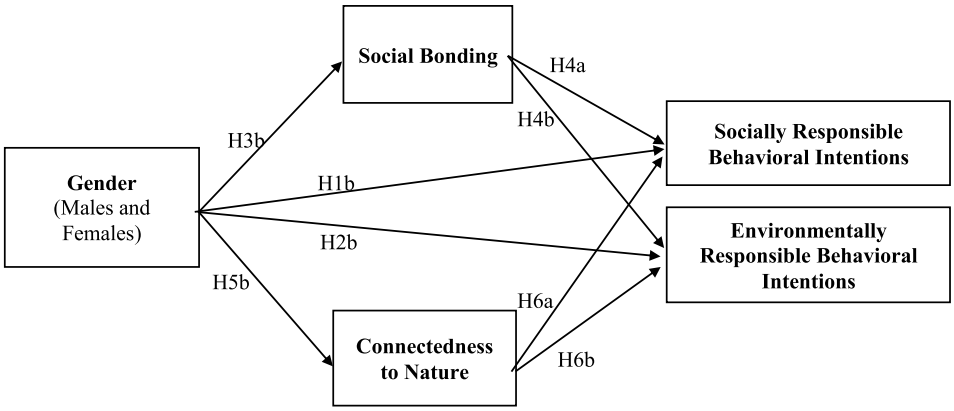

Fig. 1 Hypothetical model testing for gender effects on social bonding, connectedness to nature, socially responsible and environmentally responsible behavioral intentions

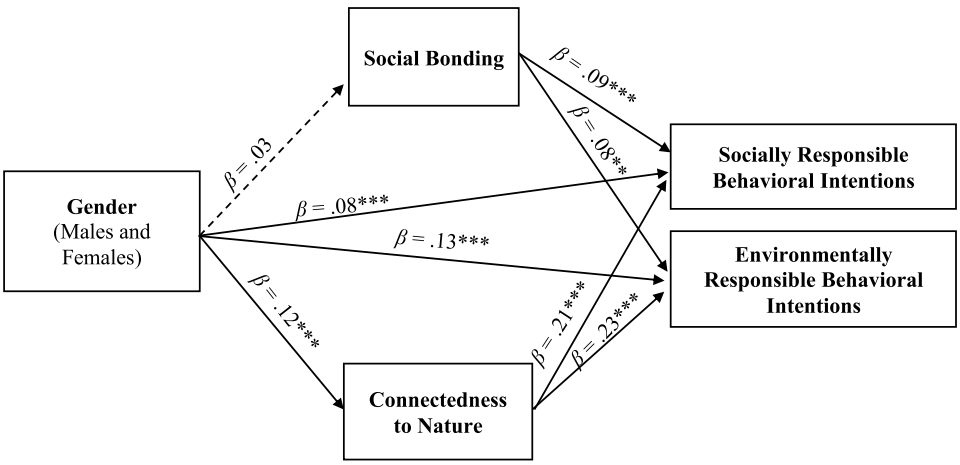

Fig. 2 Model tested for gender effects on social bonding, connectedness to nature, socially responsible and environmentally responsible behavioral intentions

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