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Determinants of the Carbon Footprint of German Swimmers

By

Ann-Marie Muehlbauer

Master's Thesis

Sport Management Department

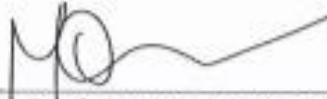
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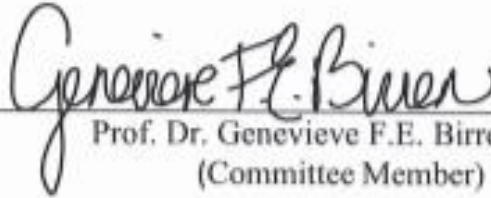
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Abstract

The current climate situation is placing our planet and future generations at risk, which demonstrates the urgency to combat climate change and conduct research to support this effort. Calculating the carbon footprint of active sport participation represents an important opportunity to conduct additional research. This study examined the environmental attitudes and practices of swim club members in Germany. The study had three goals: First, to calculate the total and partial carbon footprint of German swimmers; second, to understand how sport organizations induce participants to engage in pro-environmental behavior; and third, to analyze various factors associated with carbon footprint, such as age, environmental consciousness, gender, level of education, income, and famous athlete's environmental behavior. An online questionnaire was conducted, which led to 470 complete responses of German swim club members, between the ages of five and 76. The results of this study showed that a club's environmental practices increase athletes' internalization of the club's values. Once this internalization takes place, athletes are likely to adapt their environmental attitudes to align with the club's values, but not their behavior. Results also indicate that age, environmental consciousness, gender, and educational level influence environmental attitudes. The individual's income had no effect. These results advance the research on environmental impacts of sport, particularly by focusing on active sport participants of all ages, including child participants, and considering the influence of pro-environmental behavior of swim clubs on the environmental practices and attitudes of their athletes. The results of this study may be used to incentivize sport clubs to adopt environmentally sustainable practices as a means of influencing the attitudes of their athletes, with a view of ultimately creating positive change.

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CF Carbon footprint

CSR Corporate social responsibility

DFB Deutscher Fußball Bund [German Soccer Association]

DSV Deutscher Schwimm-Verband [German Swimming Association]

GHG Greenhouse gases

IOC International Olympic Committee

M Mean

MED Median

MO Mode

p Statistical significance

PEB Pro-environmental behavior

SD Standard derivation

α Cronbach's Alpha

β Correlation Coefficient (Pearson)

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1. Introduction

The stimulus of this study is the climate crisis and the impact of greenhouse gas emissions on accelerating this phenomenon. The climate crisis is driven by global warming, which describes the fact that “[o]ver the past 100 years, the global average temperature has increased by approximately 0.6 °C and is projected to continue to rise at a rapid rate” (Root et al., 2003, p. 57). This crisis is placing our planet and future generations at risk, thus the urgency and importance of actions to prevent and mitigate global warming across all sectors is paramount.

Among others, the cause of the climate crisis is the increased emission of greenhouse gases (GHG) (IPCC, 2007, 2014). According to the Intergovernmental Panel on Climate Change (IPCC) (2007), “[g]lobal GHG emissions due to human activities have grown since pre-industrial times, with an increase of 70% between 1970 and 2004” (p. 5). Carbon Dioxide is the most influential GHG, representing more than three fourths of the total global emissions¹. The carbon footprint (CF) describes the impact that the emission of these gases has on the global warming. Therefore, the term “‘carbon footprint analysis’ is synonymous with the phrase ‘greenhouse gas inventory’” (Franchetti & Apul, 2012, p. 7).

In sport, the natural environment has traditionally been taken for granted (Orr & Inoue, 2019); however, there is mounting pressure to “reconsider [...] [its] relevance and significance” (McCullough, et al., 2020, p. 1), since the natural resources that sustain human life are limited and “degraded throughout the world” (Mallen & Chard, 2011, p. 424). According to IPCC (2014), a continued emission of greenhouse gases will cause further global warming and increase the “likelihood of severe, pervasive and irreversible impacts for people and ecosystems” (p.56). This is the reason why sustainability issues have grown in

¹ According to IPCC (2007), CO₂ fossil fuel use contributes to the total GHG emissions with 56.6%, CO₂ through deforestation with 17.3% and CO₂ coming from other sources with 2.8%. CH₄ represents 14.3%, N₂O 7.9% and F-gases 1.1 %.

many areas of sport management in recent years (Atkinson, 2016; McCullough, Pfahl & Nguyen, 2016; Rosenberg, 2018; Trendafilova, Babiak & Heinze, 2013). According to the UN Brundtland Report (1987) definition, sustainability describes “meeting the needs of the present generation without compromising the ability of future generations to meet their own needs” (p.1). Current generations, including individuals, organizations and governments, have the responsibility to preserve the conditions and availability of natural resources for ourselves and future generations and, therefore, to provide next generations the same opportunities that we have been afforded (Mallen & Chard, 2011; Rosenberg, 2018).

Every sector of society has a certain level of responsibility for environmental stewardship and should join the combat against climate change, including sports (Dingle & Stewart, 2018; Dolf & Teehan, 2015; Inoue & Kent, 2012; Mallen, 2011; Kellison & Hong, 2015; Rosenberg, 2018; Satore-Baldwin & McCullough, 2018). Sports have a significant impact on the natural environment, perhaps best evidenced by the negative environmental impacts imposed by mega-events like the Olympics or FIFA World Cups. For example, at the 2014 Sochi Winter Olympics and the 2016 Rio Summer Olympics, the environment was not prioritized and consequently treated negligently (Del Fiacco & Orr, 2019). In Sochi, for example, the construction of facilities and building of infrastructure did not follow any sustainability guidelines resulting in “deforestation and loss of biodiversity in the region” (Del Fiacco & Orr, 2019, p. 9). Such mega-events often harm the environment by “consuming substantial energy and resources and generating food and drink waste” (Inoue & Kent, 2012, p. 417). The same trend of negative environmental impacts can be observed in amateur sport, too, which also has a crucial impact that should not be underestimated. Through the construction and maintenance of sport facilities or stadia, vegetation and wildlife in the surrounding environment can be harmed (Inoue & Kent, 2012). Furthermore, active amateur sport participation also generates a notable amount of GHGs through sport-related travel back and forth to practices, meets and training camps (Wicker, 2019).

The importance of addressing active sport participants is underlined by the fact that they are more populous than professional sport athletes and more invested in the sport than fans (Rush, December 2018). Swimming in particular is a very resource-intensive activity. It requires a temperature-controlled pool with chemicals in it. Additionally, swim meets typically happen between city club teams, not communities, so athletes must travel to their meets. This results in swimming having a larger geographic footprint than field sports which happen in closer communities, like soccer (Krüskemper, June 2012). The larger geographic footprint of swim events results in a higher CF for the athletes, which has been demonstrated among German athletes in previous research² (Wicker, 2019).

This study analyzes the impact of active sport participation on the environment through the production and emission of GHGs, with a focus on German swimmers. Since the actions of sport organizations and sport clubs fighting climate change must be based on research about the actual and exact CF of their athletes, this study has three goals: The first goal is to calculate the CF of swimmers. The second goal is to understand how sport organizations induce participants to engage in pro-environmental behavior (PEB). The third goal is to analyze various factors associated with the CF, such as age, environmental consciousness, gender, level of education, income, and famous athlete's environmental behavior. The findings of this study will enhance existing research on the CF of active sport participation and will furthermore provide swim clubs with data based on which they can develop sustainability initiatives within their organization.

² Wicker (2019) demonstrated in her study that swimming had a total CF of 622.7 kg CO₂-e and soccer had a total CF of 337.4 kg CO₂-e.

2. Literature Review

In the following section I will demonstrate findings of relevant literature, starting with the relationship between nature and sport, and the efforts of sport organizations to address climate change. I will then emphasize research on the CF of sport and show the lack of research in the field of active sport participation. Lastly, I will demonstrate the social identity theory by Tajfel and Turner (1985), and illustrate my research questions and the determinants that I will analyze.

2.1 Sustainability in sport

The relationship between nature and sport is “bidirectional and critical to the production of sport products, events and experiences” (McCullough, Orr & Kellison, 2020, p. 1). In one direction of the relationship, sport has a notable impact on nature. In the reverse direction, sport is significantly impacted by the natural environment. This is true in all sports, and therefore also relevant to every sport organization (Mallen & Chard, 2011; Orr & Inoue, 2019). This relationship makes the sport sector “potentially vulnerable to climate change impacts” (Dingle & Stewart, 2018, p. 293). Potential consequences of climate change for sport organizations “include lowered revenues [...], damage and destruction of facilities [...], event delays and cancelations [...], and an overall decline in interest in a sport” (Orr & Inoue, 2019, p. 453). Due to this strong interrelating relationship, the natural environment is often considered as a primary stakeholder in sport (Mallen & Chard, 2011; McCullough et al., 2020; Satore-Baldwin & McCullough, 2018). Besides the fact that many sport organizations depend “directly on the resources of a stable climate system for their success” (Dingle & Stewart, 2018, p. 2), the “innate” (McCullough et al., 2020, p. 6) and “intrinsic” (Satore-Baldwin & McCullough, 2018, p. 392) value of nature also shows the resulting importance of sport organizations engaging in the battle against global warming and their important role in advancing environmental sustainability.

Even though some sports, like indoor swimming or water-polo, might not perceive the influences of climate change as much as outdoor or snow sports, which are more heavily dependent on nature, all sport organizations must be able to identify the actual and potential risks for their organization and assess and address them (Orr & Inoue, 2019). Put simply, sport organizations and participants should fight global warming to preserve nature, even if the changes do not directly impact them (McCullough et al., 2020).

2.1.1 The fight against climate change in sport

Many sport organizations have already shown their efforts to combat climate change by incorporating “environmental practices and management into their operations” (Inoue & Kent, 2012, p. 417). Others have shown support for the climate by signing the ‘Sports for Climate Action Framework’, which was introduced by United Nations Framework Convention on Climate Change and aims to support sport organizations to become more environmentally sustainable. As of August 2020, 144 organizations, including several large international organizations like the International Olympic Committee (IOC) and the International Federation of Association Football (FIFA) have signed and adopted the framework (United Nations Climate Change, 2020), which includes “measuring, reducing, and reporting [their] greenhouse gas emissions” (Sports for Climate Action Framework, para. 14a). The Federación Internacional de Natación (FINA), the international governing body of swimming is part of a working group including the IOC and four other international federations created in 2017 to tackle water pollution in oceans, lakes and rivers (IF Sustainability Case Study, May 2017). These developments show evidence to suggest that sustainability is advancing in the sport sector. Even though these actions and organizational operations represent important steps in the right direction, it is also very important to bring smaller organizations to join the movement.

Sport organizations can combat climate change in different ways. For instance, sport organizations can make their contribution not only by acting in an environmentally friendly manner and fighting global warming in their own facilities and club operations, but also by promoting “sustainability messages” (McCullough et al., 2020, p. 19) to participants and spectators. This potential of sport to “raise environmental awareness to a broad audience” (Trendafilova et al., 2013, p. 310) derives from the fact that many people are involved in sports. Inoue and Kent (2012) refer to the status that sport has in society as “unique” (p. 417) and using its platform to raise consciousness and awareness for sustainability is therefore a very important part of how sport organizations can contribute to the combat against climate change (Atkinson, 2016; McCullough et al., 2020; Satore-Baldwin & McCullough, 2018; Sports for Climate Action Framework). Sport teams can also leverage the celebrity status of their athletes to communicate messages, and can show their environmental commitment on their websites, on social media accounts, or through regular communications such as e-mail (Inoue & Kent, 2012; Kellison & Hong, 2015; Trendafilova et al., 2013).

Furthermore, sport organizations can influence organizations from other industries as well. They can be “role models” (Satore-Baldwin & McCullough, 2018, p. 398) for organizations in other sectors and can influence more businesses to “lead [...] the way towards a healthier and more sustainable future” (Sports for Climate Action Framework, para.1).

Importantly, sport can inspire individuals to change their at-home behaviors (McCullough et al., 2020). Fans often “physically attach themselves to teams and players” (Satore-Baldwin & McCullough, 2018, p. 392) and this identification can lead to the adaptation of their values and commitments, including PEB (Inoue & Kent, 2012). This integration of attitudes, values and actions is called ‘Internalization’ (Ashforth & Mael, 1989). In a study on sport teams as promoters of PEB, Inoue and Kent (2012) showed that a fan’s

internalization is not only positively influenced by a team's positive environmental practices, but also that it positively influences their daily PEB. Afsar, Cheema and Javed (2018) analyzed this relationship within organizations and found that perceived Corporate Social Responsibility (CSR) has both a direct and indirect influence on PEB, whereat the indirect influence is mediated through organizational identification. Even though PEB mediated through internalization and identification is well-established in research on organizations and fans, research has not yet examined the influence of the PEB of participation-based sport clubs on the PEB of their participants. This study addresses this gap by including an analysis of PEB of sport participants influenced by the PEB of their sport clubs mediated through internalization of environmental values.

2.2 The carbon footprint of sport

Until recently, there was a lack of research on environmental sustainability in sport (Del Fiacco & Orr, 2019; Dingle & Stewart, 2018; McCullough, et al., 2020). In the last decade, research on sustainability in sport has become well established in the sport management literature, but has primarily been focused on professional sport including mega-events like the Olympics (Del Fiacco & Orr, 2019; Roper, 2006) or the FIFA World-Cup 2006 in Germany (Rooper, 2006), but not on amateur and leisure sport (Carmichael, 2020). Nevertheless, the impact of amateur sport on nature shall not be underestimated, since it has a huge participation base that commits to several practices and competitions (Wicker, 2019). Thus the CF of club sport athletes from car rides or flights back and forth to practices, competitions and training camps can be high.

Furthermore, most of the research that has been conducted on CF analysis during recent years has primarily been focused on spectators and passive sport participation. For example, Collins et al. (2012) examined the 2004 Football Association Challenge Cup Final in the UK and Jones (2008) calculated the CF during the 2004 Wales Rally. A few researchers

have specifically measured and analyzed the CF of active sport participants, including sport teams (Chard & Mallen, 2012; Dolf & Teehan, 2015), snow sports (Wicker, 2018) and 20 different individual and team sports (Wicker, 2019). Wicker (2019) was the first researcher that included swimmers in her research on CF.

Analyzing the CF of 20 different sports, including twelve individual sports³, Wicker (2019) found that compared to the other sports, swimming had the twelfth highest CF with 622.7 kg CO₂-e. The regular CF produced through regular weekly activity represented the largest share of overall emissions by swimmers (313.1 kg CO₂-e), followed by the CF related to competition travel (165.9 kg CO₂-e) and training camp travel (143.7 kg CO₂-e). Furthermore, according to Wicker (2019), the total CF in individual sports can be almost twice as high as the total CF of team/racket sports⁴. This crucial impact of the CF of individual sports, including swimming, gives credence to the relevance of additional research to ascertain the factors that contribute to CF, and opportunities to reduce CF among active sport participants.

Another aspect showing the relevance of this research is that all existing literature on the CF of active sport participation, including the study conducted on swimmers by Wicker (2019), neglects the impact of the athlete's age on sport-related travel behavior of athletes and their resulting CF, and the efforts of clubs to encourage CF reductions. Consequently, these factors are included in this study.

2.3 Sport participant identification and involvement

According to the social identity theory (Tajfel & Turner, 1985), the identity of individuals consists of personal identity and social identity. Personal identity includes factors such as personal interests and abilities, while social identity is based on group classifications

³ The analyzed individual sports included climbing/bouldering, diving, figure/roller skating, fitness (gym), golf, headis, hiking/walking, skateboarding, surf sports, swimming, track and field and triathlon.

⁴ The total CF of individual sports was 1006.5 kg CO₂-e; the total CF of team/racket sports was 514.0 kg CO₂-e.

(Tajfel & Turner, 1985). In order to be able to fit into the social environment, people classify different social groups in the course of their lives and position themselves and other people in these groups (Mael & Ashforth, 1992). Social identification refers to the feeling of belonging to one or more of these groups and the “perception of oneness with [...] [one or several] group[s] of personas” (Ashforth & Mael, 1989, p. 20). Through social identification with a group, individuals see themselves as part of the group and also internalize the group’s successes and failures as personal successes or failures (Ashforth & Mael, 1989). The group classifications can be based on a variety of factors. For example, people can associate themselves with a group of people sharing the same gender, or with a group that shares their fandom and sense of belonging to a sports club (Mael & Ashforth, 1992), or to a group that possesses both of these features at once (e.g. women fans of a certain sport club). Each person can feel belonging to several different groups at the same time, thus developing so-called "multiple social identities" (Kiang, Yip & Fuligni, 2008, p. 645). Importantly, identification with a group can enhance the “overall well-being” (Kiang, Yip & Fuligni, 2008, p. 645) of the members. However, these multiple identities do not always bring about positive effects and can produce anxieties and identity crises if the individual cannot fulfil the expectations of one of their groups or the expectations, or if different groups contradict each other (Schimmel, 2009). Despite these possible negative consequences of social identification, people gravitate to social groups in order to develop, shape and stabilize their identity (Thomas, 1992).

Besides being derived from factors like gender or the age cohort, the individual’s identity can also be based on an organization that the individual belongs to. This specific form of social identification is called “organizational identification” (Ashforth & Mael, 1989, p. 22) and describes the sense of belongingness and perception of oneness with an organization.

Examining identification, a distinction between the terms 'identity' and 'identification' is of great importance. 'Identity' is the feeling who you are (expressed by the phrase ‘I am’),

which is shaped by factors such as personal interests or abilities, whereas 'identification' refers to the sense of belonging to a group or organization. Furthermore, another related concept is internalization, which was previously introduced and mentioned in chapter 2.1.1. It differs from identity in that it refers to the “incorporation of values [and] attitudes” (Ashforth & Mael, 1989, p. 22) ('I believe'). Within organizational identification, it is important to differentiate identification and membership. According to Bhattacharya and Elsbach (2002), “identification is a cognitive state, [whereas] membership is a related behavior” (p. 27). Consequently, an individual might be a member of a sports club without identifying with it and vice versa.

This study will focus on whether internalization of a swim club's values and beliefs mediates the influence of a club's environmental PEB on the individual's attitudes toward the environment and PEB. In the context of sport consumers, Ioue and Kent (2012) analyzed the impact of internalization as a mediator between positive environmental practices by a sport team and consumers' behavior. Their results demonstrated that “a team's positive environmental practices increase consumer internalization of the team's values” (Inoue & Kent, 2012, p. 428). This internalization often led customers to support the team's initiatives and to engage in PEB themselves. The same relationships are evaluated in this study, but with active sport participants (i.e. club members) instead of passive sport consumers (i.e. fans).

2.4 Research questions

The research questions guiding this study are:

1. Which determinants significantly influence pro-environmental behavior (PEB) of German active swim club members?
2. How does PEB of German swim clubs affect members' attitudes and practices?

In addition to theoretically sound and already analyzed factors that influence PEB, like environmental consciousness, gender and level of education, this study also includes new, exploratory factors and examines their correlation to PEB by measuring the CF of the participants. By including age as a new factor, this study will help to fill the research gap that was created through the focus on adult sport participants. By including the influence of PEB of clubs on the PEB and attitudes of their participants, mediated through internalization, this study also contributes to the existing research on this correlation that previously examined only fans.

2.5 Determinants of attitudes and pro-environmental behavior

In this work, various determinants of consumer's pro-environmental attitudes and behavior are empirically examined, which can be classified into the categories 'organizational factors', and 'personal factors'. The following chapter will derive the hypotheses resulting from these categories (H1 to H9).

2.5.1 Organizational Factors

If an individual identifies him-/herself with an organization, this "perception of oneness with or belongingness to" (Ashforth & Mael, 1989, p. 21) the organization often results in internalization of its values. As mentioned in chapter 2.4, internalization describes the "acceptance of induced values, attitudes and behavior" (Inoue & Kent, 2012, p. 419) of the organization. Sen and Bhattacharya (2001) and Bhattacharya and Sen (2003) studied CSR practices of sport organizations and their influence on consumers' internalization and showed that CSR practices of sport organizations made consumers develop positive perceptions of the organization and thereby internalize its values. Inoue and Kent (2012) confirmed this positive relationship between pro-environmental practices of an organization and consumer's internalization in their study examining students from a northeastern American university.

Based on this research, it is proposed that swimmers will tend to internalize the club's values if they find that the club actively engages in PEB.

H1. A club's positive environmental practices will increase consumer's internalization of the clubs' values.

Furthermore, empirical evidence suggests that consumers will likely support a sport organization's pro-environmental initiatives if they internalize its values, which can, for example, be seen in consumers' donations to the initiative (Lafferty & Goldsmith, 2005; Lichtenstein et al., 2004). Inoue and Kent (2012) also showed this positive impact of internalization on the intention to support the organization's initiative. Casper, Pfahl and McCullough (2014) likewise supported these findings by showing evidence that sport organizations can impact environmental behavior intentions of fans. This impact on the demonstrated support of the initiatives suggests that the consumers' environmental attitudes were positively affected by the organizational practices. Consequently, in this study, it will be proposed that internalization of a swim club's values will have a positive impact on the environmental attitudes of individuals.

H2. Internalization will mediate the relationship between a club's positive environmental practices and the individual's attitudes towards sustainability.

Moreover, a CSR initiative by the Memphis Grizzlies ('Get fit with the Grizzlies') demonstrated that such initiatives can also impact consumer's direct behavior, since this initiative significantly increased the healthy eating practices of participants (Irwin et al., 2010). Based on this initiative, Inoue and Kent (2012) were able to study the impact of internalization of a sport organization's pro-environmental values on consumers' PEB and found that once internalization takes place, consumers are more likely to "perform daily pro-environmental behavior" (Inoue & Kent, p. 428).

H3. Internalization will mediate the relationship between a club's positive environmental practices and a lower individual's carbon footprint.

2.5.2 Personal Factors

The first personal factor to be investigated is age. It is possible that travel distances increase or even double when parents drive their children back and forth to practices and swim meets. In Germany, the minimum age to get a driver's license be allowed to drive alone is 18. Consequently, I hypothesize that children under the age of 18 produce a higher CF than adults, as a parent must drive the child to practices. To date, research on the CF of active sport participants has neglected emissions caused by sport-related travel of children. In my study, this factor will be included by asking parents to fill out the survey on behalf of their underage child and to state their child's sport-related travel behavior. Since there is no existing research on the correlation of age and environmental footprint in sport, this determinant is one of the new, exploratory independent variables of this study.

H4. Being under 18 is positively correlated with an individual's carbon footprint.

The second personal factor to be investigated is environmental consciousness. Environmental consciousness describes the perceived "level of concern for the quality of [...] [one's] physical surroundings" (Krause, 1993, p. 126). With globalization, environmental issues are becoming a greater threat to society. Over time, "humans slowly became aware that their planet was more fragile than once believed" (Krause, 1993, p. 126) and that natural resources are limited. With growing threats and heightened awareness of climate change, the environmental consciousness of individuals rose. Regarding the relationship between environmental consciousness and PEB, some research states that there is no significant correlation between these two variables. For instance, Casper and Pfahl (2012) showed this for sport management students, McCullough and Cunningham (2011) for sport spectators, and Wicker (2018) showed the non-existence of a relationship for snow sport tourists. However,

other researchers disagree and conducted studies showing the opposite. For example, Kennedy, Krahn and Krogmann (2015) reported that people who “care more for the environment, [which they measured with economic concern,] do have somewhat lower carbon footprints” (Kennedy et al., 2015, p. 228) This correlation was also demonstrated in the context of sport by Casper, Pfahl and McCullough (2014), who analyzed PEB of sport fans and Wicker (2019) showed this relationship for active sport participants of all individual sports that were included in her study.

This discrepancy among existing research can be explained through the “discrepancy between verbal and actual commitment” (Chung & Leung, 2007, p. 604), which occurs when people only behave in a pro-environmental way if the cost of the behavior is low. This discrepancy is often referred to as the ‘value-action gap’ (Barr, 2006; Blake, 1999; Chaplin & Wyton, 2014, Chung & Leung, 2007).

Based on the fact that most research has demonstrated a positive correlation between environmental consciousness and PEB, it is proposed that environmental consciousness negatively affects (lowers) an individual’s CF.

H5. Environmental consciousness is negatively correlated with an individual’s CF.

The third personal factor to be investigated is gender. Many empirical studies have supported the notion that women tend to be more environmentally conscious and show higher levels of PEB (Chen, Hsu & Lin, 2011; Roberts, 1996; Yam-Tang & Chan, 1998). Studying companies’ boards of directors of different countries, Fernandez-Feijoo, Romero and Ruiz-Blanco (2014) reported that companies with at least three women in management positions showed higher levels of CSR. There are several explanations for this phenomenon. Firstly, some researchers state that women are generally closer to nature (Braidotti et al, 1994), while others argue that it is based on early socialization processes that cause women to be more

worried about other people's health and happiness (Han et al., 2011). Therefore, and even though some research does not support this presumption (e.g. Wicker, 2019), it is proposed that female swim club members have a lower CF than their male counterparts.

H6. Women have a lower annual carbon footprint than men.

The fourth personal factor to be investigated is educational level. Education has been found to be positively related with environmental knowledge, attitudes and behavior (Chen et al., 2011; Kollmuss & Agyeman, 2002; Zimmer et al., 1994). The results of Chen et al.'s (2011), as well as Wicker's (2019) study demonstrate this relationship by showing that survey participants with a university degree had higher environmental knowledge and a lower CF than respondents with a high school degree. In Wicker's (2019) study of active sport participants, the CF of university educated respondents was over 20% lower than their high-school educated counterparts. This relationship can be explained by the fact that people with a higher education have most likely spent more time learning about issues related to global warming and the influence that humans have on nature. Therefore, Wicker (2019) assumed that people with a higher level of education "are more aware of the carbon dioxide emissions different transportation means produce and how these emissions negatively affect the environment" (Wicker, 2019, p. 517). Based on previous empirical evidence, I hypothesize that educational attainment positively influences PEB, hence negatively impacts an individual's CF.

H7. Educational level is negatively correlated with an individual's carbon footprint.

The fifth personal factor to be investigated is income. The empirical evidence regarding the relationship between income and PEB is mixed. Some research suggests that higher income leads to lower GHG emissions of individuals, which can be explained by the availability of additional money to afford environmental-friendly products (Royne, Levy &

Martinez, 2011). In a study conducted by Bhate and Lawler in 1997, “81% of respondents have indicated that they considered prices of environmentally friendly products to be expensive” (Bhate & Lawler, 1997, p. 461). Consequently, individuals with a higher monthly income are expected to engage more in PEB (Sommer & Kratena, 2017).

However, other research shows that a higher income leads to higher CF. Reasons for this relationship include “greater consumption opportunities” (Grill & Moeller, 2018, p. 160) that can produce GHG emissions. People with a higher income are more likely able to afford having a car or taking a flight, which produce GHG emissions. Consequently, individuals with a higher income often show less PEB and to have a higher CF (Grill & Moeller, 2018; Wicker, 2018). In her examination of the influence of income on the CF of active sport participants, Wicker (2019) supported these findings for individual sports, including the sport of swimming.

H8. Income is positively correlated with an individual’s carbon footprint.

The sixth and last personal factor to be investigated is the influence of a famous athlete’s positive environmental behavior. Successful and famous athletes are often seen as role models for amateur athletes (Bevan-Dye, Dhurup & Surujlal, 2009; Bush, Martin & Bush, 2004; Shanklin & Miciak, 1997). This phenomenon can be seen in all sports and all around the world. Focusing on the sport of swimming, athletes that became role models for a whole generation were, for example and among others, Mark Spitz, who set seven world records and won seven Olympic gold medals in 1972 and was later even referred to as a “popstar” (De Haas, June 2020, para. 1) by German media. Another athlete that even exceeded Spitz’s celebrity status and athletic achievements was Michael Phelps, who is the most decorated Olympian of all time. The impact that Phelps has had on consumers by being a role model and celebrity can be seen at the amount of advertisement deals he has signed over the course of his career. According to Nudd (December 2016), Phelps made around \$75

million off brand deals. On top of that, Phelps currently has two million followers on Twitter, over 3.3 million followers on Instagram and almost eight million followers on Facebook. According to the Johann Cruyff Institute (February 2018), Twitter, Instagram and Facebook are among the most common social media platforms that are the “voice of the new generation” (para. 4), and consequently a very powerful platform to spread information. The fact that “professional athletes around the globe are some of the most recognizable, revered, and imitated celebrities of all” (Shanklin & Miciak, 1997, p. 1) makes them an effective endorser for brands and their products (Garland & Ferkins, 2003; Koernig & Boyd, 2009). Bevan-Dye et al. (2009) for example reported that among Generation Y⁵ students, sport celebrity role models positively influence behavioral intentions and brand loyalty. Consequently, when seen as role models, empirical evidence suggests that athletes influence consumers’ attitudes and buying behavior towards a brand, but also their private behavior. This private behavior can include PEB if the celebrity athlete is perceived to be acting environmentally-friendly, too. Inoue and Kent (2012) took a first step in examining the direct impact of athletes’ involvement in pro-environmental actions on consumer’s internalization and indirect impact on consumers’ environmental attitudes and PEB. Their results showed that the involvement of athletes did not have an indirect effect on PEB of consumers through internalization. The authors explained these nonsignificant results by the fact that fans might perceive “value congruence” (Inoue & Kent, p. 428) with a club or a team if it engages in PEB no matter if they are fans of their athletes or not. However, based on the empirical evidence regarding the impact of athletes as role models on fan’s behavior, it is proposed that the awareness of a famous athlete’s pro-environmental involvement is negatively related with a fan’s CF.

It should be noted that the influence of determinants on the PEB of swimmers is not always one-sided. Circular processes can take place, whereby the determinants have an

⁵ The generation born in the 1980s and 1990s.

influence on attitudes and practices, but also the attitudes and practices on determinants. These directions of action are emerging within this determinant, since fans who actively engage in PEB might know about environmental involvement of professional athletes and might see those athletes as role models because of their involvement.

However, existing studies which show the direction of action in the direction to be demonstrated, suggest that famous athletes can have a positive impact on fans' PEB when seen as role models.

H9. Awareness of famous athletes' positive environmental involvement is negatively correlated with an individual's carbon footprint.

Table 1: Hypotheses

Hypothesis	Proposition
H1	A club's positive environmental practices will increase consumer's internalization of the clubs' values.
H2	Internalization will mediate the relationship between a club's positive environmental practices and the individual's attitudes towards sustainability.
H3	Internalization will mediate the relationship between a club's positive environmental practices and a lower individual's carbon footprint.
H4	Being under 18 is positively correlated with an individual's carbon footprint.
H5	Environmental consciousness is negatively correlated with an individual's carbon footprint.
H6	Women have a lower annual carbon footprint than men.
H7	Educational level is negatively correlated with an individual's carbon footprint.
H8	Income is positively correlated with an individual's carbon footprint.
H9	Awareness of famous athletes' positive environmental involvement is negatively correlated with an individual's carbon footprint.

3. Methodology

3.1 Study design

The hypotheses are merged in the following study model, in which the respective directions of the relationships to be examined are shown (see Figure 1).

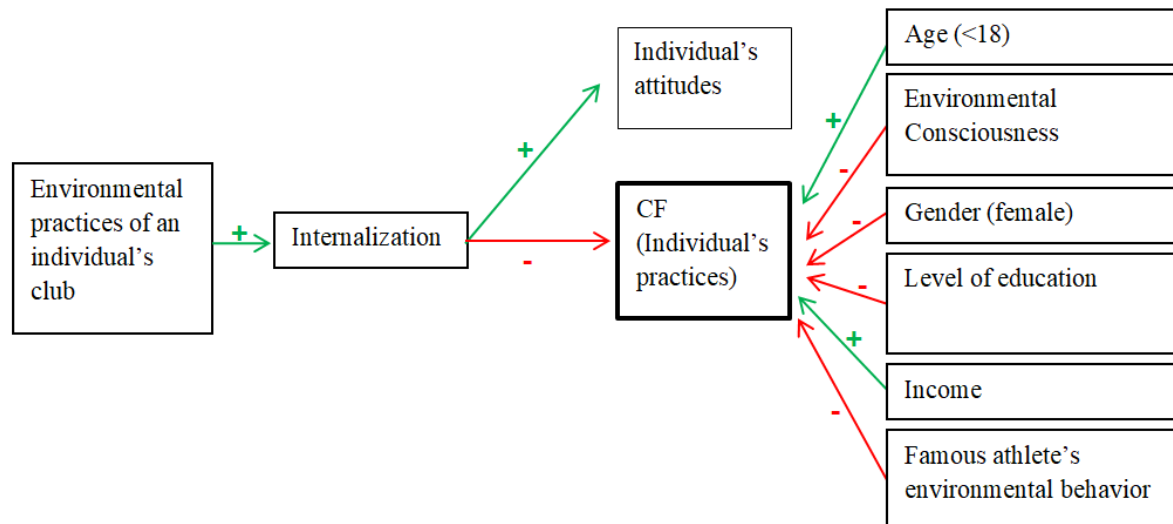


Figure 1: Study design

3.2 Concept and measurement of carbon footprint

To secure consistency among research and therefore increase comparability, the measurement of the CF in this study was oriented around the method applied by Wicker (2019). This also ensured the replicability of the current research and consequently increased the reliability of the concepts.

With disclosure on climate change gaining more attention globally, the term 'carbon footprint' is widely used among researchers and in the media. For this study, the academic definition of Wiedmann and Minx (2008) was used, according to whom CF describes the "exclusive total amount of carbon dioxide emissions that is directly and indirectly caused by an activity" (p. 4). CF was measured in tons of carbon-dioxide equivalent emissions (CO₂-e). Being well aware that there are other gases, including methane and nitrous oxide, contributing

to the greenhouse warming, these gases were “normalized to the mass of CO₂” (Franchetti & Apul, 2012, p. 7) to have one unit for collecting the data and reporting the results. Emission factors were derived from national emission tables determined by the Federal Environmental Office (2014). Consequently, the levels of emissions by means of transportation (in g CO₂-e per person per kilometer) are the following: Passenger car (139); tram, underground and city railway (43); urban bus (30); overland bus (30); long-distance railway (43); and plane (196). These emission factors were also used by Wicker (2019), which also increases comparability of the results. This study included the calculation of three partial carbon footprints: The CF produced by travel behavior to weekly practices (CF practices, see formula 1), to meets (CF competitions, see formula 2) and to training trips (CF training trips, see formula 3). The calculation of the three partial carbon footprints were based on the method used by Wicker (2019) and performed as follows:

$$\text{CF practices} = \sum (\text{Distance weekly session} \cdot \text{Emission}) \cdot 2 \cdot \text{weeks sport} \quad (1)$$

$$\text{CF competitions} = \sum (\text{Distance competition} \cdot \text{Emission}) \cdot 2 \quad (2)$$

$$\text{CF training trips} = \sum (\text{Distance training trip} \cdot \text{Emission}) \cdot 2 \quad (3)$$

The protocol to perform a CF analysis requires researchers to determine three types of boundaries for the collection of data (Franchetti & Apul, 2012). Firstly, an organizational boundary has to be set. This boundary reflects the unit for which the CF analysis is performed. This study examined swim club members with permanent residence in Germany who actively practice the sport of swimming. Secondly, an operational boundary has to be set. According to Franchetti and Apul (2012), this boundary can be sub-classified into Scope 1, Scope 2 and Scope 3 emissions. Matthews, Hendrickson and Weber (2008) refer to this classification by identifying three ‘tiers’. This study only included Scope 1 (tier 1) emissions, since they represent the direct emissions produced by the athlete, for example by travelling to

the sport facility, the competition facility or a training trip. Scope 2 and 3 (tier 2 and 3) emissions were neglected in this study design, since they represent emissions that participants do not have information about. Scope 2 emissions represent indirect emissions caused by “purchased electricity, heating, steam, [and] cooling” (Franchetti & Apul, 2012, p. 60) and Scope 3 emissions include the total supply chain emissions, including waste-related emissions and employee travel emissions (Franchetti & Apul, 2012). Since the participants of this study most likely do not have information about these company or club-related emissions, they were not included in this study. Lastly, the third boundary is a temporal boundary. In this study, the temporal boundary is set to one year, since the survey asked participants to state their sport-related travel behavior in 2019.

3.3 Context

Sports in general are very popular in Germany. About “forty million Germans⁶ [are] either a member of a sports club or [are] pursuing sports individually” (Topendsports, n.d., para. 1). Soccer is by far the most popular sport in Germany, with the national soccer association (DFB) being the largest sports federation worldwide⁷ (Movingto-Germany, 2020). Even though swimming is not within the top ten most popular sports in Germany, a study published by Koptyug in July 2019 showed that the number of Germans interested in the sport of swimming was constantly above six million in the last four years (Koptyug, July 2019). In 2019, the number of survey participants showing interest in the sport of swimming was 6.2 million (Koptyug, July 2019). According to the national swimming association (DSV), there are more than 2,300 swim clubs in Germany, and a study conducted by Zeppenfeld (2019) showed that 573,000 athletes were members of these swim clubs in 2019 (DSV, n.d.; Zeppenfeld, 2019). These numbers indicate that even though swimming is not one of the most popular sports in Germany, many people are actively engaged in the sport and therefore also

⁶ According to the German Federal Statistical Office (2020), the number of inhabitants in Germany in 2020 is 83.1 million. Therefore, 40 million Germans represent almost half of the population.

⁷ The DFB (Deutscher Fußball Bund) currently has around seven million members (2020).

likely to travel regularly to their training facility. Sport-related travel causes GHG emissions that are, according to Wicker (2019), much higher in individual sports than in team or racket sports. The impact that swimmers have on the emission of GHGs, especially when travelling to their practices, shows the importance of the further examination of this sport and why it is an interesting context to explore.

3.4 Sample

Participants in this study are club swimmers in Germany. 95 clubs all over the country were asked to distribute the survey to their members. Swimmers of all ages were allowed to participate and responses from different age groups were desired to gain meaningful results regarding the CF of underage swim club members. In order to get responses from underage athletes, the survey was sent straight to their parents and they were asked to answer on behalf of their children. A total of 1015 people responded to the survey.

3.5 Survey Administration

Ethics approval was received from the university's institutional review board of SUNY Cortland on June 2, 2020 (see Appendix II). To determine the influence of the various determinants on pro-environmental attitudes and behavior of German swim club members, an online questionnaire was conducted. Online surveys have several advantages compared to paper and pencil questionnaires, including flexibility, time savings, financial and human resource savings, and objectivity in the implementation and evaluation (Andrew, Pedersen & McEvoy, 2020). These features were especially important as the study was conducted during the COVID-19 pandemic and many people were quarantined at home during the period of the survey. Furthermore, online questionnaires are anonymous, which eliminates possible answering biases (Andrew et al., 2020).

In the first step of the distribution, the questionnaire was optimized using a pilot. This pilot was conducted with the help of five subjects who were able to identify issues or

ambiguities with the questionnaire. Once the questionnaire was revised, the surveys were distributed via email through a link that was shared by coaches of the clubs and available for 14 days, from June 8 to 22, 2020. A pre-survey email was sent three days before the survey distribution, and a reminder email was sent a few days into the survey to increase response rates (Andrew et al., 2020). To guarantee a better understanding by eliminating the language barrier and consequently increasing the response rate, the survey was conducted in German, using translations written by the author (see Appendix I) (Tortora, 2004).

3.6 Survey Instrument

The questionnaire comprised a total of 46 individual questions with six additional follow-up questions that were added depending on the respondent's answers. These were mandatory questions to ensure that all questions were answered and that distortions were minimized by partial response. Each construct examined was represented by two to five items presented in this chapter and shown in Appendix I. To examine the various constructs, the survey was divided into eight topics.

The first part, 'Information about the swim club', determined the environmental practices of the swim clubs using seven items (see Appendix I) borrowed from Wicker (2019). The first two questions determined whether the swim club acts in an environmentally friendly manner and if so, what environmental practices are in place. To determine the environmental practices of the clubs, four items on a 5-point scale (where 1 = strongly disagree and 5 = strongly agree) were used. These items were: "I think other people in my swim club expect me to act in an environmentally-friendly manner"; "My swim club supports the pro-environmental behavior of the athletes"; "Many athletes in my club are engaging in pro-environmental behavior"; and "To act in an environmentally-friendly manner is possible in my swim club without any difficulty" ($M = 3.02$; $SD = 0.82$; $\alpha = 0.77$).

The second section of the survey, 'Identification with the club', measured the individuals internalization of club values through their identification with the club, using five items on a 5-point scale (where 1 = do not agree to 5 = strongly agree). The identification items were based on Bhattachaya et al. (1995), Elsbach and Bhattachaya (2001), and Bhattachaya and Elsbach (2002)'s work and include "I strongly identify myself with my swim club"; "When someone praises my swim club, it feels like a personal compliment"; "When someone criticizes my swim club, it feels like a personal insult"; "My swim club's successes are my successes"; and "If I talk about my swim club, I rather say 'we' instead of 'they'." ($M = 3.66$; $SD = 0.91$; $\alpha = 0.85$).

The third section of the survey, 'Individual's attitudes' examined the swim club member's environmental attitudes by means of eight items on a 5-point scale (where 1 = strongly disagree to 5 = strongly agree), based on Diekmann and Preisendörfer (1998), Diekman (2018) and Wicker (2019) ($M = 3.84$; $SD = 0.72$; $\alpha = 0.86$). Diekmann and Preisendörfer (2003) described environmental concern and environmental consciousness as a general attitude towards the environment, based on which these items will also be used to examine the environmental consciousness of athletes as a determining factor of the CF.

The fourth section, 'Individual's practices', included nine items to measure individuals' PEB on a 5-point scale (1 = never to 5 = always). Items were derived from previous research by Homburg and Stolberg (2006), Inoue and Kent (2012), Kaiser et al. (2003), Lance et al. (2006), and Wicker (2019) ($\alpha = 0.598$). The fourth part also included two items on a 5-point scale (1 = do not agree to 5 = strongly agree) which were supposed to measure the impact that pro-environmental behavior of famous athletes has on fans ($\alpha = 0.653$).

The fifth, sixth and seventh sections, 'Sport-related travel to practices', 'Sport-related travel to meets', and 'Sport-related travel to training camps' provided data needed to measure

the individual's CF for travel to practices, meets and training trips. The questions asked participants to state the number of practices they attend per week, the number of meets and training trips attended per year, the travel distances to each destination, and the method of transportation. The items for these sections were based on Wicker's work on active sport participants' CF (2019).

The final section, 'Demographics', included five items that used a binary option to determine the impact of gender on the CF; open questions to measure age and whether the CF of underage children is higher than the CF of adults, and to calculate travel distances to meets and training camps; and multiple-choice questions to measure the impact of educational level on the CF, and to measure the impact of income on the CF.

3.7 Analysis

Before analyzing the collected data descriptively and analytically, the data set was cleaned by deleting unrealistic answers and dropping incomplete cases in order to ensure reliability, plausibility and validity and to "ensure that the conclusions drawn from the data are as generalizable as possible" (Osborne, 2010, p. 37).

Additionally, the internal reliability of each section was checked using the Cronbach's Alpha metric with a threshold of $\alpha = 0.7$ (Andrew et al., 2020). Once the construct's reliability was established, the mean and the standard derivation of the collected values of the different variables making up the same construct was calculated (Gliem & Gliem, 2003).

Besides reliability, the second quality criterion of statistics, validity, states to what extent the use of a survey tool actually measures the variable it indicates to measure (Andrew et al., 2020). One form of validity is the content validity, which is established by "showing that the test items are a sample of a universe in which the investigator is interested"

(Cronbach & Meehl, 1955, p. 282). This is to be assumed in this study, since most of the items used are based on existing research items and have already been used in several studies.

Proof of objectivity, which is the third quality criterion, is provided by the use of an online questionnaire. According to Batanic (2001), online questionnaires show a high degree of objectivity both in their implementation and in their evaluation.

The analysis of this study was three-pronged. First, the annual carbon footprint of each respondent was calculated using the levels of direct emissions provided by national emission tables (see chapter 3.2). Since these levels are measured in g CO₂-e per person per kilometer, they were multiplied by the traveled kilometers of the individual for each means of transportation. To calculate the traveled kilometers of an individual, the online map service Google maps was used, since respondents were asked to state the travel destinations of competitions and training trips by either providing the name of the destination or its postal code. For travel distances reached by plane, the online calculation tool luftlinie.org was used. This method, including the use of Google maps to calculate the travel distances, is a common method used among researchers (Dolf & Teehan, 2015; Wicker, 2019).

The hypotheses regarding the influence of a swim club's PEB on internalization were tested by measuring the correlation between a club's positive environmental practices and the respondent's internalization score. Thereafter, the correlations between internalization and environmental attitudes and practices, the latter being measured by the carbon footprint, were analyzed. All correlation analyses were conducted using the Pearson's correlation coefficient. The tests were based on a significance level of $p = 0.05$. Third, the different factors associated with an individual's carbon footprint and environmental attitudes were analyzed using regression analyses and T-Tests. In all models using regression analyses, the annual individual carbon footprint was the dependent variable. Variables capturing respondents' age, environmental consciousness, educational level and income were entered as independent

variables. T-Tests were used to analyze the impact of gender and age on an individual's CF, because the differences between females and males and underage participants and adults were investigated respectively.

4. Results

4.1 Summary statistics

After deleting unrealistic answers, dropping incomplete cases and dropping cases in which the respondent stated that they are not a member of a swim club, the data set consisted of 470 complete responses⁸. Similar to past research on the CF of active sport participants (Wicker, 2019), respondents' ages ranged from five to 76 and the average age was 26.31 years ($SD = 14.87$) with the median age at 21 years and the mode at 18 years. Compared to the study conducted by Wicker (2019), the average age was 4.73 years younger in this study which can be attributed to the fact that underage athletes were included here. The majority of respondents were female (53%) and had at least a high school degree (73%). Demographic frequencies of the sample are shown in figures two and three.

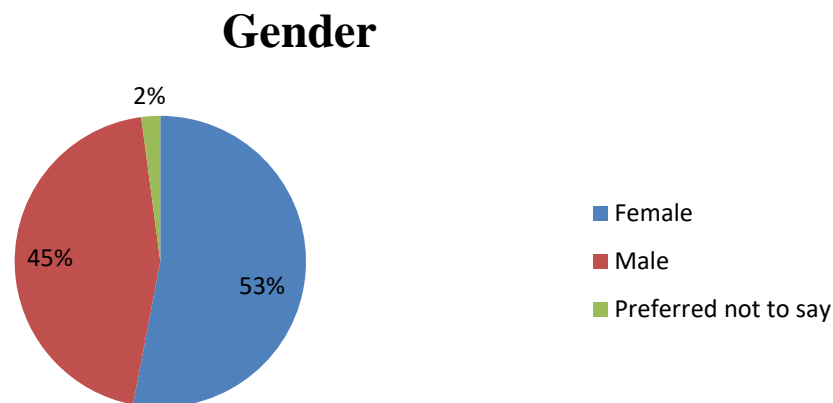


Figure 2: Gender of participants

⁸ Four answers were dropped due to being unrealistic, 483 cases were incomplete and 58 respondents were not members of a swim club.

Level of education

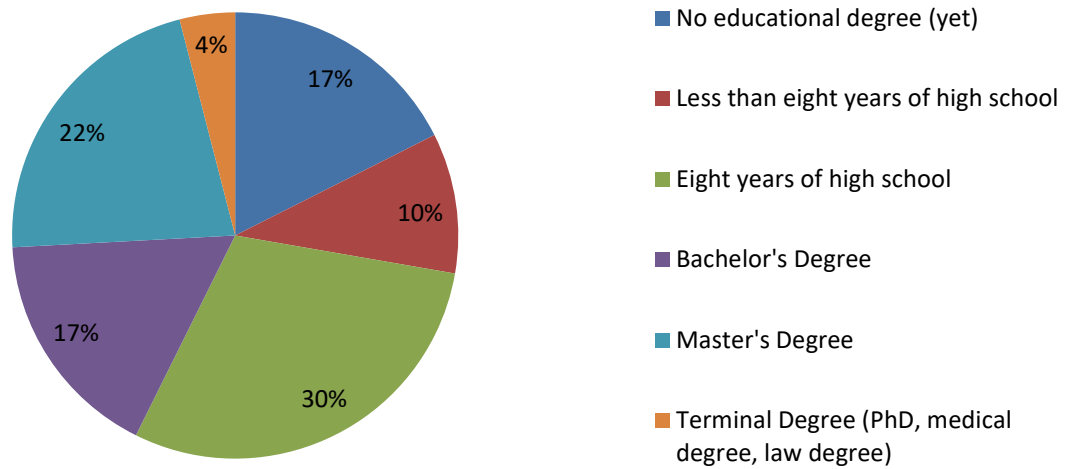


Figure 3: Educational level of participants

According to the Federal Statistics Office (2020), 50.7% of the German population is female and 49.3% is male. Therefore, the distribution in this study represents the German population well. At the end of 2019, the average age of the German resident population was 44.5 years, indicating that the present sample is younger on average (Federal Statistics Office, 2020). This difference can be explained by the nature of the sample, since members of swim clubs in Germany are mostly younger than the average German resident⁹ (SGV Freiberg, April 2019).

The swim clubs were perceived as not actively engaged in pro-environmental behavior. More than half of the respondents did not know if their club engages in pro-environmental behavior (54.9%), 153 participants stated that their club is not involved in pro-environmental behavior (32.6%) and only 59 participants (12.6%) knew about environmental initiatives of their club. These initiatives were, for example, recycling, collecting waste on the

⁹ According to the German swim club SGV Freiberg e.V. (April 2019), the average age of their members is 22.3 years, with most of them being between eight and 18 years old.

club's property, carpooling to competitions, using green energy (e.g. solar power), providing reusable water bottles at competitions, reusing practice material by giving it to younger swimmers and organizing collective bike rides or carpools to practices.

The participants practiced between one and twelve times per week with an average of 4.13 practices (SD = 2.22), a median of four practices and a mode of three practices per week. They traveled an average of 9.43 km (SD = 10.22) to their practice facility; the athlete living the furthest away from their facility had to travel 94 km. The majority of athletes (374 athletes; 79.6%) stated that they competed at a swim meet in 2019, whereas the other 96 swimmers (20.4%) did not compete. The ones that competed had between one and 30 meets in 2019 with a mean of 10.07 competitions (MED = 9.00; MO = 10; SD= 7.28). Regarding training trips, 209 athletes (44.5%) went on at least one training trip, whereas 261 swimmers (55.5%) did not go on a training trip. The ones that went on at least one training trip went on up to ten trips, though most athletes reported attending exactly one trip (M = 1.71; MED = 1.00; MO = 1; SD = 1.29).

4.2 Annual carbon footprints

The average annual carbon footprint for the full sample amounted to 906.58 kg CO₂-e (SD = 1463.47). The average partial CF was 434.72 kg CO₂-e (SD = 898.25) for regular practices, 242.53 kg CO₂-e (SD = 777.49) for competitions, and 229.33 kg CO₂-e (SD = 612.03) for training trips. Therefore, emissions produced by travel to practices were the largest contributor to the total annual CF.

The biggest contributor to the CF produced through the travel for regular weekly practices as well as for competitions is the travel by passenger cars. Regarding training trips, most emissions were produced through air travel.

Comparing total emissions of the different means of transportation shows that by far most of the emissions were produced through the travel with passenger cars, followed by the emissions produced through the travel by planes, which added up to less than half of the emissions produced by cars. The results are presented in the table below (table 2).

Table 2: Annual total and partial carbon footprints (mean values in kg CO₂-e)

Mean of transportation	CF practice	CF competition	CF training trips	CF total
Passenger car	388.01	159.75	21.36	569.12
Urban bus	12.68	7.87	2.30	22.85
Tram/ underground and city railway	15.89	0.37	-	16.26
Long-distance railway	18.14	49.63	1.89	69.66
Overland Bus	-	0.43	0.17	0.6
Plane	-	24.48	203.61	228.09
Total	434.72	242.53	229.33	906.58

4.3 Influence of pro-environmental behavior of swim clubs through internalization

The results of the Pearson's correlation coefficient support the first hypothesis, that a club's positive environmental practices will increase consumer's internalization of the clubs' values. The results show a highly significant relationship between these variables ($\beta = 0.324$; $p < 0.01$) (see figure 4).

The results of the correlation analysis analyzing the influence of internalization on an individual's attitudes towards sustainability show a positive and significant influence ($\beta = 0.098$; $p = 0.033$). Thus, the second hypothesis is supported (see figure 4).

However, internalization did not have a significant impact on an individual's CF ($p = 0.82$), so hypothesis three was not supported (see figure 4). The impact of internalization on the perceived individual practices, which were supposed to be identified in the fourth section of the survey could not additionally be analyzed, since the results of the reliability analysis for

this variable showed that the Cronbach's Alpha was at 0.598, which is lower than the threshold of 0.7. For this reason, the results from this part of the study were not retained for use.

4.4 Factors associated with annual carbon footprint

Being over 18 showed to be negatively correlated with an individual's carbon footprint, and the mean CF of underage children showed to be 58.64% higher than the CF of adults ($CF_{\text{children}} = 1202.05 \text{ kg CO}_2\text{-e}$; $SD_{\text{children}} = 1469.55$; $CF_{\text{adults}} = 758.37 \text{ kg CO}_2\text{-e}$; $SD_{\text{adults}} = 1440.04$). These results support hypothesis four.

The results related to the impact of environmental consciousness showed a highly significant and negative correlation as well, which supports hypothesis five, that environmental consciousness is negatively correlated with an individual's CF ($\beta = -0.175$; $p < 0.01$) (see table 3).

Regarding the sixth hypothesis, that women have a lower annual carbon footprint than men, the results of an independent T-test supported the hypothesis. The average CF of women was 12.25% lower than the CF of men ($CF_{\text{women}} = 843.94 \text{ kg CO}_2\text{-e}$; $SD_{\text{women}} = 1611.36$; $CF_{\text{men}} = 961.80 \text{ kg CO}_2\text{-e}$; $SD_{\text{men}} = 1261.91$) (see figure 5).

Educational level showed to be negatively correlated with an individual's carbon footprint, which supports hypothesis seven. The correlation analysis showed a highly significant and negative correlation between these two constructs ($\beta = -0.180$; $p < 0.01$) (see table 3).

Income did not have a significant impact on the CF, because the significance level was above the predetermined level of 0.05 ($p = 0.69$), which results in hypothesis eight not being supported (see table 3).

The correlation between awareness of famous athletes' positive environmental involvement and an individual's CF (H9) could not be examined because the Cronbach's Alphas for the construct measuring awareness of famous athletes' environmental actions was below the threshold of 0.7 ($\alpha = 0.653$), as were the individual behaviors of swimmers, therefore these variables were deemed unreliable. These items were included at first because they were expected to be relevant, but as the Cronbach's Alphas fell short of the threshold, the study found that these variables were actually not reliable predictors of overall environmental behaviors.

4.5 Graphical presentation of the results

The correlations established above by significance levels and correlation coefficients are summarized in the following figures (see figure 4 and 5). The red-colored results show a highly significant or significant correlation between the two variables, which supports the associated hypotheses. The blue colored variables are among the hypotheses that were not supported because the significance level is higher than the predetermined level of 0.05.

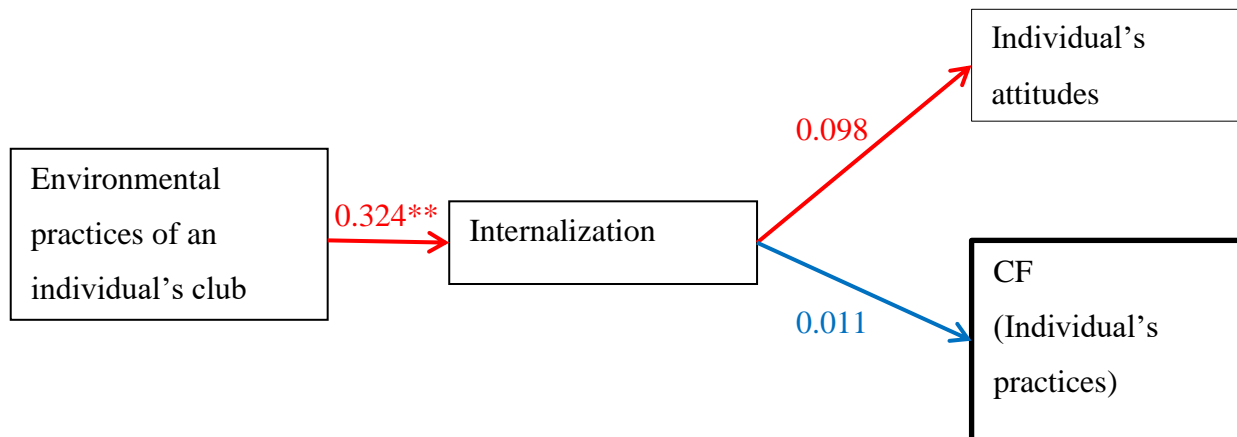


Figure 4: Pearson-Correlation: Influence of PEB of swim clubs through internalization; **p < 0.01

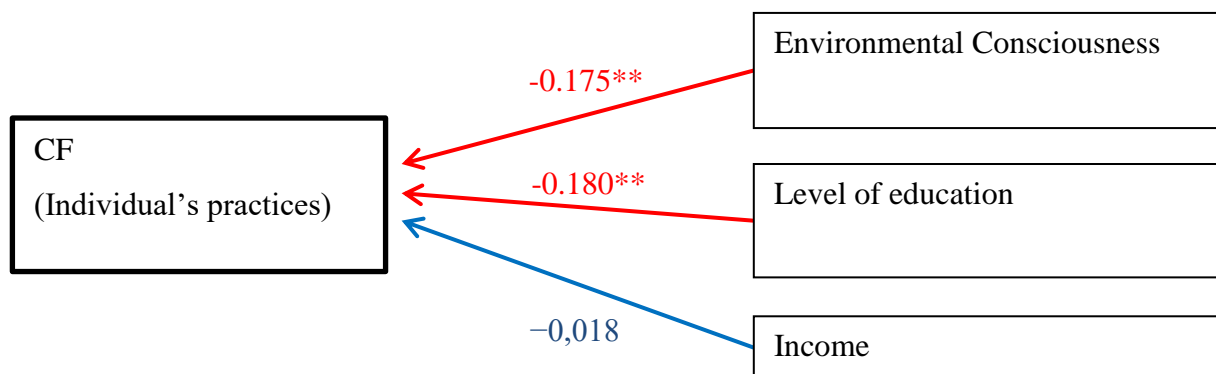


Figure 5: Pearson-Correlation: Factors associated with CF, **p < 0.01

The following figure shows the difference between the CF of underage children and adults as well as the difference between the CF of women and men, which are prevalent in this study and demonstrated through a comparison of the means of the total produced emissions (see figure 5).

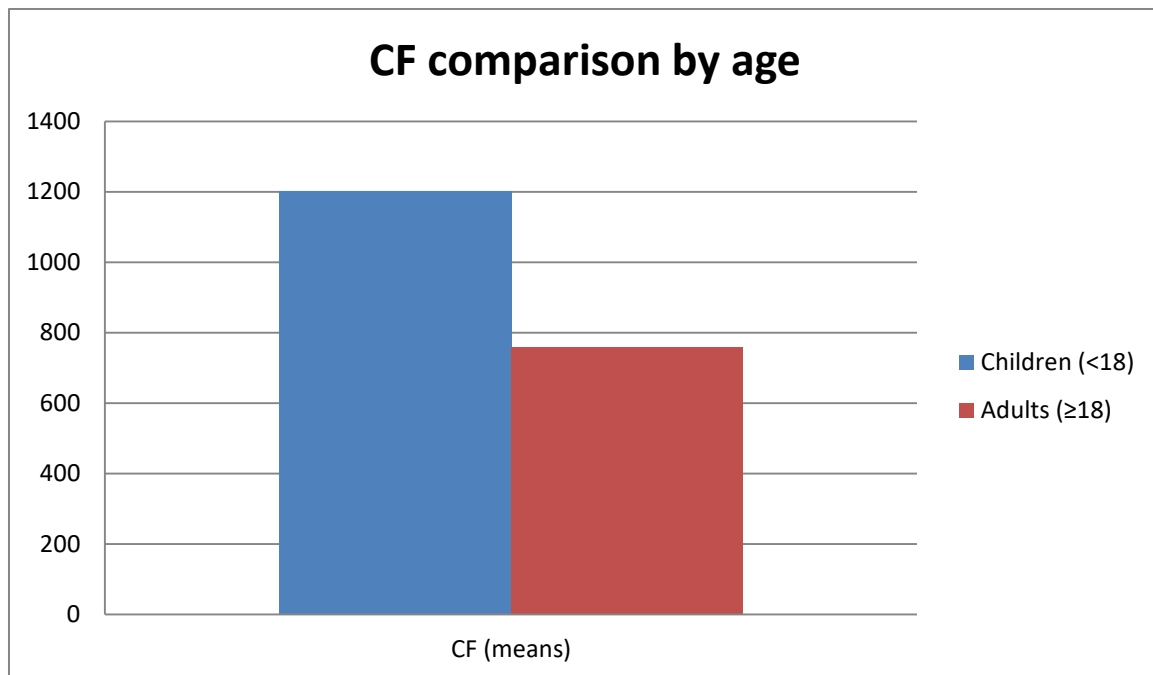


Figure 6: CF comparison of age

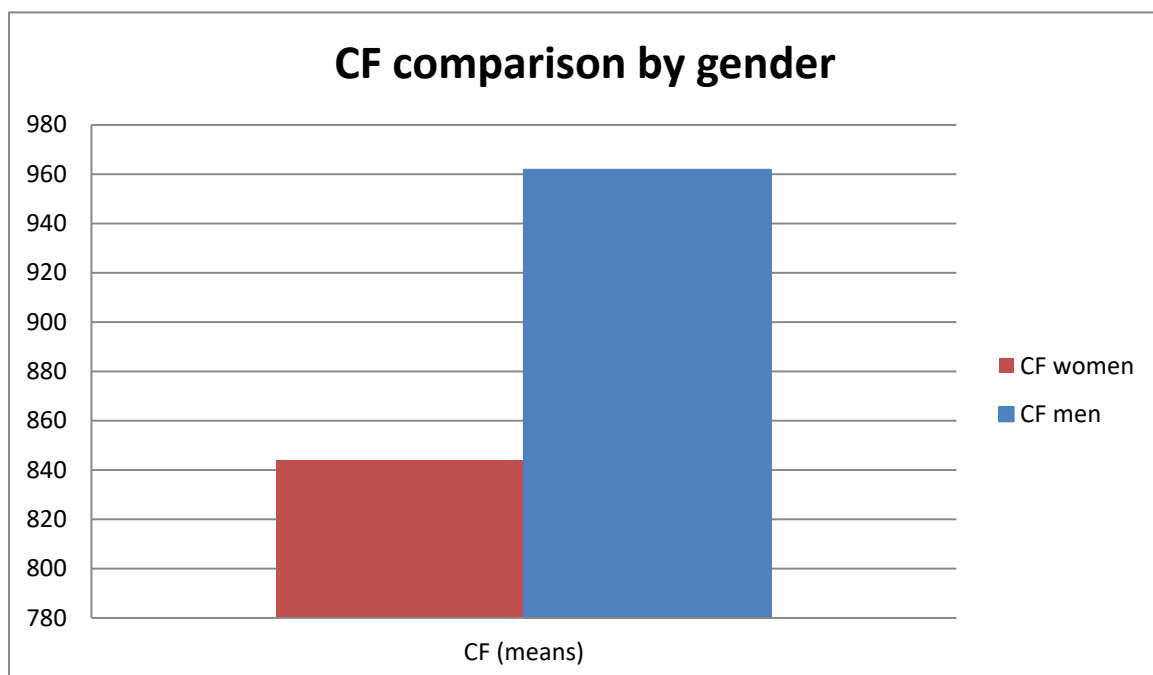


Figure 7: CF comparison by gender

5. Discussion

This study examined the annual CF of active German swimmers and the influence of PEB of sport clubs on an individual's attitudes and practices, as well as different factors affecting individual emissions produced by travel to practices, competitions and training camps. This study was among the first to estimate emission levels of active sport participants, particularly of swimmers.

5.1 Findings

This study included several new ideas that were neglected in previous research. Firstly, the age of athletes was considered, which had been previously neglected in research about the CF of active sport participants. This study fills the research gap that was created through the focus on adult athletes. Secondly, the influence of PEB of swim clubs on the environmental practices and attitudes of their athletes was examined, which also contributes to existing literature on this correlation, which has overwhelmingly focused on fans and organizations, not on active sport participants.

The estimated emission levels were consistent regarding their proportions (i.e. distribution of emissions between practices, meets, and training trips) with the results of Wicker's study (2019), which included swimming in an examination of the CF of 20 different sports. According to Wicker (2019), regular weekly exercise was the largest contributor to the total annual CF as well, followed by competitions and training trips. Even though the emission levels in this study are slightly higher than those reported by Wicker (2019), the proportions between the different purposes of travel are similar. The increased emission levels in this study might be explained through the high participation percentage of highly involved athletes. This can be seen when looking at the sport demographics collected in this study, as the participants practiced on average 4.13 times per week and a very large percentage (79.6%) also competed regularly at swim meets. Professional athletes are more likely not only more

involved in the sport, but also willing to travel more and longer distances, which could be the reason for relatively high emission levels.

Clubs' environmental practices showed to be positively correlated to an individual's internalization of the club's values. These results are consistent with the study by Inoue and Kent (2012), which showed this relationship between a team's positive environmental practices and consumer's internalization of the team's values. However, Inoue and Kent (2012) also showed that this internalization results in consumers being more likely to support the team's initiative and act in an environmentally-friendly manner themselves. This correlation was tested, but internalization showed to be only positively correlated to individuals' attitudes, but not to individuals' practices. This may be partially explained by the value-action gap¹⁰. People might be environmentally conscious, but when it comes to acting in an environmentally friendly way, they might not want to face any additional costs or inconveniences that might be associated with the environmental behavior.

As expected; the higher CF of children might be explained by the increased travel distances when parents drive their children to the swimming facility, drive back home, and drive again to the facility to pick them up. These results are additionally underpinned by the fact that more than half of the parents who stated that they answered the survey on behalf of their underage child said that they drive their child back and forth to practices regularly (52.08%).

Environmental consciousness also showed to be negatively correlated with an individual's CF. Although the results regarding this construct were somewhat contradictory, the findings of this study are consistent with Kennedy, Krahn and Krogmann (2015), who examined this relationship in a general environment and Casper, Pfahl and McCullough (2014) as well as Wicker (2019), who showed this negative influence of environmental

¹⁰ The concept of the value-action gap is further explained in chapter 2.5.2.

consciousness on individuals' CF in the context of sport, examining fans and active sport participants.

Gender also showed to be an influential factor on the individual's CF. Women showed to have a lower overall CF than men. These findings support several empirical studies that have shown that women tend to be more environmentally conscious and show higher levels of PEB (Chen, Hsu & Lin, 2011; Roberts, 1996; Yam-Tang & Chan, 1998). A reason for this difference might be early socialization processes that cause women to be more concerned about other people's health and happiness (Han et al., 2011).

Educational level also showed a negative correlation with an individual's CF. Participants with a higher educational degree displayed lower total emissions, which is consistent with Chen et al.'s (2011) study, that examined the CF of air travelers, as well as Wicker's (2019) study, which examined the CF of active sport participants. A reason for this relationship might be that people with a higher educational degree were most likely taught more about issues related to global warming during their educational career and might therefore be and act more environmentally-friendly themselves.

However, there was no significant correlation between income and an individual's CF detected in this study. The reason for this might be that people who have a higher income might on the one hand be able to afford to travel by plane, which would increase their CF, but they might also have more money available to afford environmentally-friendly products, which would lower their CF. This discrepancy can also be seen at mixed results within existing research. While some researchers suggest that higher income leads to lower GHG emissions of individuals (Sommer & Kratena, 2017), others disagree by showing that a higher income leads to a higher CF of individuals (Grill & Moeller, 2018; Wicker, 2018).

Two of the variables, individual's practices and famous athlete's environmental behavior, had to be excluded from this research because the Cronbach's Alpha fell under the threshold of 0.7, which consequently showed that the used items were not appropriate predictors for an individual's CF. Even though the items were based on existing research, which suggested that athletes should have an effect on individuals' behaviors and attitudes (Bevan-Dye et al., 2009), they did not show this effect in this study. A possible explanation for this might be that famous swimmers are often not as visible as professional athletes in other sports. Soccer players for example might get much more media attention than swimmers, since their sport is much more popular in Germany (Movingto-Germany, 2020). An additional constraint might be the fact that the Olympic Games 2020 got postponed to 2021 (Olympic News, April 2020). Athletes might be better promoted by the media and consequently more visible to their fans during an Olympic season. So perhaps without the lockdown due to COVID-19 and the postponing of the Olympic Games, environmental behaviors of professional athletes would have been better visible for other athletes.

5.2 Limitations and directions for future research

This study faces some limitations that must be addressed to appropriately analyze and interpret the results. Furthermore, these limitations help to predict directions and implications for future research.

A first limitation of this study is its reliance on retrospective data. It is possible that participants did not accurately recall their travel behavior from 2019. Another limitation of this study might be that especially high active participants might have dropped out because they might have perceived the detailed questions about their sport-related travel behavior as too time-consuming (i.e. it may have been too much effort to input all their travel data for every trip they took). Future research could address these limitations by using other means of data collection, for example GPS tracking devices.

Second, choosing to conduct an online questionnaire can be seen as another limitation of this study, since only people that had access to and the technical knowledge to use the internet were able to answer the survey. This might lead to especially older people being underrepresented in this study, since Clement (June 2020) showed that the share of adults who use the internet declines over age. According to Clement (June 2020), only 73% of the age group of 65+ are actively using the internet.

A third limitation of this study is the non-consideration of scope 2 and 3 emissions in the measurement of the CF. These emissions represent values that athletes most likely will not have any information about and were therefore excluded in this research. However, these indirect emissions (scope 2) and emissions within the supply chain (scope 3) do have a crucial impact on the total emissions related to active sport participation and could be included in future research, with assistance and participation of sport clubs who can provide information on these emissions to supplement the survey results from participants.

A fourth limitation that should be addressed in future research is that the choice of the means of transportation to get to practice might depend on the accessibility and location of the nearest pool. When living far away from the next pool, athletes might have to travel further distances to their practice facility. They might in some cases not be able to choose environmentally friendly means of transportation if the facility is not connected to bus or railway connections or too far away to travel by bike.

Another limitation is based on the use of emission factors from national emission tables determined by the Federal Environmental Office (2014). These tables only define one level of emission per means of transportation. Consequently, carpooling was only considered to some extent, since the Federal Environmental Office (2014) indicated an average occupancy rate of 1.5 persons per car. This occupancy rate does not include an exact number of how many people were actually in each car and neither includes the potential situation that

a parent drives two siblings, which would lower the emissions of each child. Future research could solve this limitation by including questions about the exact occupancy rate into the survey. The national emission tables that were used also used the same value for all cars, independent of the type of car. According to Schwedes, Kettner and Tiedtke (2013), “e-mobility has become very much in vogue” (p. 72) since 2009 and more and more people try to contribute to sustainable transportation by buying an electric car. According to Ahlswede (March 2020), the number of electric cars in Germany rose to an all-time high from around 53,000 vehicles in 2019 to around 136,600 vehicles in January 2020. This development can also be seen regarding buses and trains. The emission factors of these electric means of transportation differ greatly from common means and should therefore be considered in future research.

Including solutions for these limitations, future research should examine the same phenomenon in other sports and also in another country, or ideally, several other countries, to determine whether the findings for this study are generalizable to all swimmers or if the German context is unique.

Future research could also analyze how seeing the impact that swimmers have on the total emissions of GHGs underlined by the results of this study would influence athletes to change their environmental attitudes and practices. This research could include Moral Justification Theories that question to what extent “beliefs about matters of fact” (Haslett, 1987, p. 25) play a role in the justification of moral norms and beliefs. It could also be based on the Balance Theory by Fritz Heider (1946), which deals with the consistency or inconsistency of the relationship that a person has with other elements of the environment (Manhart, 2009). Within this relationship, humans prefer balanced states against unbalanced states and they feel no need or urge to change a balanced state (Manhart, 2009). In case athletes might be surprised about the dimension of emissions that swimmers actually produce,

they might perceive the relationship in which they are with their environmentally-friendly swim club or nature in general as unbalanced, which might initiate them to change their attitudes and behavior.

5.3 Implications

The findings of this study will help to further the existing research as well as provide a basis on which swim clubs in Germany can come up with sustainability strategies and initiatives to reduce the carbon footprint of their athletes. For example, swim clubs could organize collective bike rides to practices, give their athletes the opportunity to store their practice equipment at the facility so that athletes can more conveniently use environmentally-friendlier means of transportation, or acquire a club bus which athletes can collectively take to competitions.

The athletes themselves can also initiate change, not only by changing their own behavior, but also by serving as a role model to others at their club, and impacting on their attitudes and behaviors.

Besides providing a basis for the sport clubs and the athletes themselves, the data collected in this study also shows sport managers how crucial the impact of swimmers is on the total emission of GHGs and raise awareness for sustainability issues. The data can be used to inform organizational activities and advocacy, for example by strengthening the recycling system of the organization or by starting an in-company low emission competition among employees, in which employees producing low emissions on their way to work will be honored for their environmental-friendly travel behavior. Raising sport managers' awareness for sustainability issues might not only lead to them and their companies engaging more environmentally friendly themselves, but also to them setting an example for other organizations – within and outside sport.

The results of this study regarding the influence of PEB of swim clubs indicate that there is a value-action gap prevalent in the sport of swimming in Germany. Even though the PEB of their clubs had a positive impact on individuals' attitudes, it did not have an effect on the actual CF of the athletes. This obvious predominant value-action gap can help the government and policy makers in their decisions, for example regarding the promotion of environmental initiatives. They should see the importance of prioritizing an environmentally-friendly infrastructure in the cities, for example by creating bike routes within and among the cities. Car companies should also reconsider the impact that they can have on total emission levels. Even though E-mobility is getting bigger and more popular in Germany, electric cars are often for example still by far more expensive than fuel-driven ones. Car manufacturers could have an enormous impact on local and global emission levels by making these cars more affordable, addressing the value-action gap of their consumers.

6. Conclusion

This study aimed at calculating the CF of swimmers, understanding how sport organizations induce participants to engage in PEB, and analyzing various factors associated with the CF, such as age, environmental consciousness, gender, level of education, income, and famous athlete's environmental behavior.

By collecting data from 470 participants through an online survey, the results of this work prove the influence of some determinants on individuals' CF, including age and education level. In doing so, the results partly support hypotheses that have already been examined in existing research and expand the state of research in this field, or stimulate food for thought, as they sometimes provide contradictory results from existing research. The results of this study showed that a club's environmental practices increase athletes' internalization of the club's values. Once this internalization takes place, athletes are likely to adapt their environmental attitudes, but not their behavior. Regarding the different determinants impacting an individual's CF, a correlation was shown towards the constructs age, environmental consciousness, gender, and educational level, but not to the individual's income. By supporting some existing assumptions, these have been reinforced and can be used even more securely by representatives of organizations around the world to decrease the CF of their consumers.

The results offer valuable insights into the impact of PEB on athletes' attitudes and practices, as well as the impact of different organizational and personal factors. Additionally, they deliver implications for various stakeholders in order to be able to identify the actual and potential risks of the current climate situation and might initiate them to address them and fight global warming to preserve the nature as it is.

7. References

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8. Appendix I - Survey Questions

Teil 1 – Informationen über den Schwimmverein [*Part 1 – Information about the swim club*]

1. Sind Sie Mitglied in einem Schwimmverein ? Ja/Nein

Are you a member of a swim club? Yes/No

2. Verhält sich Ihr Schwimmverein aktiv umweltbewusst? Ja/Nein/Ich weiß es nicht.

Beispielsweise durch bestimmte Umweltinitiativen, Nutzung "grüner" Energie, geplante Umweltaktionen mit Mitgliedern, Wiederverwendung von Materialien oder Recycling von Abfällen.

Is your swim club actively engaging in pro-environmental behavior? Yes/No/I do not know.

For example through certain environmental initiatives, use of 'green' energy, planned environmental actions with members, reuse of materials or recycling of waste.

2a. Wenn ja: Nennen Sie eine umweltbewusste Initiative Ihres Schwimmvereins in 2019.

(Follow-up question – if yes) Name one pro-environmental initiative of your swim club in 2019.

Skala von 1 (= trifft überhaupt nicht zu) bis 5 (= trifft voll und ganz zu)

Scale from 1 (= strongly disagree) to 5 (= strongly agree)

3. Ich denke, andere Leute in meinem Schwimmverein erwarten von mir, dass ich umweltfreundlich handle.

I think other people in my swim club expect me to act in an environmentally-friendly manner.

4. Mein Schwimmverein unterstützt umweltfreundliches Verhalten der Athleten.

My swim club supports the pro-environmental behavior of the athletes.

5. Viele Athleten in meinem Verein engagieren sich für umweltschonendes Verhalten.

Many athletes in my club are engaging in pro-environmental behavior.

6. Sich umweltfreundlich zu verhalten ist in meinem Schwimmclub problemlos möglich.

To act in an environmentally-friendly manner is possible in my swim club without any

difficulty.

Teil 2 – Identifikation mit dem Verein [Part 2 – Identification with the club]

Skala von 1 (= trifft überhaupt nicht zu) bis 5 (= trifft voll und ganz zu)

Scale from 1 (= strongly disagree) to 5 (= strongly agree)

7. Ich identifiziere mich sehr mit meinem Schwimmverein.

I strongly identify myself with my swim club.

8. Wenn jemand meinen Schwimmverein lobt, fühlt sich das wie ein persönliches Kompliment an.

When someone praises my swim club, it feels like a personal compliment.

9. Wenn jemand meinen Schwimmverein kritisiert, fühlt sich das wie eine persönliche Beleidigung an.

When someone criticizes my swim club, it feels like a personal insult.

10. Die Erfolge meines Vereins sind auch meine Erfolge.

My swim club's successes are my successes.

11. Wenn ich von meinem Verein rede, sage ich meistens 'wir' statt 'sie'.

If I talk about my swim club, I rather say 'we' instead of 'they'.

Teil 3 – Individuelle Einstellungen [*Part 3 – Individual's attitudes*]

Skala von 1 (= trifft überhaupt nicht zu) bis 5 (= trifft voll und ganz zu)

Scale from 1 (= strongly disagree) to 5 (= strongly agree)

12. Es beunruhigt mich, wenn ich daran denke, unter welchen Umweltverhältnissen unsere Kinder und Enkelkinder wahrscheinlich leben müssen.

It worries me when I think about the environmental conditions that future generations will have to live in.

13. Wenn ich Zeitungsberichte über die Umweltprobleme lese oder entsprechende Fernsehsendungen sehe, bin ich oft empört und wütend.

When I read newspaper articles or watch TV shows about environmental concerns and problems I often get mad and outraged.

14. Wenn wir so weitermachen wie bisher, steuern wir auf eine Umweltkatastrophe zu.

If we continue to environmentally behave like we did, we will most likely face an environmental crisis soon.

15. Es gibt Grenzen des Wachstums, die unsere industrialisierte Welt schon überschritten hat oder sehr bald erreichen wird.

There are boundaries of industrial growth that our world is about to reach or already passed.

16. Nach meiner Einschätzung wird das Umweltproblem in seiner Bedeutung von vielen Umweltschützern stark übertrieben.

I think that environmental problems are often exaggerated by environmental activists.

17. Zugunsten der Umwelt sollten wir alle bereit sein, unseren Lebensstandardbewusst anzupassen und gegebenenfalls einzuschränken.

We should all be willing to change or even restrict our standard of living to do something good for our environment.

18. Forscher und neue Technologien werden unsere Umweltprobleme lösen, ohne dass wir unser Verhalten ändern müssen.

Researchers and new technology will solve our environmental issues without the need for us changing our behavior.

19. Ich möchte mich bei jeder sich bietenden Gelegenheit, die sich im nächsten Jahr ergeben wird, umweltfreundlich engagieren.

I would like to engage environmentally at every opportunity that will arise during the next year.

Teil 4 – Individuelles Verhalten [Part 4 – Individual's practices]

Skala von 1 (= nie) bis 5 (= immer)

Scale from 1 (=never) to 5 (= always)

20. Ich recycle Kunststoffprodukte zu Hause.

I recycle plastic products at home.

21. Ich kaufe bewusst Recyclingpapier und/oder recycelte Kunststoffprodukte.

I consciously buy recycled paper and/or recycled plastic products.

22. Ich sammle und recycle Altpapier.

I collect and recycle used paper.

23. Ich entsorge Plastik- und Papierabfälle getrennt.

I dispose of plastic and paper waste separately.

24. Ich benutze nachfüllbare Wasserflaschen.

I use refillable water bottles.

25. Ich Sorge immer dafür, dass die Lichter ausgeschaltet sind, wenn ich die letzte Person bin, die die Einrichtung verlässt.

I always make sure that the lights are turned off when I am the last person leaving the facility.

26. Ich schalte das Wasser in der Dusche aus, während ich mich einshampooiere.

I turn the water off in the shower when I put shampoo in my hair.

27. Ich benutze umweltfreundliche Verkehrsmittel, um zu Trainingseinheiten und Wettkämpfen zu gelangen (z.B. Fahrrad oder öffentliche Verkehrsmittel).

I use environmental-friendly transportation to get to practices and meets (e.g. bike or public transportation).

28. Ich nutze Fahrgemeinschaften zu Trainingseinheiten oder Wettkämpfen.

I carpool to practices and/or to meets.

Skala von 1 (= trifft überhaupt nicht zu) bis 5 (= trifft voll und ganz zu)

Scale from 1 (= strongly disagree) to 5 (= strongly agree)

29. Meine Lieblingssportler verhalten sich umweltfreundlich.

My favorite athletes act environmentally-friendly.

30. Wenn ich sehe, wie mein Lieblingssportler umweltfreundlich agiert, motiviert es mich, seinem/ihrem Beispiel zu folgen.

If I see my favorite athlete acting environmental-friendly, it motivates me to follow his/her lead.

Teil 5 – Transport- und Reiseverhalten zu Trainingseinheiten [Part 5 - Sport-related travel to practices]

Die folgenden Fragen beziehen sich auf Ihr reguläres, wöchentliches Training. Alle Fragen beziehen sich auf Ihre Trainingseinheiten im Jahr 2019 während einer durchschnittlichen Trainingswoche.

The following questions are about your weekly practices on a regular basis. All questions refer to your practices in 2019 and an average practice week.

31. Wie viele Trainingseinheiten haben Sie im Jahr 2019 durchschnittlich pro Woche trainiert?

How many times per week did you practice swimming on average in 2019?

32. Zu wie vielen Trainingseinheiten sind Sie im Jahr 2019 durchschnittlich pro Woche gelaufen oder mit dem Fahrrad gefahren?

How many swim practices per week in 2019 did you walk or bike to?

33. Zu wie vielen Trainingseinheiten sind Sie im Jahr 2019 durchschnittlich pro Woche mit dem Auto gefahren?

To how many swim practices per week in 2019 did you take a car?

34. Beantworten Sie diesen Fragebogen für Ihr minderjähriges Kind? Ja/Nein

Are you answering this survey on behalf of your underage child?

34a. Wenn ja, haben Sie Ihr Kind zu den meisten Trainingseinheiten mit dem Auto gefahren und anschließend wieder abgeholt?

(Follow-up question) If yes, did you drive your child to most of his/her practices and then pick him/her up again afterwards?

35. Zu wie vielen Trainingseinheiten haben Sie im Jahr 2019 durchschnittlich pro Woche einen Bus genommen?

To how many swim practices per week in 2019 did you take an urban bus?

36. Zu wie vielen Trainingseinheiten sind Sie im Jahr 2019 durchschnittlich pro Woche mit

der Straßenbahn gefahren?

To how many swim practices per week in 2019 did you take an underground/ city railway?

37. Zu wie vielen Trainingseinheiten sind Sie im Jahr 2019 durchschnittlich pro Woche mit der Deutschen Bahn gefahren?

To how many swim practices per week in 2019 did you take a long-distance railway?

38. Wie weit ist Ihr primärer Trainingsort (das Schwimmbad, in dem Sie meistens trainieren) von Ihrem zu Hause entfernt? [km]

How far away is your primary training facility (the pool you swim at most frequently) from your house? [km]

Teil 6 – Transport- und Reiseverhalten zu Wettkämpfen [Part 6 – Sport-related travel to meets]

39. Haben Sie im Jahr 2019 an Schwimmwettkämpfen teilgenommen? Ja/Nein

Did you participate at swim competitions in 2019? Yes/No

39a. Wenn Ja, an wie vielen Schwimmwettkämpfen haben Sie in 2019 teilgenommen? ____

(Follow-up question – If yes) If yes, at how many swim meets did you compete in 2019? ____

39b. Bitte geben Sie in folgendem Format an, mit welchen Transportmitteln Sie zu den Schwimmwettkämpfen gefahren sind und wo diese waren: (PLZ oder Name), genutztes Verkehrsmittel.*

*Bitte wählen Sie aus den folgenden Transportmitteln: Auto, Bus, Straßenbahn, Überlandbus, Bahn, Flugzeug

(Follow-up question – If yes) Please provide information about which means of transportation you used to get to your meets and where they were in the following format:

*Place (Postal Code or name), means of transportation.**

**Please select from the following means of transportation: Passenger car, urban bus, tram/ underground/ city railway, overland bus, long-distance railway, plane.*

Teil 7 – Transport- und Reiseverhalten zu Trainingslagern [Part 7 – Sport-related travel to training camps]

41. Haben Sie in 2019 an einem oder mehreren Trainingslager(n) teilgenommen? Ja/Nein

Did you attend a training trip in 2019? Yes/No

41a. Wenn ja, an wie vielen Trainingslagern haben Sie 2019 teilgenommen?

(Follow-up question – If yes) If yes, how many training trips did you do in 2019? ____

41b. Bitte geben Sie in folgendem Format an, mit welchen Transportmitteln Sie zu den Trainingslager(n) gefahren sind und wo diese waren: (PLZ oder Name), genutztes Verkehrsmittel.*

*Bitte wählen Sie aus den folgenden Transportmitteln: Auto, Bus, Straßenbahn, Überlandbus, Bahn, Flugzeug

*(Follow-up question – If yes) Please provide information about which means of transportation you used to get to your training trips and where they were in the following format: Place (Postal Code or name), means of transportation.**

**Please select from the following means of transportation: Passenger car, urban bus, tram/ underground/ city railway, overland bus, long-distance railway, plane.*

Teil 8 – Persönliche Fragen [Part 8 – Demographics]

42. Welches Geschlecht sind Sie, bzw. Ihr Kind, für welches Sie diesen Fragebogen ausfüllen?

männlich weiblich möchte ich nicht angeben

What gender are you or your child for whom you are completing this survey?

male female prefer not to say

43. Wie alt sind Sie, bzw. Ihr Kind, für welches Sie diesen Fragebogen ausfüllen?

How old are you or your child for whom you are completing this survey?

44. Wie lautet die Postleitzahl Ihres Hauptwohnsitzes? _____

What is the area code of the place you mainly reside in? _____

45. Was ist Ihr derzeit höchster Schulabschluss?

(Only if participant is not answering on behalf of their child) What is your highest completed educational level?

Kein Abschluss/ noch Schüler. *I do not have an educational degree/ am still going to high school.*

Haupt- oder Realschulabschluss. *Less than 8 years of high school.*

Abitur. *8 years of high school.*

Bachelor-Abschluss. *Bachelor's Degree.*

Master-Abschluss. *Master's Degree.*

Doktorarbeit. *Terminal Degree (PhD, medical degree, law degree).*

46. Dürfen wir Sie abschließend noch nach Ihrem Haushaltseinkommen pro Kopf (Netto) pro Monat fragen?

What is your household net income per month (per capita)?

0-500 €

501-1,000 €

1,001-1,500 €

1,501-2,000 €

2,001-2,500 €

2,501-3,000 €

3,001-3,500 €

3,501-4,000 €

> 4,001 €

9. Appendix II – IRB Protocol

Application: Pages 1 - 19

Informed Consent English: Page 20

Informed Consent German: Page 21

Pre-survey Email English: Page 22

Pre-survey Email German: Page 23

Survey Email English: Page 24

Survey Email German: Page 25

Reminder Survey Email English: Page 26

Reminder Survey Email German: Page 27

Survey Questions English/German: Pages 28 – 33

Appendix A: Page 34

Instructions to investigators: If you have any questions or any doubt about your category/section of review (i.e. exempt, expedited, or full-board) contact us by email at: irb@cortland.edu.

**Category II:
EXPEDITED Protocol**

Institutional Review Board
Application for Use of Human
Participants in Research

Applicant Information

Title of Protocol:

Determinants of the Carbon Footprint of German Swimmers

Name of Lead Principal Investigator (PI):

Madeleine Orr

Co-Investigator (If Applicable)

Ann-Marie Muehlbauer

Department:

Professional Studies

Campus Address:

SUNY Cortland, School of Professional Studies, 21 Graham Ave, Cortland, NY 13045

Email:

Annmarie.muehlbauer@cortland.edu

Phone:

+49 152 37394636

PI's Status (Check Box):

- Faculty
- Staff
- Graduate Student
- Undergraduate Student

Has another IRB reviewed this protocol?

- Yes
- No

If yes, please identify the institute where the IRB approval is and which institution will serve as the primary institution for IRB Review (if applicable):

Click or tap here to enter text.

Is the principal investigator or any co-investigator affiliated with another institution?

- Yes
- No

If yes, please identify the institute where the PI or any Co-investigator are affiliated with (if applicable):

Click or tap here to enter text.

Instructions to investigators: If you have any questions or any doubt about your category/section of review (i.e. exempt, expedited, or full-board) contact us by email at: irb@cortland.edu.

Are you certified through CITI for the Social/Behavioral course?

- Yes (Certifications expire after 3 years) In Progress

Undergraduate and Graduate Student Applicants:

Student researchers serving as PI's, please provide the following information about your faculty/sponsor (research advisor). Students may NOT submit applications without their sponsor's approval.

Research Sponsor's Name	Department	Email	Social/Behavioral CITI Training Completed
Click or tap here to enter text.	Click or tap here to enter text.	Click or tap here to enter text.	<input type="checkbox"/> Yes <input type="checkbox"/> In Progress
Click or tap here to enter text.	Click or tap here to enter text.	Click or tap here to enter text.	<input type="checkbox"/> Yes <input type="checkbox"/> In Progress

Co-Investigator and Research Staff

Are there co-investigators or research staff (other faculty, staff, undergraduate students, graduate students) working with you?

- Yes (If yes please complete Appendix B on the next page) No

Instructions to investigators: If you have any questions or any doubt about your category/section of review (i.e. exempt, expedited, or full-board) contact us by email at: irb@cortland.edu.

Appendix Form B:

Complete this form only when applicable to your project. Add rows to this form in the event that you need the extra space. If you have not yet identified the undergraduates or graduate students to be involved with the study, under Name type a description of the students (e.g., “upper-division undergraduates”). When you are finished, save this file in Word, Rich Text Format, or Adobe format. Send it with your application to irb@cortland.edu.

Co-Investigators: List all co-investigators. Every co-investigator assumes equal responsibility for the execution of the study and all co-investigators must sign Appendix Form A – Investigator Assurance.				
Name	Institution, Address, Email, Phone Number	Degree/Field	Social/Behavioral CITI Training Completed (yes/in progress)	
Ann-Marie Muehlbauer	SUNY Cortland, Max-Reger-Str. 29, 69121 Heidelberg, Germany, Annmarie.muelbauer@cortland.edu , +49 152 37394636	Master’s student, International Sport Management	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> In Progress	
Graduate Student Research Assistants (Note: <i>CITI Training is required for all graduate students engaged in</i>				
Name	Department	Role on the project	Social/Behavioral CITI Training Completed (yes/in progress)	
			<input type="checkbox"/> Yes <input type="checkbox"/> In Progress	
			<input type="checkbox"/> Yes <input type="checkbox"/> In Progress	
Undergraduate Student Research Assistants (Note: <i>Level of research methods training and IRB training should be commiserate with the degree of risk identified in the protocol and the level of direct, continuous supervision</i>).				
Name	Department	Role on the project	Research Methods Training	Social/Behavioral CITI Training Completed (yes/in progress)
				<input type="checkbox"/> Yes <input type="checkbox"/> In Progress
				<input type="checkbox"/> Yes <input type="checkbox"/> In Progress

Instructions to investigators: If you have any questions or any doubt about your category/section of review (i.e. exempt, expedited, or full-board) contact us by email at: irb@cortland.edu.

Project Information

Project type (Place an “X” next to the statement that best describes the purpose of this research):

- Pilot data for a grant/fellowship proposal or R & D
- Thesis or dissertation research (Complete thesis box below)
- Program evaluation that will be disseminated off Campus Technology Services
- Pre-submission review for a grant proposal or fellowship application (data collection is contingent upon finding)
- Other (please explain below):

Click or tap here to enter text.

❖ **If you selected thesis/dissertation, please provide contact information for your committee chair below:**

Name	Email	Phone	College/University where your degree will be awarded:
Ann-Marie Muehlbauer	Annmarie.muehlbauer@cortland.edu	+49152 37394636	SUNY Cortland

Project Period

(Can indicate a period up to one year); place an X in the “From” or “To” boxes on the left, OR type the exact start and end dates in the boxes on the right)

From: Date of IRB Approval

To: One year after Approval

Project Start Date:

Click or tap to enter a date.

Project End Date:

Click or tap to enter a date.

Project Funding (Place an “X” next to the statement that best describes the funding source for this research):

Not Funded

Internal Funding (e.g. department, UUP,

Applying/applied for funding

Research Foundation)

Instructions to investigators: If you have any questions or any doubt about your category/section of review (i.e. exempt, expedited, or full-board) contact us by email at: irb@cortland.edu.

External Funding from a Government Source Other (explain in space below):

External Funding from a Private Source

Click or tap here to enter text.

If funded, provide agency and grant/contract number:

Agency	Grant/Contract Number

Category II Expedited Sections

Abbreviated section titles appear below; **read the full text of each section number before choosing a section** (see <http://www.hhs.gov/ohrp/humansubjects/guidance/45cfr46.html>). Investigators make a preliminary decision, in consideration of all procedures from recruitment through dissemination. After reading the protocol, the IRB Administrator makes a final determination concerning the review category and section number appropriate for the study. All requests for waivers or exceptions are considered by the Full Board, as required by federal regulations

Indicate by typing an “X” into the box on the left the requested section of review. If your study does not fit one of these categories, it CANNOT be reviewed as exempt.

<input type="checkbox"/>	1.	Clinical studies of drugs and medical devices (limitations apply)
<input type="checkbox"/>	2.	Collection of blood samples by finger stick, heel stick, ear stick, or venipuncture (time and volume limits apply)
<input type="checkbox"/>	3.	Prospective collection of biological specimens for research purposes by noninvasive means (see examples)
<input type="checkbox"/>	4.	Collection of data through noninvasive procedures (not involving general anesthesia or sedation) routinely employed in clinical practice (see limitations and examples)
<input type="checkbox"/>	5.	Research involving materials (data, documents, records, or specimens) that have been collected, or will be collected solely for nonresearch purposes (some of this research will be exempt, see definition of minimal risk)
<input type="checkbox"/>	6.	Collection of data from voice, video, digital, or image recordings made for research purposes (see definition of minimal risk)

Instructions to investigators: If you have any questions or any doubt about your category/section of review (i.e. exempt, expedited, or full-board) contact us by email at: irb@cortland.edu.

☒	7.	Research on individual or group characteristics or behavior (see examples); survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies (some of this research will be exempt, see definition of minimal risk)
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Research Procedures Involving Specific Risks to be Documented

The conditions listed below often require additional documentation or may involve a different category of review. Check a box to alert the IRB when a condition listed below applies to the study (mark an X next to all that apply):

<input type="checkbox"/>	Questions are of a sensitive or controversial nature; given the standards of the Cortland community, the research would likely be viewed as controversial; or the research may generate public concern.
<input type="checkbox"/>	Questions are asked involving any kind of activity that may be illegal, illicit, unethical or are violations of institutional policy; OR participants' responses, if known outside of research could increase risk of civil/criminal liability or damage financial standing or employability (this includes the recreational use of drugs/alcohol).
<input type="checkbox"/>	Research involves the use of equipment (ranging from playground or camp equipment to experimental apparatus) that may or may not be attached to participants.
<input type="checkbox"/>	Deception is used or debriefing is necessary to check the participants' wellbeing (physical or psychological) or protect their welfare.
<input type="checkbox"/>	Procedures are used that involve assignment to groups, the manipulation of subjects' behavior or responses, an intervention, or any procedure intended to change the participant's opinions, thoughts, feelings, or behavior.
<input type="checkbox"/>	Procedures involves the assessment of mental health status, a questionnaire allowing the diagnosis of a mental illness (DSM-IV axis 1 or axis 2), or the survey asks questions about suicidal ideation or suicide attempts.

Instructions to investigators: If you have any questions or any doubt about your category/section of review (i.e. exempt, expedited, or full-board) contact us by email at: irb@cortland.edu.

Study Purpose and Procedures

Study Purpose

Describe the purpose of this study, the objectives, aims, gap in knowledge the study addresses, and/or the rationale for performing the study.

This study has three main objectives. The first goal of this study is to calculate the carbon footprint of club swimmers in Germany. The second goal is to understand how sport organizations (in this case, swim clubs) induce consumers (in this case, swimmers) to engage in pro-environmental behavior (PEB). The third objective is to analyze various factors associated with the carbon footprint. The findings of this study will enhance existing research on the carbon footprint of active sport participation and will provide swim clubs with data based on which they can develop sustainability initiatives within their organization.

Research Design:

Begin this section with a statement describing the design of your study. Be sure to explain the study type, (eg. experimental, descriptive, ethnography), methodology, variables, etc. Define technical terms so that all members of the IRB can understand.

The study type will be descriptive research. I intent to collect data on knowledge/attitudes/behavior (K/A/B) from adult participants. I will also be asking adults parents to report on their children's K/A/B. An online survey will be conducted to analyze various factors influencing the carbon footprint of swimmers. The variables that will be investigated are on the one hand how internalization with a swim club mediates the relationship between the environmental practices of an individual's club and the individual's environmental attitudes and practices. Furthermore, other determinants that will be included in the analysis will be age, environmental consciousness, gender, level of education, income and the impact of famous athlete's environmental behavior.

Research Protocol:

Explain the procedures of your study; explain what you plan to ask participants to do, include scripts and instructions that will be given to participants, (as appendices), along with other details about how you plan to execute the research activities. Describe the procedures chronologically, beginning with advertisement and recruitment to the end of the participants' involvement in the study. Note that the IRB cannot approve a study in concept. The application must have enough detail to understand precisely how the research will be executed. A well-written protocol contains sufficient detail so that another researcher in your field could replicate your procedures.

Instructions to investigators: If you have any questions or any doubt about your category/section of review (i.e. exempt, expedited, or full-board) contact us by email at: irb@cortland.edu.

I will ask the participants to fill out an online survey. The questionnaire comprises a total of 46 individual questions with six additional follow-up questions that might be added depending on the preceding answers of the participant. These are mandatory questions to ensure that all questions are answered and that distortions are minimized by denial of reply. Each construct examined will be collected by two to five items. To examine the various constructs, the survey will be divided into eight topics (Information about the swim club, Identification with the club, Individuals' attitudes, Individuals' practices, Sport-related travel to practices, Sport-related travel to meets, Sport-related travel to training camps, and Demographics). The surveys will be distributed via email, and available for 30 days. A pre-survey email will be sent a week before the survey will be sent out and a reminder email will be sent a few days into the survey to increase response rates. To guarantee a better understanding and consequently increase the response rate, the survey will be conducted in German.

Email to irb@cortland.edu a copy of all instructions to participants, scripts, surveys, measurement instruments, stimuli, etc.

Assessment of Anticipated Benefits

In the space below, describe the anticipated benefits to participants (directly or indirectly), to science, and/or benefits to society. Incentives for participation should not be listed as a benefit.

Although participation will not benefit the participants directly, the information obtained from the study will help further the research on the carbon footprint of active sport participation as well as greatly help my graduate studies.

Instructions to investigators: If you have any questions or any doubt about your category/section of review (i.e. exempt, expedited, or full-board) contact us by email at: irb@cortland.edu.

Assessment of Risk

The term *risk* is defined as the probability of harm or injury (physical, psychological, social, or economic). To assess risk, investigators should be able to (1) describe potential risks or discomforts; (2) estimate the probability of the risk; and (3) assess the severity (mild, moderate, severe), should that risk occur. Use the OHRP's definition of minimal risk as the benchmark; minimal risk is when the probability and magnitude of harm or discomfort anticipated in the research are not greater in and of themselves than those ordinarily encountered in daily life or during the performance of routine physical or psychological examinations or tests.

Using the definition of minimal risk stated above, choose the statement that best describes this study:

- Research involving less than minimal risk
- Research involving no more than minimal risk
- Research involving greater than minimal risk, but presenting the prospect of direct benefit to the individual participants
- Research involving greater than minimal risk, but presenting no prospect of direct benefit to the individual participants, but likely to yield generalizable knowledge about the participants' disorder or condition
- Research involving greater than minimal risk that does not fit any of the above conditions

Nearly all research activities pose at least some risk to participants. Identify and describe, in the space below, reasonably foreseeable risks associated with this research (for some studies, e.g., survey research, reasonably foreseeable risks may be confined to confidentiality risk). For each risk, explain what precautions, safeguards, and alternatives have been incorporated into the research activity to reduce the probability and magnitude of discomfort or harm. **Expedited research activities, by definition, must pose no more than minimal risk to participants.**

The participation should cause no direct risk to participants.

Instructions to investigators: If you have any questions or any doubt about your category/section of review (i.e. exempt, expedited, or full-board) contact us by email at: irb@cortland.edu.

Recruitment and Participant Selection

In the space below, describe the social demographics of your target population. Include all important defining characteristics of your potential sample. In particular, specify any on-campus or community groups from which you will recruit (for example, SUNY Cortland faculty, staff, students; students at Cortland JSHS; members of the Cortland Chamber of Commerce, etc.) and explain any relationship you have with that group, past or present (if applicable).

Target Demographic	German swim club members of all ages.
Target sample size (If the study has multiple phases, include a target sample size for each phase.)	300 people

Classification of Recruitment Procedures

Place an “X” in the box that applies to this study, and send all recruitment materials to the IRB for review before implementation. The IRB highly recommends that all investigators **read the instructions concerning participant recruitment, as recruitment issues are the most common source of delays in gaining approval.**

Issues relating to the relationship among the investigators and the individuals targeted for recruitment:

- This study involves no contact with participants (e.g., use of existing data)
- Recruitment is targeted at individuals who will remain anonymous during recruitment and are individuals not already known to the investigators (e.g., random digit dialing, newspaper advertisement, flyers posted, etc.)
- Recruitment is targeted at individuals already known to the investigators (e.g., the use of students in the investigator’s course; employees of the college). Provide a detailed explanation in the Procedures section.
- Recruitment is targeted at individuals not already known to the investigator, but are known to another group or organization who will assist with recruitment. Provide a detailed explanation in the Procedures section.

Instructions to investigators: If you have any questions or any doubt about your category/section of review (i.e. exempt, expedited, or full-board) contact us by email at: irb@cortland.edu.

section.

Issues relating to how the participants will volunteer for the study:

- The participant responds by signing-up or showing-up at the date/time/location where data collection will occur.
- The participant responds by providing the investigator with contact information to schedule an appointment at a later time.
- The participant is solicited by a third party (e.g., another professor, school principal, director or owner of a business or recreational facility) and the participant responds by contacting the investigator.
- Other (please explain):

The investigator will contact the coaches and other officials of various swim clubs in Germany. The officials will then distribute the link for the survey to their club members. The investigator will not know who participated, and the participation is completely voluntary and anonymous. The club officials will also not know who participated, and will not have access to the raw data, only the aggregate data, after analysis.

Issues regarding the use of inclusion/exclusion criteria:

Defining the appropriate group of participants for a research project involves a variety of factors - requirements of scientific design, susceptibility to risk, likelihood of benefit, practicability, and considerations of fairness. IRBs are required to make a specific determination that the selection of participants is equitable. Do you plan to use any inclusion or exclusion criteria to select participants for this study?

- Yes (If you marked "yes," state the criteria and justification in the box below. Type inclusion and/or exclusion criteria; provide a scientific justification for any inclusion/exclusion criteria used)
- No

Participants have to be members of a German swim club.

Note: Send copies of **ALL** recruitment materials (flyers, email, advertisements, parent information sheets, etc) as an email attachment to irb@cortland.edu.

Instructions to investigators: If you have any questions or any doubt about your category/section of review (i.e. exempt, expedited, or full-board) contact us by email at: irb@cortland.edu.

Informed Consent

(Please attach any/all Consent/Assent forms/statements you plan to use for IRB review as appendices to: irb@cortland.edu)

Are you requesting a waiver to document informed consent? This is when a researcher provides all of the elements of informed consent but does not collect signed consent forms. This IS typically requested for online surveys or in the case of otherwise anonymous research, where signed consent forms could increase the risk to participants (from breach of confidentiality).

Yes No

If you marked yes, provide a justification in the box below

We will not be in direct contact with the participants. Not having direct contact increases the anonymity of the study and is additionally the only option due to the current Covid-19 situation, since swim clubs in Germany have not re-opened yet. Consequently, since participants would have to print out the consent form, sign it and send me a scanned copy, collecting signed consent forms might decrease the participation rate. Instead, we propose including a first page on the survey that participants must read and click 'I have read the survey information and I agree to participate'. This first page of the survey is enclosed with the application.

Are you requesting a waiver to provide informed consent or withhold elements of informed consent? In this case, you are asking to omit administering some or all of the elements of informed consent (e.g., unobtrusive observation or studies that involve the use of deception). This is rarely granted by the IRB without significant justification, and extensive safeguards for participants.

Yes No

If you marked yes, provide a justification in the box below

Click or tap here to enter text.

Instructions to investigators: If you have any questions or any doubt about your category/section of review (i.e. exempt, expedited, or full-board) contact us by email at: irb@cortland.edu.

Incentives and Remuneration for Participation

Part A: Incentives and Remuneration

If you are using incentives or remunerations, explain what you will be giving, how much and when it will be given. If the research is required for course credit or for extra credit, explain how the incentive will be offered without undue influence (also complete Part B). If you plan to provide monetary awards of any kind (including cash, gifts, or gift certificates) please check with Research and Sponsored Programs, your funding agency, or the Business Office to make sure promises are not made to participants that cannot be kept. If you will not be using incentives or remuneration, simply enter “N/A” in the space below.

N/A

Research Involving Students as Participants – Alternate Assignments

Part B: Alternate Assignments

If participation is required for a course or if participation is offered as extra credit, the principle investigator assures that all professors involved with participant recruitment or data collection have agreed to provide an alternate assignment for their classes that meet the federal requirements:

Yes No

If you marked No, explain in the box below.

N/A

Participant Expenses (with or without reimbursement)

Part C: Expenses and Reimbursement

Yes, participants will incur expenses to participate (if yes, explain in the space below)

Instructions to investigators: If you have any questions or any doubt about your category/section of review (i.e. exempt, expedited, or full-board) contact us by email at: irb@cortland.edu.

No, participants will not incur expenses to participate

In the box below, outline any expenses the participant will incur because of their involvement with this study. If participants are being reimbursed for expenses (e.g., mileage to and from the research location, parking, child care, etc.) outline the expenses and state the amount of reimbursement.

N/A

Privacy and Confidentiality

Mark an “X” in the box next to each that applies to this study:

- Paper documents/records
- Audio recording, video recording, or photographs
- Recording of physiological data
- Biological specimens
- Internet-based survey (provide location of planned web site in the box below) Computer administered survey that is not online
- Other (if other was checked, provide information about your method of recording participant responses in the box below)

The online survey will be set up through Cortland’s survey portal ‘Select Survey’ and distributed via Email.

Instructions to investigators: If you have any questions or any doubt about your category/section of review (i.e. exempt, expedited, or full-board) contact us by email at: irb@cortland.edu.

Identifying Participant Response

If you intend on using surveys in your protocol, please refrain from using Google Forms or Google Docs. Use the campus supported Formstack or Select Survey to create your survey. If you have any questions on an alternative survey creator you plan to use, please contact [Joshua Peluso](#).

Mark an “X” next to the circumstance below that applies to your study (**mark one**):

Anonymous, no participant identifiers will be collected (not at any point during the research).

(Note that audio and video- recordings of participants cannot be considered anonymous)

Indirect link to participant identifiers: Identifiers will permit an indirect link to participants (i.e., a code will be assigned to the data and a key linking the code to the identity of the participant exists somewhere, either temporarily or permanently).

Indirect link to participant identifiers: Open-ended interview format or open-ended questions on a survey may unintentionally elicit identifying participant responses (questions may elicit the names of individuals, places, events, objects that could identify an individual or group); this could also occur when investigating the doctor/patient or client/therapist relationship, a context where personal information may be inadvertently or unintentionally recorded.

Direct link to participant identifiers: Participant identifiers will be maintained with the data (i.e., personal or private information about the participants are associated with the data, either temporarily or permanently). In box directly below, explain and justify direct link to participant identifiers, state how long they will be kept.

Other (explain in box below):

If identifiers are collected, temporarily or permanently, include information about where identifiers will be kept, how long identifying information will be kept and when identifying information will be destroyed. Below, explain how open-ended data will be purged of any unintentional identifying information revealed (names of people, places, events, etc).

N/A

Instructions to investigators: If you have any questions or any doubt about your category/section of review (i.e. exempt, expedited, or full-board) contact us by email at: irb@cortland.edu.

Storage of Data and Privacy After Research Participation is Complete

Will data be transported from a data collection site to the college or other location (in paper or electronic format)?

- Yes No

(If yes, in the box below, explain how the data will be transported in a way that protects the participants' privacy)

The survey answers will be collected through 'Select Survey' and will be kept on a password protected computer. The researchers will be the only ones who have access to this information. After the study has been completed, the data will be destroyed. The collected data will be kept on a password locked computer.

Data will be stored in which formats (Mark an "X" next to ALL that apply):

- In paper format
- In electronic format (on a desktop computer or on a campus server).
- On a portable device (e.g., laptop, portable hard drive)
- On the internet (off-campus server). Indicate the programs and servers used in the box below:

The computer will be password locked and the researchers will be the only ones who have access to the collected data.

- Other (explain in space below):

Click or tap here to enter text.

Consent forms will be stored in which formats (mark an "X" next to all that apply):

- In paper format
- In electronic format (on a desktop computer or on a campus server).
- On a portable device (e.g., laptop, portable hard drive)
- On the internet (off-campus server). Indicate the programs and servers used in the box below:

Click or tap here to enter text.

- Other (explain in space below):

Content forms will be sent out per Email, but will not be signed and collected by the researcher.

Instructions to investigators: If you have any questions or any doubt about your category/section of review (i.e. exempt, expedited, or full-board) contact us by email at: irb@cortland.edu.

Data and consent forms (if documented) will be retained in this (these) format(s) for (mark an “X” next to longest time that applies):

- Three years after study completion (minimum required by federal, state, and SUNY guidelines)
- Seven years after study completion (required for most federally funded research)
- Other (explain in the box below):

Click or tap here to enter text.

Where will the data and consent forms be permanently stored?

- On-campus, faculty-staff locked office/laboratory
- On-campus other location (specify in box below):

Click or tap here to enter text.

- Off-campus location (specify in box below):

Password-locked computer (Ann-Marie Muehlbauer)

Reporting of Research Results

Place an “X” in the boxes that apply:

Dissemination is at the group level (e.g., group means, standard deviations) so that individual responses (people, places, objects, and events, including participating K-12 schools or the college will) could not necessarily be identified

Dissemination includes reporting and/or describing individual responses that could identify the names of participants or their acquaintances, the location of data collection, etc. (justify this procedure and explain consent process below)

If the questions in this section did not completely describe your document handling/storage procedures, in the space below explain how the participants’ privacy, confidentiality, or anonymity will be protected. If you plan to disseminate responses in a way that would identify the place of data collection, individual students or groups of students, faculty, the community, etc. provide an explanation and justification in box below.

Some information that stands out might be separately mentioned. Participants’ privacy, confidentiality, and anonymity will be protected by not identifying the place of data collection, since the researcher will not know that either.

Instructions to investigators: If you have any questions or any doubt about your category/section of review (i.e. exempt, expedited, or full-board) contact us by email at: irb@cortland.edu.

Additional Information or Documents

The box below is reserved for any additional information you wish to provide.

I will provide the following documents in the appendix (attached to the Mail): (1) Appendix A; (2) Survey questions in English and German; (3) Informed consent form in English and German; (4) All Emails that will be sent to the participants, including the pre-survey Email, the survey Email and the reminder Email in English and German; and (5) my CITI certification.

You can email any additional documents you would like to provide to: irb@cortland.edu. (See note at the bottom of this form regarding required documents.)

Instructions to investigators: If you have any questions or any doubt about your category/section of review (i.e. exempt, expedited, or full-board) contact us by email at: irb@cortland.edu.

Protocol 192055

Informed Consent Form

As a graduate student in the State University of New York Cortland's Department of Professional Studies, I am conducting a research project to examine the carbon footprint of German swimmers. I will calculate the carbon footprint of German swim club members, examine how sport organizations induce consumers to engage in pro-environmental behavior, and analyze various factors associated with the carbon footprint. I will strive to enhance existing research on the carbon footprint of active sport participation and will furthermore provide swim clubs with data based on which they can develop sustainability initiatives within their organization. I would like you participate in an online survey to obtain your environmental attitudes and behavior. Your participation is expected to take about 30 minutes at most. The survey will be conducted online. Your responses will be kept confidential and anonymous. You are under no obligation to participate and you may discontinue your participation at any time. If you discontinue participation, your responses will not be utilized.

Your participation should cause no more discomfort than you would experience in your everyday life. Although participation may not benefit you directly, the information obtained from the study will help further the research on the carbon footprint of active sport participation as well as greatly help my graduate studies.

Participation in this survey indicates your willingness to take part in this study and that you are at least 18 years old, including parents answering on behalf of their underage children. Should you have any questions about this project or your participation in it, please do not hesitate to reach out to me (Annmarie.muehlbauer@cortland.edu). If you have any questions about your rights as a research participant, you may email institutional.reviewboard@cortland.edu.

Protocol 192055

Informed Consent Form

Als Studentin des Professional Studies Institutes der State University of New York in Cortland führe ich ein Forschungsprojekt durch, welches den CO₂-Fußabdruck deutscher Schwimmer untersucht. Ich werde den CO₂-Fußabdruck deutscher Schwimmvereinsmitglieder berechnen, untersuchen, wie Sportvereine Mitglieder zu umweltfreundlichem Verhalten verleiten, und verschiedene Faktoren analysieren, die mit dem CO₂-Fußabdruck verbunden sind. Die Ergebnisse dieser Studie werden helfen, die bestehende Forschung über den CO₂-Fußabdruck der aktiven Sportbeteiligung zu verbessern und darüber hinaus Schwimmclubs Daten zur Verfügung stellen, auf deren Grundlage sie Nachhaltigkeitsinitiativen innerhalb ihrer Organisation entwickeln können. Ich bitte Sie, an einer Online-Umfrage teilzunehmen, um Informationen über Ihre Umwelteinstellungen und Ihr Umweltverhalten zu erhalten. Ihre Teilnahme wird voraussichtlich höchstens 30 Minuten dauern. Die Umfrage wird online durchgeführt. Ihre Antworten werden vertraulich und anonym behandelt. Sie sind nicht zur Teilnahme verpflichtet und können Ihre Teilnahme jederzeit einstellen. Wenn Sie die Teilnahme abbrechen, werden Ihre Antworten nicht genutzt.

Ihre Teilnahme sollte nicht mehr Unbehagen verursachen, als Sie in Ihrem Alltag erleben würden. Auch wenn Die Teilnahme Ihnen vielleicht nicht direkt zugute kommt, werden die aus der Studie gewonnenen Informationen dazu beitragen, die Forschung über den CO₂-Fußabdruck der aktiven Sportbeteiligung zu unterstützen und außerdem meinem Studium und meiner Materarbeit sehr helfen.

Die Teilnahme an dieser Umfrage zeigt Ihre Bereitschaft, an dieser Studie teilzunehmen und setzt voraus, dass Sie mindestens 18 Jahre alt sind, einschließlich der Eltern, die im Namen ihrer minderjährigen Kinder antworten. Sollten Sie Fragen zu diesem Projekt oder Ihrer Teilnahme daran haben, zögern Sie bitte nicht, mich zu kontaktieren (Annmarie.muehlbauer@cortland.edu). Wenn Sie Fragen zu Ihren Rechten als Forschungsteilnehmer haben, können Sie das Institutional Review Board der State University of New York unter institutional.reviewboard@cortland.edu per E-Mail erreichen.

Protocol 192055

Hello,

My name is Ann-Marie Muehlbauer and I am a Masters student at the State University of New York in Cortland in the department of Professional Studies. I received your contact information from your club's website and trainers.

I am conducting my Master's thesis about the carbon footprint of German swimmers. I aim to calculate the carbon footprint of German swim club members, and analyze various factors associated with the carbon footprint (distance traveled to practices and meets, type of transport used, etc.). The findings of this study will inform swim clubs with data that will help them design and implement sustainability initiatives within their organization.

I am looking to send an online-survey to swim club members of various clubs. You will receive another email with the survey URL included in one week. This study has been approved by SUNY Cortland's Institutional Review Board.

Your participation is expected to take about 20 minutes. The survey is entirely online. Your responses will be kept confidential and anonymous.

Your participation in this study would greatly help my graduate studies as well as contribute to our understanding the carbon footprint of active sport participation. I truly hope that you are willing to participate in the study and I look forward to hearing from you. If you need any additional information about the thesis, please do not hesitate to reach out at my contact information below.

Sincerely,
Ann-Marie Muehlbauer

Email:
Annmarie.muehlbauer@cortland.edu

Protocol 192055

Hallo,

mein Name ist Ann-Marie Mühlbauer und ich bin Master-Studentin an der State University of New York in Cortland im Institut für Professional Studies. Ich habe Ihre Kontaktinformationen von der Website Ihres Vereins und dessen Trainern erhalten.

Ich führe die Studie meiner Masterarbeit über den CO₂-Fußabdruck deutscher Schwimmer durch. Ich werde den CO₂-Fußabdruck deutscher Schwimmvereinsmitglieder berechnen und verschiedene Faktoren analysieren, die mit dem CO₂-Fußabdruck der Athleten verbunden sind (Reisedistanzen zu Trainingseinheiten und Wettkämpfen, genutztes Transportmittel, etc.). Die Ergebnisse dieser Studie werden Schwimmclubs Daten zur Verfügung stellen, auf deren Grundlage sie Nachhaltigkeitsinitiativen innerhalb ihrer Organisation entwickeln und umsetzen können.

Ich werde eine Online-Umfrage an Schwimmvereinsmitglieder verschiedener Vereine senden. Sie erhalten eine weitere E-Mail mit der Umfrage-URL in einer Woche. Diese Studie wurde vom Institutional Review Board der SUNY Cortland genehmigt.

Ihre Teilnahme wird voraussichtlich 20 Minuten dauern. Die Umfrage wird ausschließlich online durchgeführt. Ihre Antworten werden vertraulich und anonym behandelt.

Ihre Teilnahme an dieser Studie würde meinem Studium sehr helfen und dazu beitragen, Forschung über den CO₂-Fußabdruck der aktiven Sportbeteiligung zu erweitern. Ich hoffe sehr, dass Sie bereit sind, an der Studie teilzunehmen, und ich freue mich darauf, von Ihnen zu hören. Wenn Sie weitere Informationen über die Abschlussarbeit benötigen, zögern Sie bitte nicht, mich zu kontaktieren.

Mit freundlichen Grüßen,

Ann-Marie Mühlbauer

Email:

Annmarie.muehlbauer@cortland.edu

Protocol 192055

Hello again,

My name is Ann-Marie Muehlbauer and I am a Masters student at the State University of New York in Cortland in the department of Professional Studies.

I already reached out to you a week ago regarding my Master's thesis. I would greatly appreciate your participation in my survey on the carbon footprint of German swimmers.

You can take the survey at the following link: [URL link online survey].

Your participation is expected to take about 20 minutes at most. The survey will be conducted online. Your responses will be kept confidential and anonymous.

Your participation in this study would greatly help my graduate studies as well as contribute to our understanding the carbon footprint of active sport participation. I truly hope that you are willing to participate in the study and I look forward to hearing from you. If you need any additional information about the thesis, please do not hesitate to reach out at my contact information below.

Sincerely,
Ann-Marie Muehlbauer

Email:
Annmarie.muehlbauer@cortland.edu

Protocol 192055

Hallo,

mein Name ist Ann-Marie Mühlbauer und ich bin Master-Studentin an der State University of New York in Cortland im Institut für Professional Studies.

Ich habe mich bereits vor einer Woche bezüglich meiner Masterarbeit per Mail an Sie gewandt. Ich würde mich sehr freuen, wenn Sie an meinem Fragebogen über den CO₂-Fußabdruck von deutschen Schwimmern teilnehmen würden.

Sie können den Untersuchungsfragebogen unter folgendem Link öffnen: [URL Fragebogen].

Ihre Teilnahme wird voraussichtlich höchstens 20 Minuten dauern. Die Umfrage wird online durchgeführt. Ihre Antworten werden vertraulich und anonym behandelt.

Ihre Teilnahme an dieser Studie würde meinem Studium sehr helfen und dazu beitragen, Forschung über den CO₂-Fußabdruck der aktiven Sportbeteiligung zu erweitern. Ich hoffe sehr, dass Sie bereit sind, an der Studie teilzunehmen, und ich freue mich darauf, von Ihnen zu hören. Wenn Sie weitere Informationen über die Abschlussarbeit benötigen, zögern Sie bitte nicht, mich zu kontaktieren.

Mit freundlichen Grüßen,

Ann-Marie Mühlbauer

Email:

Annmarie.muehlbauer@cortland.edu

Protocol 192055

Hello,

This email is a reminder to participate in the online survey about the determinants of the carbon footprint of German swimmers.

If you have not had the chance to participate in the survey yet, I would greatly appreciate your participation under the following link: [URL link online survey].

Your participation should take no more than 20 minutes at most. The survey will be conducted online. Your responses will be kept confidential and anonymous.

Your participation in this study would greatly help my graduate studies as well as contribute to our understanding the carbon footprint of active sport participation. I truly hope that you are willing to participate in the study and I look forward to hearing from you. If you need any additional information about the thesis, please do not hesitate to reach out at my contact information below.

Sincerely,
Ann-Marie Muehlbauer

Email:
Annmarie.muehlbauer@cortland.edu

Protocol 192055

Hallo,

Diese E-Mail ist eine Erinnerung an die Teilnahme an der Online-Umfrage über die Determinanten des CO₂-Fußabdrucks deutscher Schwimmer durchführe.

Wenn Sie noch keine Möglichkeit hatten, an der Umfrage teilzunehmen, würde ich mich sehr über Ihre Teilnahme unter dem folgenden Link freuen: [URL Link Online-Umfrage].

Ihre Teilnahme sollte nicht mehr als 20 Minuten dauern. Die Umfrage wird online durchgeführt. Ihre Antworten werden vertraulich und anonym behandelt.

Ihre Teilnahme an dieser Studie würde meinem Studium sehr helfen und dazu beitragen, Forschung über den CO₂-Fußabdruck der aktiven Sportbeteiligung zu erweitern. Ich hoffe sehr, dass Sie bereit sind, an der Studie teilzunehmen, und ich freue mich darauf, von Ihnen zu hören. Wenn Sie weitere Informationen über die Abschlussarbeit benötigen, zögern Sie bitte nicht, mich zu kontaktieren.

Mit freundlichen Grüßen,

Ann-Marie Mühlbauer

Email:

Annmarie.muehlbauer@cortland.edu

Fragebogen [Survey Questions]

Teil 1 – Informationen über den Schwimmverein [Part 1 – Information about the swim club]

1. Sind Sie Mitglied in einem Schwimmverein ? Ja/Nein

Are you a member of a swim club? Yes/No

2. Verhält sich Ihr Schwimmverein aktiv umweltbewusst? Ja/Nein

Is your swim club actively engaging in pro-environmental behavior? Yes/No

2a. Wenn ja: Nennen Sie eine umweltbewusste Initiative Ihres Schwimmvereins in 2019.
(Follow-up question – if yes) Name one pro-environmental initiative of your swim club in 2019.

Skala von 1 (= trifft überhaupt nicht zu) bis 5 (= trifft voll und ganz zu)

Scale from 1 (= strongly disagree) to 5 (= strongly agree)

3. Ich denke, andere Leute in meinem Schwimmverein erwarten von mir, dass ich umweltfreundlich handle.

I think other people in my swim club expect me to act in an environmentally-friendly manner.

4. Mein Schwimmverein unterstützt umweltfreundliches Verhalten der Athleten.

My swim club supports the pro-environmental behavior of the athletes.

5. Viele Athleten in meinem Verein engagieren sich für umweltschonendes Verhalten.

Many athletes in my club are engaging in pro-environmental behavior.

6. Sich umweltfreundlich zu verhalten ist in meinem Schwimmclub problemlos möglich.

To act in an environmentally-friendly manner is possible in my swim club without any difficulty.

Teil 2 – Identifikation mit dem Verein [Part 2 – Identification with the club]

Skala von 1 (= trifft überhaupt nicht zu) bis 5 (= trifft voll und ganz zu)

Scale from 1 (= strongly disagree) to 5 (= strongly agree)

7. Ich identifiziere mich sehr mit meinem Schwimmverein.

I strongly identify myself with my swim club.

8. Wenn jemand meinen Schwimmverein lobt, fühlt sich das wie ein persönliches Kompliment an.

When someone praises my swim club, it feels like a personal compliment.

9. Wenn jemand meinen Schwimmverein kritisiert, fühlt sich das wie eine persönliche Beleidigung an.

When someone criticizes my swim club, it feels like a personal insult.

10. Die Erfolge meines Vereins sind auch meine Erfolge.

My swim club's successes are my successes.

11. Wenn ich von meinem Verein rede, sage ich meistens 'wir' statt 'sie'.

If I talk about my swim club, I rather say 'we' instead of 'they'.

Teil 3 – Individuelle Einstellungen [Part 3 – Individual's attitudes]

Skala von 1 (= trifft überhaupt nicht zu) bis 5 (= trifft voll und ganz zu)

Scale from 1 (= strongly disagree) to 5 (= strongly agree)

12. Es beruhigt mich, wenn ich daran denke, unter welchen Umweltverhältnissen unsere Kinder und Enkelkinder wahrscheinlich leben müssen.

My mind is at ease when I think about the environmental conditions that future generations will have to live in.

13. Wenn ich Zeitungsberichte über die Umweltprobleme lese oder entsprechende Fernsehsendungen sehe, bin ich oft empört und wütend.

When I read newspaper articles or watch TV shows about environmental concerns and problems I often get mad and outraged.

14. Wenn wir so weitermachen wie bisher, steuern wir auf eine Umweltkatastrophe zu.

If we continue to environmentally behave like we did, we will most likely face an environmental crisis soon.

15. Es gibt Grenzen des Wachstums, die unsere industrialisierte Welt schon überschritten hat oder sehr bald erreichen wird.

There are boundaries of industrial growth that our world is about to reach or already passed.

16. Nach meiner Einschätzung wird das Umweltproblem in seiner Bedeutung von vielen Umweltschützern stark übertrieben.

I think that environmental problems are often exaggerated by environmental activists.

17. Zugunsten der Umwelt sollten wir alle bereit sein, unseren Lebensstandard einzuschränken.

We should all be willing to restrict our standard of living to do something good for our environment.

18. Forscher und neue Technologien werden unsere Umweltprobleme lösen, ohne dass wir unser Verhalten ändern müssen.

Researchers and new technology will solve our environmental issues without the need for us changing our behavior.

19. Ich möchte mich bei jeder sich bietenden Gelegenheit, die sich im nächsten Jahr ergeben wird, umweltfreundlich engagieren.

I would like to engage environmentally at every opportunity that will arise during the next year.

Protocol 192055

Teil 4 – Individuelles Verhalten [Part 4 – Individual's practices]

Skala von 1 (= nie) bis 5 (= immer)

Scale from 1 (=never) to 5 (= always)

20. Ich recycle Kunststoffsprodukte zu Hause.

I recycle plastic products at home.

21. Ich kaufe bewusst Recyclingpapier und/oder recycelte Kunststoffsprodukte.

I consciously buy recycled paper and/or recycled plastic products.

22. Ich sammle und recycle Altpapier.

I collect and recycle used paper.

23. Ich entsorge Plastik- und Papierabfälle getrennt.

I dispose of plastic and paper waste separately.

24. Ich benutze nachfüllbare Wasserflaschen.

I use refillable water bottles.

25. Ich Sorge immer dafür, dass die Lichter ausgeschaltet sind, wenn ich die letzte Person bin, die die Einrichtung verlässt.

I always make sure that the lights are turned off when I am the last person leaving the facility.

26. Ich schalte das Wasser in der Dusche aus während ich mich einshampooniere.

I turn the water off in the shower when I put shampoo in my hair.

27. Ich benutze umweltfreundliche Verkehrsmittel, um zu Trainingseinheiten und Wettkämpfen zu gelangen (z.B. Fahrrad oder öffentliche Verkehrsmittel).

I use environmental-friendly transportation to get to practices and meets (e.g. bike or public transportation).

28. Ich nutze Fahrgemeinschaften zu Trainingseinheiten oder Wettkämpfen.

I carpool to practices and/or to meets.

Skala von 1 (= trifft überhaupt nicht zu) bis 5 (= trifft voll und ganz zu)

Scale from 1 (= strongly disagree) to 5 (= strongly agree)

29. Meine Lieblingssportler verhalten sich umweltfreundlich.

My favorite athletes act environmentally-friendly.

30. Wenn ich sehe, wie mein Lieblingssportler umweltfreundlich agiert, motiviert es mich, seinem/ihrer Beispiel zu folgen.

If I see my favorite athlete acting environmental-friendly, it motivates me to follow his/her lead.

Teil 5 – Transport- und Reiseverhalten zu Trainingseinheiten [Part 5 - Sport-related travel to practices]

Die folgenden Fragen beziehen sich auf Ihr reguläres, wöchentliches Training. Alle Fragen beziehen sich auf Ihre Trainingseinheiten im Jahr 2019 während einer durchschnittlichen Trainingswoche.

The following questions are about your weekly practices on a regular basis. All questions refer to your practices in 2019 and an average practice week.

31. Wie viele Trainingseinheiten haben Sie im Jahr 2019 durchschnittlich pro Woche trainiert?

How many times per week did you practice swimming on average in 2019?

32. Zu wie vielen Trainingseinheiten sind Sie im Jahr 2019 durchschnittlich pro Woche gelaufen oder mit dem Fahrrad gefahren?

How many swim practices per week in 2019 did you walk or bike to?

33. Zu wie vielen Trainingseinheiten sind Sie im Jahr 2019 durchschnittlich pro Woche mit dem Auto gefahren?

To how many swim practices per week in 2019 did you take a car?

34. Beantworten Sie diesen Fragebogen für Ihr minderjähriges Kind? Ja/Nein

Are you answering this survey on behalf of your underage child?

34a. Wenn ja, haben Sie Ihr Kind zu den meisten Trainingseinheiten mit dem Auto gefahren und anschließend wieder abgeholt?

(Follow-up question) If yes, did you drive your child to most of his/her practices and then pick him/her up again afterwards?

35. Zu wie vielen Trainingseinheiten haben Sie im Jahr 2019 durchschnittlich pro Woche einen Bus genommen?

To how many swim practices per week in 2019 did you take an urban bus?

36. Zu wie vielen Trainingseinheiten sind Sie im Jahr 2019 durchschnittlich pro Woche mit der Straßenbahn gefahren?

To how many swim practices per week in 2019 did you take a short-distance railway?

37. Zu wie vielen Trainingseinheiten sind Sie im Jahr 2019 durchschnittlich pro Woche mit der Deutschen Bahn gefahren?

To how many swim practices per week in 2019 did you take a tram, underground or metro?

38. Wie weit ist Ihr primärer Trainingsort (das Schwimmbad, in dem Sie meistens trainieren) von Ihrem zu Hause entfernt?

How far away is your primary training facility (the pool you swim at most frequently) from your house?

Teil 6 – Transport- und Reiseverhalten zu Wettkämpfen [Part 6 – Sport-related travel to meets]

39. Haben Sie im Jahr 2019 an Schwimmwettkämpfen teilgenommen? Ja/Nein

Did you participate at swim competitions in 2019? Yes/No

39a. Wenn Ja, an wie vielen Schwimmwettkämpfen haben Sie in 2019 teilgenommen? ____

(Follow-up question – If yes) If yes, at how many swim meets did you compete in 2019? ____

39b. Bitte geben Sie in Folgendem Vornat an, mit welchen Transportmitteln Sie zu den Schwimmwettkämpfen gefahren sind und wo diese waren: (PLZ oder Name), genutztes Verkehrsmittel.*

*Bitte wählen Sie aus den folgenden Transportmitteln: Auto, Bus, Straßenbahn, Überlandbus, Bahn, Flugzeug

*(Follow-up question – If yes) Please provide information about which means of transportation you used to get to your meets and where they were in the following format: Place (Postal Code or name), means of transportation.**

**Please select from the following means of transportation: Car, Bus, Short-Distance Railway, Overland Bus, Long-Distance Railway, Plane*

Teil 7 – Transport- und Reiseverhalten zu Trainingslagern [Part 7 – Sport-related travel to training camps]

41. Haben Sie in 2019 an einem Trainingslager teilgenommen? Ja/Nein

Did you attend a training trip in 2019? Yes/No

41a. Wenn ja, an wie vielen Trainingslagern haben Sie 2019 teilgenommen?

(Follow-up question – If yes) If yes, how many training trips did you do in 2019? ____

41b. Bitte geben Sie in Folgendem Vornat an, mit welchen Transportmitteln Sie zu den Trainingslager(n) gefahren sind und wo diese waren: (PLZ oder Name), genutztes Verkehrsmittel.*

*Bitte wählen Sie aus den folgenden Transportmitteln: Auto, Bus, Straßenbahn, Überlandbus, Bahn, Flugzeug

*(Follow-up question – If yes) Please provide information about which means of transportation you used to get to your training trips and where they were in the following format: Place (Postal Code or name), means of transportation.**

**Please select from the following means of transportation: Car, Bus, Short-Distance Railway, Overland Bus, Long-Distance Railway, Plane*

Teil 8 – Persönliche Fragen [Part 8 – Demographics]

42. Welches Geschlecht sind Sie?

männlich weiblich möchte ich nicht angeben

What gender are you?

male female prefer not to say

43. Wie alt sind Sie, bzw. Ihr Kind, für welches Sie diesen Fragebogen ausfüllen?

How old are you, or if you are taking this survey on behalf of an underage child swimmer, how old is the child? ____

44. Wie lautet die Postleitzahl Ihres Hauptwohnsitzes? _____

What is the area code of the place you mainly reside in? _____

45. Was ist Ihr derzeit höchster Schulabschluss?

What is your highest completed educational level?

Kein Abschluss/ noch Schüler. *I do not have an educational degree/ am still going to high school.*

Haupt- oder Realschulabschluss. *Less than 8 years of high school.*

Abitur. *8 years of high school.*

Bachelor-Abschluss. *Bachelor's Degree.*

Master-Abschluss. *Master's Degree.*

Doktorarbeit. *Terminal Degree (PhD, medical degree, law degree).*

46. Dürfen wir Sie abschließend noch nach Ihrem persönlichen Nettoeinkommen pro Monat fragen?

What is your personal net income per month?

0-500 €

501-1,000 €

1,001-1,500 €

1,501-2,000 €

2,001-2,500 €

2,501-3,000 €

3,001-3,500 €

3,501-4,000 €

< 4,001 €

Protocol #

The IRB will begin reviewing your online application when this form has been received.

**STATE UNIVERSITY OF NEW YORK COLLEGE AT CORTLAND
INVESTIGATOR ASSURANCE**

SUBMIT THIS FORM:

By US Mail and intercampus mail: IRB Office, Miller 206, P.O. Box 2000, Cortland, NY 13045

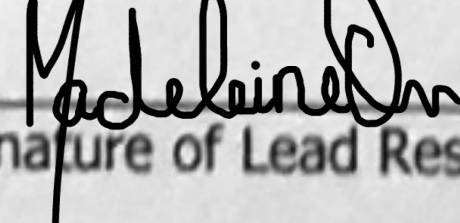
This form and all signature-bearing documents can be submitted by fax, *directly from the originating investigator or agency* at 607.753.5995. Please send hard copy to the IRB Office at address listed above.

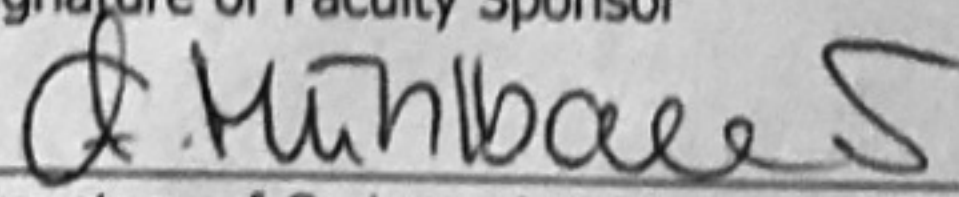
Study Title: Determinants of the Carbon Footprint of German Swimmers

The proposed research involves the use of human research participants. This form and the required information are submitted to the Institutional Review Board (IRB) for the Protection of Human Research Participants for review and approval. **If the IRB approves this application and if the project is undertaken, all investigators agree:**

1. The information provided in this application is accurate and complete;
2. All named individuals on this project have read and understand the procedures outlined in the protocol;
3. All named individuals on this project, paid assistants, and all graduate students working on this project have completed the CITI Course for the Protection of Human Subjects. All undergraduates working on this project have been made aware of the "Common Rule" (45 CFR Part 46) and have read the Belmont Report. The lead investigator assures that all individuals working on this project understand the principles of the aforementioned documents as well as SUNY Cortland's policies and procedures;
4. All recruitment, experiments, and procedures involving human subjects will be performed under the lead investigator's supervision or that of another qualified professional listed on this protocol;
5. I will submit to the IRB all modifications and/or changes to this project and I will promptly provide to the IRB any information requested;
6. All research personnel agree to comply with all applicable requirements for the protection of human subjects in research including, but not limited to, the following:
 - a. Providing legally effective informed consent to all human subjects or their legally authorized representatives; assent will be provided to minors;
 - b. Documenting the legally effective informed consent/asset (unless documentation of consent is waived by the IRB);
 - c. Immediately reporting any internal and external adverse events, unanticipated problems, and/or protocol violations;
 - d. Responding appropriately to participants' complaints or requests for information about the study; and reporting to the IRB at the time of continuing review any participant complaints, resolved or unresolved;
7. Assuring the appropriate administration and/or documentation of federally mandated forms other than informed consent (e.g., HIPPA, MSDS);
8. Refraining from any advertisement, recruitment, or data collection until all requests for information or documents are satisfied and IRB approval has been obtained;
9. Promptly and completely complying with an IRB decision to suspend data collection or withdraw its approval for the project;
10. Obtaining continuing review prior to the date approval for this study expires (I understand if I fail to apply for continuing review, approval for the study will automatically expire, and study activity must cease until IRB current approval is obtained).

The lead investigator, faculty sponsor, and/or all co-investigators affiliated with the project must sign this form. Use additional copies, when needed.

Professor Madeleine Orr		05/18/2020
Typed Name of Lead Researcher	Signature of Lead Researcher	Date

Ann-Marie Muehlbauer		05/17/2020
Typed Name of Co-investigator	Signature of Co-investigator	Date

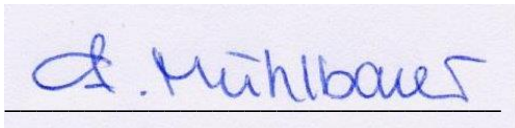
Typed Name of Co-investigator	Signature of Co-investigator	Date

Typed Name of Co-investigator	Signature of Co-investigator	Date

Typed Name of Principal Investigator's Department Chair or Immediate Supervisor	Signature of Department Chair or Immediate Supervisor - Required -	Date

Affirmation in lieu of an oath

Herewith I affirm in lieu of an oath that I have authored this Master's thesis independently and did not use any other sources and tools than indicated. All citations, either direct quotations or passages, which were reproduced verbatim or nearby-verbatim from publications, are indicated and the respective references are named. The same is true for tables and figures. I did not submit this piece of work in the same or similar way or in extractions in another assignment.



Ann-Marie Muehlbauer