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Missed Opportunities for Critical Consciousness in Canadian High School Coaching: An Exploratory Case Study

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High school sport coaches are important non-parental sources of influence who can help adolescent athletes develop in and beyond sport. In light of recent social movements that have led citizens to organize in the name of social change, there is a need to examine how coaches can leverage high school sport to foster athlete development in manners that address social inequity and promote social justice. In the present exploratory case study, one coach's attitudes on social justice in Canadian high school sport are explored. Two semi-structured interviews were conducted with the coach participant and subjected to a reflexive thematic analysis. Findings highlight how the coach was in the process of further developing critical consciousness surrounding his coaching yet relied mainly on a reactive approach when addressing social justice issues, resulting in missed opportunities for displaying and/or developing critical consciousness. Using a critical positive youth development framework (CPYD; Gonzalez et al., 2020), practical considerations and reflections are offered in terms of how youth sport coaches can be better trained to proactively address social justice issues through sport. Future directions for research in the Canadian high school sport context related to social justice are also discussed.

Keywords: critical positive youth development, youth sport, coach education, privilege

Sport occupies an important role in Canadian high schools, as participation allows over 750,000 adolescents from across the country to develop not only from a physical standpoint but also acquire a wide range of psychosocial skills that can promote positive youth development (PYD; Camiré & Kendellen, 2016; Gould & Carson, 2008; School Sport Canada, 2021). The PYD framework (Lerner et al., 2005), a strengths-based approach in which adolescents are viewed as individuals with potential rather than as problems to be fixed, has been a popular approach in the 21st century to study the psychosocial development of adolescents through sport (Holt, 2016). Past research has shown how adolescent high school sport participants can experience more PYD outcomes when their coaches are competent and caring, and when coach-created learning environments are structured appropriately (see Camiré, 2014 for a review). In light of recent social movements (e.g., Black Lives Matter, #MeToo) that have spurred collective social awareness and change (Greene et al., 2019), it has become increasingly warranted to examine how coaches can leverage high school sport as a platform for addressing social justice issues. Despite the positive influence coaches can have on adolescents through sport participation, scholars have cautioned that many coaches fail to take advantage of opportunities to address social justice issues with their athletes (Newman et al., 2021). Moving forward, research that allows for the examination of the interplay between coaching, adolescent development, and social justice is needed. Accordingly, through the present study, we utilize the Gonzalez et al. (2020) critical positive youth development (CPYD) framework to explore one coach's attitudes toward social justice. The study represents an important step in determining future directions for expanding research in the areas of social justice and coaching within the Canadian high school sport context.

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Social Justice and Sport

Social justice is a complex and multifaceted construct to which it is difficult to attach a single comprehensive definition (Walton-Fisette & Sutherland, 2018). Bell (2007) explained that social justice is both a process and a goal, and Newman et al. (2019) stated that social justice includes, but is not limited to, "raising awareness about oppression and diversity, striving for equal opportunities for all people by ensuring access to resources, services, and information, and opening spaces so all groups can participate in decision making at different levels of citizenship" (p. 167). Through several recently published position statements (e.g., Bredemeier & Shields, 2019; Darnell & Millington, 2019; Love et al., 2019; Schinke et al., 2019), scholars have argued the need for more attention and resources to be given to the role of social justice in sport, and, more specifically, youth sport coaching (e.g., Camiré et al., 2021). An increased awareness, leading to skills and knowledge to effect positive social justice activism and advocacy in high school sport is needed, as adolescents stand to benefit developmentally from coaches who are proactive in implementing social justice initiatives (e.g., supporting a boycott of an oppressive organization), given that coach support has been shown to be central in shaping adolescents' attitudes and behaviors surrounding activism (Fuller & Agyemang, 2018).

Athlete activism has been well-studied, though much of the extant literature has focused on Olympic, professional, and more recently, collegiate athletes (Fuller & Agyemang, 2018). Kaufman and Wolff (2010) suggested that sport is an ideal vehicle for studying social justice activism due to several characteristics often attached to sport such as responsible citizenship, social consciousness, meritocracy, and interdependence. A typology of African American athlete activism in professional sport differentiated between symbolic activism, scholarly activism, grassroots activism, sport-based activism, and economic activism, showing the many ways athletes can contribute to positive social justice activism (Cooper et al., 2019). Within collegiate sports, research has shown American student-athletes define an athlete-activist as someone who uses their social power and privilege to affect everyday change through positive social justice action, mentorship, authenticity, intervention, and public acts of resistance (Kluch, 2020). An emerging line of research has explored collegiate student-athletes' perceptions of social justice in relation to behavior change and activism. Findings showed how participants' attitudes, perceived behavioral control, and subjective norms were significant predictors of their intention and willingness to engage in social justice activism (Mac Intosh et al., 2020). More recently, this line of research was extended through an exploration of collegiate athletes' perceptions of social justice causes and social support. Findings showed how compared to non-activists, activist athletes perceived a higher degree of approval for engaging in social justice activism from various social agents, including friends, teammates, and parents (Martin et al., 2022). Taken together, the research on athlete activism suggests that sport can be utilized as a vehicle for promoting positive social change, specifically through student-athlete activism efforts that are supported by culturally-competent and caring coaches. However, this type of support is not always present.

Despite having been identified as an important setting for promoting social justice (e.g., Cunningham et al., 2019; Kaufman & Wolff, 2010), it is important to acknowledge that in many cases, sport remains a context where the status quo is maintained through the discursive practices of administrators and coaches who resist social change (Spaaij et al., 2020). For instance, in 2017, four football players at a high school in Mississippi kneeled during a game to protest violence and systemic racism against Black Americans. These students were subsequently suspended indefinitely from school, with the suspension being supported by coaches, administrators, and district officials who claimed the students had disrespected their country by kneeling in protest (Eppes, 2017). This is merely one example of many illustrating how sport can serve as a site of resistance, whereby athletes' efforts to engage in activism are thwarted and punished by those in positions of power (i.e., coaches and administrators). Regarding youth sport coaches' perception of various social justice issues, Newman et al. (2021) surveyed American youth sport coaches (80% male, 88% White) and found that few deemed topics of mental health (6.5%), race/diversity (1.9%), disabilities (1%), and 2SLGBTQIA+ (0%) as key priorities that impact youth sport. Such findings demonstrate how the dominant perspectives in sport (e.g., White, cisgender, heterosexual, able-bodied, men) continue to contribute to normative coaching practices known to marginalize certain groups of adolescents (e.g., racially minoritized groups, 2SLGBTQIA+ community), making them feel unsafe or even unwilling to participate in sport (Kulick et al., 2019). In consideration of the important role of coaches, as well as sport's often-untapped potential for fostering adolescent development, the present study focuses on critically exploring the attitudes of one Canadian high school coach as it relates to social justice.

The Critical Positive Youth Development Framework

Although the PYD framework has been a popular and widely utilized approach to studying the psychosocial development of adolescents through sport (Holt, 2016), it has recently been critiqued by several researchers. Gonzalez et al. (2020) discussed how the PYD framework fails to address how social injustices, marginalization, and discrimination continue to affect the experiences and development of youth and adolescents. Coakley (2016) argued that the way the PYD framework is currently situated in sport-based programs aligns with a neoliberal ideology, whereby the psychosocial skills coaches teach their athletes through sport are heavily influenced by the values of Western, capitalistic society (e.g., emphasize individual growth and success). Similarly, Ronkainen et al. (2021) critiqued the narrow view of the PYD approach to sport, driven by a focus on coaches who teach psychosocial skills geared towards economic productivity (e.g., developing a strong work ethic) at the expense of considering non-instrumental forms of experiential learning. Kochanek and Erickson (2020, 2021) highlighted the dominant influence of Eurocentrism in adolescent sport research and situated the PYD framework as functionalist due to "views [that] uphold prevailing structures/norms and interpersonal dynamics that can (dis)advantage individuals based on minoritized social identity categories" (Kochanek & Erickson, 2021, p. 2). Therefore, there are growing concerns in terms of how coaches who implement PYD-based sport programming may not "provide youth with the knowledge and skills necessary to competently challenge systemic oppression so that they may contribute to the well-being of all people in their communities" (Gonzalez et al., 2020, p. 27). These are crucial considerations for educators and coaches operating at the high school level given the complex plethora of challenges faced by adolescents today at school, in sport, and in wider society.

In attempts to address the critiques, Gonzalez et al. (2020) created the CPYD framework, which integrates the Freirean (1973, 2000) concept of critical consciousness into the traditional strengths-based PYD framework as a means of addressing social justice in youth settings, including sport. The CPYD framework builds on Lerner et al.'s (2005) Five Cs of PYD model (i.e., competence, confidence, connection, caring, and character). In the Lerner et al. (2005) model, when competence, confidence, connection, caring, and character are properly fostered in developmental settings, youth and adolescents are said to develop a sixth C: contribution. For the most part, contribution within the Lerner et al. (2005) model relates to being a productive, contributing member of society. However, this conceptualization fails to address societal systemic inequities, which shape youth and adolescent development. Within the CPYD framework, scholars suggest the addition of a seventh C, *critical consciousness*. Critical consciousness was initially conceptualized by Brazilian educator and activist Paulo Freire (1973, 2000), in which reflection and action work together in a cyclical and iterative manner to effect positive social change. Per Gonzalez et al. (2020), critical consciousness consists of three interconnected components: *critical reflection, political efficacy,* and *critical action*. Critical reflection refers to acknowledging and understanding the ways in which oppressive systems of social power impact individuals and groups, political efficacy refers to an individual's belief in their ability to act to bring about positive social change, and critical action refers to activism and advocacy-related efforts related to social oppression and marginalization (Gonzalez et al., 2020). When these three components come together, a person is said to exhibit critical consciousness by engaging in an iterative process whereby they not only recognize social injustices, but they also feel competent in their ability to act and affect positive social change. This action in turn reinforces and strengthens the individual's critical reflections about social justice and increases their belief in their ability to affect further positive change. The addition of critical consciousness as a seventh C in the model merges PYD with critical theory, creating a framework that can be used in youth settings, including sport, to directly address social justice issues.

Critical Consciousness in Sport

Although the CPYD framework (Gonzalez et al., 2020) has yet to be used in empirical research in sport (i.e., at the time of writing the current paper), several studies have explored the use of critical pedagogies, including critical consciousness, in youth sport coaching contexts. Spaaij et al. (2016) explored the integration of critical pedagogies for coaches into various sport for development and peace programs in Kenya and Cameroon. Findings pointed to the complex nature of designing and implementing critical pedagogies in sport for development contexts but also reinforced the role of the coach as being central in the delivery of these curricula (Spaaij et al., 2016). Similarly, Wright et al. (2016) explored the experiences of Belizean youth sport coaches after they received training in the United States centered on critical consciousness and the teaching of physical and social responsibility (TPSR) through

sport model. Results suggested that coach participants attempted to reflect critically and felt empowered during their training, which appeared to lead to transformative learning to varying degrees amongst participants (Wright et al., 2016). Related to critical consciousness, Kochanek and Erickson (2019) interviewed 12 high school head coaches from the United States on their critical praxis (i.e., the combination of awareness and action related to oppression and social injustice), finding that critical praxis may exist on a continuum and that "the extent to which coaches demonstrated a truly critical praxis that challenged the dominant coaching discourse varied not only by coach (given their positionality), but by content (issue) and context (sport)" (Kochanek & Erickson, 2019, p. 8). As a result, if coaches make even minor changes towards developing a more robust critical praxis, it may help them create more inclusive and welcoming spaces for youth athletes, where all participants can experience positive developmental outcomes (Kochanek & Erickson, 2019). Meir (2020) conducted a qualitative systematic review of critical pedagogy in physical education and sport for development, with findings suggesting that social transformation outcomes are more likely to take place when shifts in curriculum and professional development occur within broader organizational cultures of social justice. Taken together, these findings point to the need for coaches to adopt critical pedagogies across various youth sport programs (e.g., high school sport, sport for development), while being supported by coach professional development opportunities.

The Present Study

The CPYD framework is used in the present study to explore one coach participant's attitudes on social justice through an examination of his critical consciousness to better understand how high school coaches can best support their athletes' development through sport. The research question that guided the study was: how does a coach's attitudes on/understanding of social justice inform their critical consciousness? Findings from this research can provide suggestions for future directions related to social justice research and critical consciousness interventions in coaching within the Canadian high school sport context.

Method

A single exploratory case study approach (Mills et al., 2012) was used to explore one coach's attitudes on social justice issues in Canadian high school sport through a critical consciousness lens. Although research does exist on critical consciousness and social justice efforts in youth sport, studies have yet to explore critical consciousness in coaching within Canadian high school sport. The justification for selecting a single exploratory case study approach lies in the research team's desire to generate topics of discussion and potential directions for future research in this specific context.

The study was guided by a relativist ontology, in which reality is considered subjective (Smith & Sparkes, 2016), and a constructivist epistemology, in which individuals construct meaning through interactions with the world around them (Creswell, 2013). From a relativist and constructivist lens, the research team co-interpreted the coach participant's attitudes on social justice in high school sport in an effort to construct shared meaning. One reason for utilizing this epistemological and ontological perspective was to attempt to understand some of the reasons why the participant may or may not have been supportive or engaged with social justice activism at his school. Through the use of the CPYD framework, a critical methodological approach was adopted, as the researchers focused on analyzing the coach's attitudes on matters of social justice through the concepts of critical reflection, political efficacy, and critical action.

Participant and Procedure

The participant recruited for the present study coached in the Canadian high school sport system and resided in a large city in the province of Québec. High school sport is defined as extracurricular sport where adolescents represent their schools and are part of teams that compete in leagues and championships. In this sense, high school sport is distinguished from physical education classes and intramural sports offered in high schools because of its competitive and interscholastic nature (Camiré et al., 2019). In Québec, adolescents spend five years in high school (i.e., *secondaire* 1-5) between the ages of 12-17 years.

A coach who identified as a white man was recruited to be interviewed for this study. As per recommendations from Gearity et al. (2019), although it is of the highest importance to explore the perspectives of marginalized and oppressed individuals, there is also merit in exploring the perspectives of those in privileged positions (i.e., white, cisgender, heterosexual, able-bodied, men) for understanding their perceived responsibility in promoting social justice. Accordingly, purposive sampling was used to recruit Stephen (pseudonym), a high school physical education teacher and coach with 16 years of experience working at the high school level. Stephen was born and raised in the province of Québec and self-identified as an English-speaking, white, heterosexual man. He was

41-years-old at the time of the study. Although Stephen was not actively coaching at the time of data collection due to COVID-19 pandemic restrictions that forced the cancellation of high school sports in 2020-2021, he had actively coached up until the 2019-2020 school year. Over the course of his career, Stephen has acted as a head and assistant coach for a variety of boys' and girls' teams in the sports of soccer, basketball, and badminton.

Data Collection and Analysis

Ethics approval was obtained from the authors' university research ethics board before conducting the study. The first author obtained informed verbal consent from Stephen (which he opted for over written consent) before conducting and recording the two interviews over Zoom. To build rapport with the participant, the interviewer (first author) spent a few minutes making casual conversation before beginning the interview, discussing shared experiences relating to high school sport and physical education. The first interview (February 2021) included questions related to demographics, conceptions of social justice, comfort in addressing social justice issues, and perceived challenges and recommendations for addressing social justice issues in the Canadian high school sport context. Upon completion of the first interview, which lasted 33 minutes, the authors met to discuss the interview transcript, focusing their attention on what Stephen said and did not say during the interview. From the discussion, the authors identified several topics that required further elaboration from Stephen surrounding social justice issues. A second interview guide was then created, enabling Stephen to elaborate on his previous responses. The second interview (May 2021) lasted 42 minutes.

A reflexive thematic analysis (RTA; Braun & Clarke, 2019) was conducted and led by the first author. The RTA process (Braun & Clarke, 2021) began with the first author transcribing the interviews verbatim, reading the transcripts attentively, and then rereading the transcripts while listening to the recordings. After familiarizing himself with the data, the first author began to code inductively through semantic codes (i.e., low inference interpretations of the participant's answers grounded in the research team's theoretical and paradigmatic assumptions; Braun & Clarke, 2021). Then, the first author analyzed the data deductively through latent codes based on the Gonzalez et al. (2020) CPYD framework and Freire's (1973, 2000) concept of critical consciousness. Coding occurred by making notes in the margins of the transcripts, followed by the creation of a preliminary concept map. Following the initial code development, the first author began to group codes into themes, informed by the CPYD framework. At this point, the three authors worked together to refine, define, and name the themes, in addition to refining the concept map. Here, the second and third authors acted as critical friends (Smith & McGannon, 2018), providing critical feedback, reflections, and insights to the first author's coding and interpretation of the data (e.g., posing reflective questions to help determine if the themes aligned with the concepts of the CPYD framework). The authors then selected quotes from Stephen that best represented the different themes and sub-themes, which were then embedded within a textured analytic narrative (i.e., surrounding the participant's quotes with rich, layered interpretations). The first author led the writing of the results section, and multiple drafts were reviewed by the co-authors. As the RTA process is iterative, the analysis was an ongoing process that continued throughout the writing and re-writing of the manuscript.

Positionality

Scholars working in the area of cultural sport psychology (CSP) have highlighted the importance of critical self-awareness and reflexivity, stressing the need for researchers to acknowledge how their positionality (i.e., social position, values, biases) may influence various stages of the research process (Ryba et al., 2013). In the present study, all three authors have past experiences as athletes and coaches in the Canadian high school sport system and are familiar with the various features of this setting. Furthermore, the authors (one woman, two men), acknowledge their identities as white, heterosexual, cisgender, able-bodied, and educated Canadians, recognizing that their positionality impacted their shared assumption that social justice issues should be addressed in the context of high school sport. The authors acknowledge that their position as three socially privileged academics may limit, or at the very least, influence their scope of interpretation of the data. For instance, by interviewing a coach who shared many aspects of a privileged intersectional identity (i.e., white, cis-gender, man), the first author had to be cautious to maintain a critical perspective and to not overly sympathize with the participants' reasons for not engaging in social justice activism and advocacy. At the same time, conducting research from a perspective of supporting social justice activism efforts, the first author also had to make concerted efforts to understand the participant's reasons for not engaging in social justice activism and advocacy without making

negative judgments about the participant's values. In consideration of the above, the authors made conscious efforts to engage in ongoing discussions about reflexivity and positionality (Braun & Clarke, 2019, 2021) while carrying out the study, including meeting to discuss how their shared personal experiences and observations about systemic inequities in sport and education shaped how they engaged with the data.

Study Rigor

Several reflexive practices were employed throughout the research process in efforts to enhance the rigor of the study. With the help of a colleague not involved in this study, the first author participated in an individual bracketing interview two months prior to data collection, allowing him to become more aware of his own assumptions, biases, and preconceptions related to social justice and high school sport coaching (McNarry et al., 2019). This colleague was selected to conduct the bracketing interview because they had a close professional relationship with the first author and shared overlapping research interests related to social justice, gender equity, and Canadian sport. The first author also kept a reflexive journal throughout the research process, enabling him to engage in critical reflexivity about how his positionality and life experiences inescapably shaped his interpretation of the data (Tufford & Newman, 2010). Below is one example of a reflection from this reflexive journal:

> Because I share a very similar intersectional identity to the participant recruited (i.e., white, male, cisgender, heterosexual, able-bodied, Canadian-born, English-speaking, university educated), will I be hoping his attitudes towards social justice are similar to my own? Will I try to defend some of his statements (if they are not supportive of social justice) because of our shared intersectionality and professional backgrounds (i.e., physical and health education, youth sport coaching)?

Throughout the conduct of the study, the first author read several important texts on intersectionality, whiteness, and systemic racism (e.g., Butryn, 2016; Feagin et al., 2001; Kendall, 2012) with the aims of both encouraging his own critical reflexivity and widening his interpretative lens with regards to social justice and whiteness in sport coaching. Together, the authors engaged in critical discussions about their positionalities and on past/current social justice issues in high school sport and in broader sport contexts. For example, the authors discussed reflective questions together on video calls, "We know that our role as white privileged individuals can be limiting at times because we lack personal experience with marginalization/oppression/discrimination, but to what extent can we leverage our privilege to effect the greatest amount of good?" During the conduct of the study, all three authors continued to self-educate themselves on social justice topics, such as by taking part in a series of workshops addressing racism (e.g., Sports Can Battle Racism workshop by Positive Coaching Alliance, 2021) and promoting diversity, equity, and inclusion in sport (e.g., Centering Black Youth Wellbeing by Youth Research and Evaluation Exchange, 2021; Gender Equity LENS e-module by Canadian Women & Sport, 2021).

Results

The results are presented under three higher-order themes in accordance with the CPYD framework and critical consciousness: critical reflection, political efficacy, and critical action. More specifically, results are framed within a perspective that highlights *missed opportunities* related to Stephen's (lacking) critical consciousness within the high school sport context.

Critical Reflection

The first higher-order theme of critical reflection encapsulates how Stephen viewed the impacts of power, privilege, oppression, marginalization, and discrimination within the high school sport context where he coached. Results showed how Stephen was somewhat inconsistent in his reflections, and thus not truly critical or transformative. Three sub-themes are presented: the importance (or lack thereof) placed on social justice, not keeping up to date with social justice issues, and privilege.

The Importance (or Lack Thereof) Placed on Social Justice

Stephen acknowledged the importance of social justice in school, in sport, and beyond, saying that, when he thinks of social justice, he thinks of "just justice in general. I think of fairness and equity." He added that when it comes to addressing overt social justice issues, such as witnessing a clear act of discrimination, he considers it his responsibility to speak up and address the issue, "I don't think anything should be left unsaid. If it, you know, perks your ears up enough to say, 'there was something not quite right there.'"

However, despite claiming a responsibility to speak up when issues occur, Stephen also recognized that his reactive approach to social justice issues, where he waits for incidents to occur before acting, is "probably not ideal." He did, nevertheless, acknowledge the importance of addressing social justice issues proactively, insisting

that a better understanding of social justice would allow him to develop the competency needed to move past his reactive approach, "as we go further and as we understand things better, definitely proactive – so that you're not having to be as reactive – obviously, would be, would be best." Yet, a perceived lack of competency may not have been the only reason for Stephen's reactive approach to addressing social justice issues. In his role as a teacher, he pointed to the importance he places on ensuring students move as much as possible during physical education classes, given the sedentary nature of other classes. The following quote illustrates how Stephen prioritized having students being active during physical education, which may inevitably leave little to no time to proactively discuss matters related to social justice:

> Um, again unfortunately [there are] so many things to consider in Phys. Ed. They [the students] do a lot of sitting and listening and discussing and things like that in so many other classes, getting them up and moving is priority number one. Again, it's finding that balance I suppose, so, you know as time goes on, continuing to evolve in terms of teaching and realizing what's important.

Not Keeping Up to Date on Social Justice Issues

Despite acknowledging the importance of proactively addressing social justice, which requires intently learning about and staying current on present and past events, Stephen appeared mostly passive in his approach to keeping up to date on social justice issues, waiting for new information to be presented to him rather than seeking it out for himself. Specifically, he shared a dislike and complete avoidance of mainstream news in the year preceding the two interviews:

> I haven't watched a minute of news in about 13 months… So, if there's stuff that's happening, I'm just not up on it. I'm only hearing things through second-hand reporting from friends and things like that. So, it's not like I'm completely out of the loop, I'm just not seeking it out myself these days just because all of the other garbage that I see happening.

Stephen's avoidance of mainstream news, particularly during a year that spotlighted social injustices across the world, illustrates his privilege of being able to disconnect from social issues or be selective in his intake, given that the issues at-hand do not affect him directly. Despite his avoidance of the news, Stephen did discuss how he engages in conversations with colleagues and friends, whom he considers as having higher levels of expertise with social justice, as resources that allowed him to maintain some awareness on current issues:

> You know, I've obviously got a few friends that are involved – people that I enjoy talking to – so that ends up being, whether when we get together or chatting on the phone or something like that, 'ok, well, let me know what's happening' and they can get decently in-depth into it.

He also added that watching sports on television allows him to be somewhat exposed to social justice issues, "I suppose the way that I do [keep up to date on social justice issues] is, because I'm a big sports fan, that's oftentimes where I will see it," referencing events such as NFL athlete Colin Kaepernick taking a knee during the national anthem to protest violence and systemic racism against Black Americans.

Even though Stephen was mostly passive in how he stayed up to date on social justice issues, he did talk about attending an extracurricular social justice club for students at his high school. He shared how he enjoyed sitting in on the club's lunchtime meetings whenever he could make time in his busy teaching and coaching schedules, although he explained that he preferred to remain quiet during the discussions, "I'd rather just sit and listen and hear what people have to say." When asked to elaborate on why he preferred to listen as opposed to actively engage in the discussions, he explained:

> I'm not necessarily the person who needs to be heard in the first place. Um, so, I like listening to what other people have to say, you know, it's fun… It's the same thing when I go into [teaching and coaching] workshops and stuff like that: let's hear what people have to say and I'll jump in if I feel it's necessary. But it's also necessary to give other people the opportunity to have the chance to speak and be heard by people who are actually listening to them.

When asked if he ever felt that his social identities (e.g., White, heterosexual, man) made him feel as though he could/should not contribute to the discussions on social justice, he explained, "I've never felt like I can't speak, I've just felt like there's no need to, or I won't really bring anything new or all that great to the table during those discussions." He then clarified that his passivity in these discussions is so that he can listen and learn, saying that his quiet involvement in these discussions is "more for personal growth than for anything else."

Privilege

In both interviews, Stephen did demonstrate some level of critical reflection given that he was able to acknowledge and reflect on his privileged social

identities. In explaining how he had never personally faced social injustices related to marginalization or discrimination, Stephen stopped to add:

> We're talking right now from my perspective as a middle-class, white, male, heterosexual, uh, born in Canada. I've been really fortunate in my life to not come across too many unfortunate difficulties [related to social injustices], that other people haven't had that same good fortune.

Although Stephen did recognize the presence of social injustice and inequity in the Canadian high school sport context (e.g., racism, sexism, heteronormativity, ableism), it appeared as though such topics were not high on his priority list. Perhaps more problematically, he indicated how he felt a proactive approach to social justice was not something he needed to integrate in his teaching and coaching because he believed that he was already creating socially just, inclusive, and safe environments. On the topic of actively integrating social justice into his teaching and coaching, he explained:

> It's not really something that I've put a ton of thought into. I think, luckily, I just kind of do that kind of stuff naturally within my teaching… And now that it's becoming more and more, um, hot button, it'll be something that I try to work on a little bit more. I wish I did because it's an interesting subject and topic… But just haven't put enough thought into it in the past.

Stephen's stance, which likely stems from not being personally affected by social injustices due to his privilege and social identities, allowed him to at times make statements that inadvertently worked to downplay the deeply engrained and longstanding histories of social injustices by referring to social justice movements as "an interesting subject," "such a buzzword these days," and "kind of a hot topic du jour." Moreover, Stephen appeared to circumvent the idea of putting more emphasis on social justice in his teaching and coaching, instead making use of speech acts (i.e., treating people fairly is already a basic feature of my teaching/coaching) through the appropriation of language that essentially exonerated him from having to alter his ways. He highlighted that as teachers and coaches: "we shouldn't have to put extra emphasis on it [social justice] because that emphasis should be there in the first place." Stephen followed up his circumventing and exonerating statements by expanding on how he was often worried about how he would be perceived if he was not seen by others to make extra efforts to integrate social justice more actively, pointing to ongoing tensions, "but then I don't want it to be made to look as 'this person doesn't care about this stuff that's being put out there these days.' Um, because I absolutely do."

Political Efficacy

The second higher-order theme, political efficacy, refers to Stephen's belief in his ability to affect positive social change within the high school sport context in which he coaches. Stephen believed that coaches can hold a significant amount of influence over athletes during adolescence, recognizing that:

> [Organized] sport is a platform where we are setting a particular example... I do think that the biggest thing we teach is examples of how to be, how to behave, how to treat each other… It's so much more important than any of the information-based stuff that gets passed along.

That being said, Stephen was also transparent about his own lack of perceived comfort and competence in addressing social justice issues with his athletes. He self-assessed his level of confidence with social justice issues as a "5 on 10" and admitted, "I'm not an expert in the least." At one point in the second interview, Stephen anxiously paused after saying the word "gender," then explained, "again, I'm always nervous about [using] that term." In elaborating on his comfort level with language in relation to social justice issues, Stephen positioned himself within a discourse of self-victimization, and explained how, "there are lots of terms these days that's just difficult to keep track of." In further indications of his low perceived political efficacy, Stephen demonstrated a clear unwillingness to serve as an active figure in the social justice movement. For instance, when asked if he had any recommendations for promoting social justice in Canadian high schools or in the broader youth sport system, Stephen stated: "I'm definitely not going to be at the forefront of any of this stuff. I'll be somebody who is 100% supportive… I don't know, I'm definitely not the person for that particular question." Despite situating himself as fully supportive for promoting social justice in high school and sport, Stephen remained vague as to what his "100% support" entails on an everyday basis. In sum, in reference to political efficacy, Stephen acknowledged the influential role of the high school sport coach but positioned his lack of knowledge of and comfort with social justice as preventing him from proactively addressing social justice issues with his students and athletes.

Stephen stated how he views his role as a teacher and a coach as entailing some responsibility in acting on instances of social injustice. He indicated that when he notices an instance of social injustice at his school, he acts on it but then deems it necessary to reach out to more experienced and more knowledgeable colleagues, letting them take responsibility to follow up on the issue with administration. Thus, he acknowledged not

wanting, or not having to take full responsibility on such matters at his school because:

> There's always gonna be people that have a great comfort level speaking on subjects that they just have a greater background in, uh, whether it be they've done schooling related to it, they've done that much more research, they have a passion for it in particular.

When asked what it would take for him to feel comfortable enough to handle social justice issues on his own, Stephen mentioned the importance of gaining access to more professional development opportunities that would allow him to have, "a greater understanding of things that have happened in the past, things that are currently going on, it allows us to form a better understanding and to be more well-spoken on the subject." Stephen suggested using pedagogical days, scheduled within his school for the teachers to engage in professional development, as opportunities to "educate the educators" by organizing social justice workshops with guest speakers. However, thus far in his career, Stephen stated how he had yet to receive any type of formal social justice training at his school as a teacher or as a sport coach.

Critical Action

The third higher-order theme of critical action refers to social justice activism and advocacy-related efforts occurring at Stephen's school, which he acknowledged and praised, but tended to *watch from the sidelines* instead of directly getting involved. Two sub-themes are presented: the value of dialogue, and collaboration among staff and students.

The Value of Dialogue

In the two interviews, Stephen referenced only one instance during which he was the one to directly address a social justice issue while coaching, and this was done reactively after an event had occurred. He explained:

> We had an instance several years ago – four years ago maybe – where myself, a student, and our vice principal at the time had to go to another school […] to apologize for the mistreatment of a student on their basketball team because of a slur that had been uttered by one of our students.

Stephen then elaborated on how he did his best to work with his school's administration to address the situation with the student to ensure a similar incident did not occur again. Stephen discussed the importance of transparency when discussing social issues to help ensure advocacy-related efforts are effective in instigating change. Moving forward, he acknowledged how the ability to dialogue fluently in the language of social justice is something he needs to develop in order to address his lack of comfort:

> It's just a matter of creating a setting for open dialogue and non-judgmental interactions with other people. And through those conversations, being somebody that can, you know, guide a conversation in a particular way. Just being able to hear other peoples' thoughts and opinions, more importantly hearing about their experiences, yeah just having an open mind and encouraging others to take that same approach. It might counterbalance my lack of knowledge when it comes to these things.

Collaboration Among Staff and Students

Stephen emphasized the importance of collaboration in addressing social justice issues. He talked about how at his school, the administration plays an active role in promoting diversity, equity, and inclusion among staff and students, particularly through making efforts to recruit a diverse population of students through the admissions process. For example, Stephen shared how the administration at his school was proactive in sending an urgent email to all students and staff to diffuse any potential conflicts that may arise at school in response to the dispute that occurred between Israel and Palestine in May 2021.

> [The email was] reinforcing and repeating our school's code of conduct inside the walls and beyond, um, and how if there's anyone being mistreated, or you hear or see signs of anything happening to please make sure to delve into it or to bring it forward to the people who would be able to deal with it further.

Stephen followed this by praising the administration's active efforts to create a quality school environment, saying that they play "a massive role in kind of being the umbrella over all these different elements within the school."

Stephen also discussed the role of students in addressing social justice issues, mentioning how he observed several advocacy efforts whereby the students at the school engaged directly with the administration to instill positive social change. In one instance, he said:

> We had students who, when it came to Black History [month] and Black Lives Matter and that push that was happening, they involved themselves more along with the administration in terms of 'okay, how can we go about making a greater difference?' So, having your voice heard and that type of thing is extremely important, and feeling like you have value and are validated.

Together, the examples of critical action illustrated above indicate how Stephen generally took a passive

approach to social justice activism and advocacy-related efforts at his school.

Discussion

The study provides insights into one coach's attitudes on social justice in the Canadian high school sport context, as interpreted by the researchers through the lens of the CPYD framework and critical consciousness. In the discussion, three reflections are offered: reflecting on privilege, reactivity and reluctance, and a need for social justice education. In the case of Stephen, these reflections are framed as *missed opportunities*.

Reflecting on Privilege

Stephen demonstrated only some level of critical reflection during the two interviews, particularly in relation to his privilege. White (male) privilege has been described as "an invisible knapsack" (McIntosh, 1989, p. 1) full of unearned advantages, with Stephen appearing to recognize how this privilege resulted in him having no personal experiences whatsoever related to social injustices. As suggested by Leonardo (2004), Stephen's concern for how he was perceived by others in relation to social justice advocacy (i.e., not wanting to say the wrong thing) may have prevented him from working towards developing a greater understanding of the structural, systemic mechanisms of privilege and social injustices. Furthermore, Stephen's privilege meant he could afford to disconnect himself from mainstream news and avoid having to make efforts to keep himself up to date on social justice issues for over a year. As elucidated by Compton (2022), remaining neutral in the face of ongoing social inequities is only made possible by a privileged social identity (e.g., white, cis-gender, man), and Stephen exhibited this privilege and neutrality by choosing to remain disconnected from ongoing social justice issues. *White silence* refers to the notion that many white individuals choose to not contribute to, or avoid entirely, crucial discussions related to social justice and social inequities (DiAngelo, 2012), which appeared to mostly be the case for Stephen. A related notion is that of *white complicity* – the idea that white individuals (unknowingly) play a role in maintaining social injustices through their silence and inaction related to race and other social justice issues (Daum, 2020). Indeed, many white children are socialized to not discuss race and whiteness (Hazelbaker et al., 2022), which has produced generations of white North American adults who tend to avoid critical discussions related to race. DiAngelo (2016) underlined how anti-racist practices require a person to continuously educate themselves about social justice and strive to build cross-racial relationships – and that white silence only serves to prevent these two requirements from being fulfilled. While white individuals may participate in discussions about race without actively contributing (i.e., listening only), the only way to work toward ending white silence is for white individuals to meaningfully contribute to these social justice discussions (Wattsjohnson, 2003) in ways that allow for their thoughts and biases to be challenged and restructured (DiAngelo, 2016).

Stephen's speech acts downplaying the social justice movement were problematic and his choice of referents such as "buzzword" or "hot-button topic" worked to discredit the enduring reality of the historical and systemic oppression and marginalization in the lives of millions (Hammond et al., 2019; Spaaij et al., 2020). Similarly, discursive practices of self-victimization (i.e., "I'm doing my best") prevented Stephen from becoming more aware and active regarding social justice issues, which is in line with previous research that examined how youth sport leaders resist social justice efforts through discourses of victimhood (Spaaij et al., 2020). Related to discourses of victimhood that dismiss critical discussions of social justice is the notion of *white fragility*, which refers to how many white individuals in North America possess a low ability to tolerate racial stress (i.e., difficult conversations about race, racism, and privilege; DiAngelo, 2011). White fragility often leads to anger, fear, guilt, and silence among many white individuals, which unfortunately only serves to reinforce the existing inequities that perpetuate marginalization and oppression (Applebaum, 2015; DiAngelo, 2011). By breaking down white fragility, white individuals can in turn reverse trends of white silence by finding ways to be reflexive and to act as social justice allies. It is important to note that, while white silence, white fragility, and white complicity all refer to race-related social justice, these notions can be applied to all aspects of one's intersectional identity (e.g., gender, sexuality, disability). In other words, individuals with privileged social identities must find ways to educate themselves about *all* social justice issues, which can in turn allow them to meaningfully contribute to social justice discussions and activism-related efforts.

Overall, study findings suggest that Stephen appeared to lack a *critical* approach to teaching and coaching, which is needed in order to understand "the impact of power, privilege, and oppression on young people's lived experiences, regardless of social group membership" (Gonzalez et al., 2020, p. 31). In line with previous research from Newman et al. (2021), Stephen did not proactively prioritize social justice issues in his role as

a physical educator and coach and appeared to employ a normative (DeJaeghere, 2022) and functionalist coaching practice (Kochanek & Erickson, 2019), which fails to address the many systemic inequities that shape youth sport participation and subsequent development outcomes. As discussed by Gearity et al. (2019), coaches must work harder to improve their sociocultural awareness, specifically pertaining to white privilege, but also in relation to other forms of privilege (e.g., cisgender privilege, able-bodied privilege), if we are to create more socially inclusive and safe sporting environments for young athletes. Similarly, considering the influence coaches can have on adolescent athletes' development and experiences in sport, it is crucial to consider how coaches' silence or inactivity in relation to social justice may impact athletes. Indeed, many white individuals appear to *talk the talk* when it comes to advocating for social justice issues, claiming to support various social justice efforts. *White intellectual alibis* (Leonardo & Zembylas, 2013) refer to white individuals' efforts to put forth a non-racist self-image rather than making real efforts to meaningfully align themselves with anti-racist practices. In the case of Stephen, there is no evidence that he *walks the walk* – essentially, the results suggest that Stephen made no efforts to support his alleged advocacy with any social justice engagement/activism. Considering Stephen's privileged position as a teacher and coach, this case elucidates missed opportunities for social justice advocacy/activism within the high school sport setting.

Reactivity and Reluctance

Consistent with previous research (e.g., Camiré et al., 2019; Martin et al., 2021), Stephen believed that coaches can have a significant impact on adolescent athletes' development and recognized that high school sport is a context suitable for teaching a wide range of life skills. However, Stephen's reactivity and reluctance to engage in discussions on social justice illustrates missed opportunities for sport to serve as a meaningful platform for dialogue and action in the service of social issues (Camiré et al., 2021). Of note is Stephen's view that there is always someone else who can take responsibility for social justice issues, thereby propagating a narrative of exoneration that in turn allowed him to shy away from difficult, yet necessary, conversations surrounding social justice. Stephen's reliance on colleagues and friends to keep him updated on current social justice issues was problematic, as it contradicted his previous statements on the importance of staying informed about current and past social issues. Moreover, a reliance on colleagues and friends of colour to educate Stephen about social justice issues is particularly problematic, as it exemplifies a *colonizer logic* (i.e., extracting value from individuals of racially minoritized groups; Harkins et al., 2021). In terms of critical praxis (i.e., the combination of awareness and action related to oppression and social injustice), Stephen appeared to be at the lower end of the continuum outlined by Kochanek and Erickson (2019), as he demonstrated low levels of awareness of social injustice and oppression, especially related to systemic injustices. Moreover, from the two interviews, Stephen did not discuss any instances in which he or his peers actively challenged dominant coaching discourses.

To effectively develop their critical consciousness, white coaches and athletes should, according to critical sport journalist Dave Zirin, use their privilege to speak up against injustices and thereby take some pressure off Black coaches and athletes (Agyemang et al., 2020) who have traditionally been at the forefront of social justice activism efforts through sport. Developing one's critical consciousness is highly important for coaches because it can help them not only work to better serve athletes who experience marginalization and oppression but also assist those in privileged positions who are seeking to demonstrate allyship (Love, 2000). Adopting a critical lens to one's coaching, supported by the CPYD framework, can be valuable for coaches given that "by including critical reflection and political efficacy, CPYD leads to more transformative, critically grounded and informed youth [and adult] contribution and systemic change in the form of critical action" (Gonzalez et al., 2020, p. 32). In the case of Stephen, his identities, privilege, and his deliberate efforts to disconnect from mainstream news meant that he may have engaged in critical reflection only partially and inconsistently, which impeded him from fully contributing to the transformative, systemic change alluded to in the CPYD framework (Gonzalez et al., 2020).

Beyond the privilege that led to Stephen's lack of social justice action, another reason that might have contributed to his reluctance and reactivity was the social climate in which he worked, which aligns with findings from Martin et al. (2022) who suggested that senior college athletes were less likely to engage in social justice activism due to perceived lack of support. Moreover, a review from Meir (2020) suggested that shifts in curriculum and professional development related to social justice are more likely to be successful when they occur within broader organizational cultures of social justice. Although Stephen appeared satisfied with the promotion of social justice at his school, more data would need to be collected on the school environment in order to draw further conclusions. In

sum, while Stephen's privilege likely played a major role in his missing many opportunities to promote social justice in his role as a physical educator and coach, it is also important to consider the environment (i.e., social support, school culture) that enabled Stephen to remain disconnected from social justice advocacy and activism. However, it is imperative to note that individuals maintain a responsibility to educate themselves about how to positively contribute to social justice activism efforts, and an over-reliance on one's environment to learn about social justice issues can be, as discussed above, problematic.

A Need for Social Justice Education

Stephen's self-proclaimed lack of comfort with notions of social justice may speak to the need for sport systems to offer coaches access to educational initiatives that meaningfully address social justice issues. However, more research is needed before these claims can be applied across the entire Canadian high school sport context. Stephen's claim that he would have benefited from greater access to social justice training is in line with research from Tam et al. (2020), who alluded to in their study on the #MeToo movement in Canadian sport that many coaches want to receive more formal training and professional development opportunities related to social justice. For Freire (1973, 2000), the essence of critical consciousness is reading, dialogue, reflection, and action, supported by a knowledge of history that is crucial to grasping the roots of marginalization, oppression, and discrimination. Thus, in theory, for coaches to enhance their critical consciousness, they should read, reflect, and derive knowledge that is historically situated. Studies that have explored the merits of critical consciousness-focused coach education through the use of critical pedagogies have shown how these initiatives can have a positive impact on coaches' developing critical consciousness, exemplified through some coaches learning how to act as positive role models for youth athletes (Spaaij et al., 2016), and learning how to promote a more positive cultural impact among their athletes (Wright et al., 2016). It is suggested that implementing similar interventions in the Canadian high school sport context is needed moving forward. Recent research from (Bishop et al., 2023) explored perceptions of white privilege and social justice issues among Canadian high school coaches, finding that coaches who had a higher awareness of white privilege in society were more likely to have favorable attitudes towards a range of other social justice issues (e.g., anti-racism, support for 2SLGBTQIA+ individuals, recognition of the urgency to address climate change). These findings suggest that coach education initiatives related to social justice may benefit from using white privilege as a stepping stone to get coaches to become more aware – and eventually, more active – in relation to their ability to effect positive social change through social justice activism and advocacy.

Accordingly, it is recommended that experiential components in the form of dialogue be included in the development of educational initiatives aimed at enhancing coaches' critical consciousness. In the context of sport, previous research has demonstrated the value of dialogue between coaches and student-athletes in addressing power dynamics (e.g., Mac Intosh & Martin, 2018; Ryba et al., 2013). As stated by Watts et al. (2011), if a single encapsulating term for critical consciousness existed, it would be *group discussion*. Through critical group discussions, both coaches and athletes can increase their awareness of and ability to address microaggressions (e.g., colorblindness, use of sexist and heterosexist language, pathologizing cultural values) that continue to exclude, discriminate, and marginalize various groups (e.g., racially minoritized groups, 2SLGBTQIA+ community), even when coaches appear to not have overtly oppressive intentions (Gearity & Henderson Metzger, 2017). Ultimately, a combination of informational and experiential learning opportunities can help coaches work towards creating and maintaining safe, inclusive, and equitable environments for all their athletes. Schools, school boards, and school sport governing bodies must seek to work with diversity, equity, and inclusion professionals, as well as other qualified professionals who are experienced in areas of social justice, coaching, and sport psychology.

Limitations

The study is not without its limitations. First, it must be noted that the findings reflect the perspective of a single (white) teacher-coach from one high school in Canada. Future research is needed to explore the perspectives of other stakeholders (e.g., coaches who identify as women, coaches of equity-deserving groups, coaches who identify as 2SLGBTQIA+, athletes, and administrators) to provide a more holistic understanding of critical consciousness and social justice in the high school sport context in Canada and elsewhere. Second, despite our best efforts to engage in a continuous reflexive process (i.e., bracketing interview, discussions with critical friends, ongoing professional development and education in the form of workshops and seminars), we recognize that as researchers, our interpretations are bound within the realm of our limited experiences with oppression and marginalization and are shaped by

identities (e.g., white, cisgender) and our positions of privilege and power (i.e., university students, professor). Third, a more robust approach to data collection (e.g., multiple interviews, multiple participants, varied data collection methods) may have enhanced the richness of the data and ultimately led to additional nuances and insights deriving from our interpretations. In line with recommendations from Watts et al. (2011), researchers studying critical consciousness could consider using collaborative methods, case studies, and mixed-method longitudinal study designs. For studies centered on coach critical consciousness, this could include exploratory case studies of multiple coaches; data collection through the use of individual interviews, solicited journaling, and field observations; and data collection at time points across a span of 12 months or longer.

Future Directions

Based on the findings of this exploratory case study, we suggest several directions for future research. First, before coach education initiatives around critical consciousness can be developed, future research should be conducted to explore high school coaches' attitudes and motives for advocating for social justice, as well as their potential willingness (or not) to take part in social justice training. By first understanding coaches' attitudes and motives around advocating for social justice, coach education initiatives may be met with open-mindedness and commitment rather than defensiveness and reluctance to change. Critical reflection has been said to be the catalyst to critical consciousness development (Watts et al., 2011) and thus, we suggest that critical reflection should be a central focus of research on social justice in coaching moving forward. More specifically, researchers should explore how coaches can partake in meaningful dialogue and group discussions as a means of social justice education, which may include looking outside of the immediate school environment and seeking guidance from professionals who are qualified and experienced in leading social justice-related workshops and training programs (e.g., Athlete Ally, Black Canadian Coaches Association). Second, as suggested by several scholars (e.g., Cooper et al., 2019; Kluch, 2020), social justice activism can take many forms and is not limited to boycotting and protesting. Thus, future research efforts should focus on educating coaches, athletes, and administrators about the various ways in which they can proactively participate in social justice activism, which may ultimately serve to get more people engaged in fighting for social justice. Third, longitudinal research could be conducted to explore the sustainability of critical consciousness-focused coach education, helping answer questions such as: Is this type of coach education leading to changed attitudes and actions in the short-term (i.e., intervention effects) or long-term (i.e., durable effects)? Such research would be useful in helping determine the coach education priorities of Canadian high school coaches and their preferred mechanisms for delivering social justice education (e.g., formal training, informal training, mentorship programs, and online programs). Fourth, moving beyond individual attitudes and motives, future research should be conducted to explore the environments in which high school coaches teach and coach, and how these environments (i.e., social support, school culture) work to promote or resist the status quo (i.e., white, Eurocentric, androcentric) in relation to critical consciousness and social justice.

Conclusion

This case study explored the attitudes on social justice of a Canadian high school sport coach. Findings suggested that the coach had a developing critical consciousness, which was underpinned by a reactive approach to addressing social justice issues. A critical analysis informed by the CPYD framework (Gonzalez et al., 2021) led the researchers to frame the results as missed opportunities to engage in social justice advocacy and activism. Moving forward, more research should explore the attitudes of high school sport coaches related to social justice. Furthermore, it is suggested that critical consciousness should be an integral component of coach education and professional development opportunities for physical educators in Canada. Specifically, critical consciousness education for coaches should not only focus on Freirean concepts such as dialogue and group discussion but also educate coaches about systemic injustices that extend beyond acknowledgements of individual privilege. Moving forward, privileged teachers and sport coaches must make better use of their positions to positively influence the next generation of athlete-activists. In conclusion, the study's findings advance research in sport and serve to stimulate discussions about how to integrate social justice initiatives within the high school sport context as a means of having sport play a meaningful role in creating a safer, more inclusive society.

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Social Comparison in Healthy Adult Peloton Bikers: How Visual Display of Exercise Data Affects Performance

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In group exercise settings, individuals compare their performance against others, a process called social comparison. Although social comparison in laboratory-based exercise settings has been investigated, little is known about how exercising with others can boost motivation to perform in a non-laboratory group exercise setting with data display. Peloton bikers (N = 26) completed the same 30-minute cycling session in three conditions: group data display, individual data display, and no data display. Participants' exercise performance (i.e., heart rate, calories burned, and distance cycled) was assessed for each condition. Ego orientation and social comparison were investigated as predictors of performance. Results indicated that in the group data condition, participants had higher heart rates (p = .02), calories burned (p = .03), and longer distance cycled (p < .001) compared to the no data condition. Positive correlations emerged between social comparison and calories burned (r = .52), social comparison and distance (r = .45), and calories burned and distance (r = .75). Additionally, there was a negative correlation between ego orientation and HR (r = -.45), and between task and ego orientations (r = -.47). Ego orientation explained 19% of the variance in HR, and social comparison accounted for 20% and 27% of the variance in distance and calories burned, respectively. These results suggest that social comparison, ego orientation, and visually displayed data can all improve exercise performance. This study is bridging the gap between research and practice by providing further evidence of the application of the motivational effect of visually displayed exercise data in a group exercise setting. Specifically, fitness professionals can utilize the visual presentation of exercise data to increase their participant's engagement, while being cognizant of the risk of over-exertion.

Keywords: exercise motivation, group exercise, exercise data, peloton

Since the rise of the wellness trend in the 1980s, participation in fitness activities such as cycling, aerobics, and running, has continually increased (Karapanos et al., 2016). In exercise settings, individuals commonly refer to peers to compare performance, a process known as social comparison (Festinger, 1954). Social comparison is described as a comparative process of information between the self and others (Wood, 1996). In an exercise setting, social comparison could be described as comparing one's exercise performance (e.g., HR, speed, or level of fatigue) to another person performing the same exercise. Initially, social comparison researchers investigated "with whom" individuals tend to compare themselves, but the interest has morphed into why individuals make social comparisons and how it affects subsequent behaviors (Gerber, 2018).

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Social Comparison Theory

The social comparison theory, developed by Leon Festinger in 1954, suggests that social comparison arises in times of uncertainty about one's ability and results in pressure for group uniformity (Wood, 1989). Since the original development of the social comparison theory, several factors have been shown to influence social comparison. For example, Aral and Nicolaides (2017) found the influence of same-sex pairs on social comparison was strong, while the influence on mixed-sex pairs was significantly weaker. Self-enhancement is another factor that can influence social comparison

(Wood, 1989). Self-enhancement motives protect self-esteem and primarily occur when an individual experiences a threat or a loss (e.g., an opponent "beat" them). In this case, to protect their self-esteem, individuals compare themselves to others who did worse than them (i.e., downward comparison; Wood, 1989).

Social Comparison and Exercise

Social comparison is also an important factor in the exercise setting. Research among runners in a social network demonstrated that exercise is socially contagious, or impacted by peers (Aral & Nicolaides, 2017). In their study, Aral and Nicolaides (2017) tracked one million runners over five years to assess the influence of social connection and activity levels amongst high- and low-activity runners. Results suggested that high- and low-activity runners had longer run durations and higher calories burned when their peers had run longer distances. Although Aral and Nicolaides (2017) found strong contagion effects, they highlighted the need for more generalizable studies of peer effects on health behaviors in non-laboratory settings rather than laboratory-based settings because individuals may behave differently in a "true" exercise setting.

Few studies have investigated group exercise outside laboratory settings or how exercising with others can boost motivation to perform, that is, providing more effort to increase exercise performance data (e.g., HR, calories; Irwin et al., 2012). Exercising in a group has offered a variety of benefits, including increased enjoyment and enhanced effort, when compared to exercising alone (Mauriello et al., 2014). In a group exercise setting, the Köhler effect can explain the enhanced effort, as it is a process in which a weaker individual working in a more capable group will feel more motivated (Feltz et al., 2011). Irwin and colleagues (2012) examined if the Köhler effect could be used to increase effort and exercise duration when exercising with a virtual partner over a series of sessions in a coactive condition (i.e., exercising side by side but independently), a conjunctive condition (i.e., performance is determined by whichever partner stops exercising first), or a control condition (i.e., cycling alone). They found participants in the coactive condition persisted longer (9.12 minutes) in a cycling task than those who cycled alone. Further, those in the conjunctive condition persisted on average 11.26 minutes longer than individuals in the coactive condition. These results suggest that the Köhler effect is apparent when the outcome of dyad performance relies upon the weaker individual (Irwin et al., 2012). Using isometric plank exercises, Feltz and colleagues (2011) found that participants exercising with a virtual partner, regardless of ability level, had significantly greater persistence than those exercising alone. On average, they observed a 24% (58 seconds) increase in isometric plank duration. This supports the notion that exercising with a virtual partner can serve as motivation to persist longer in exercise, especially when performance of the dyad relies on the weaker individual. However, those studies did not consider the effect of displayed exercise data while exercising.

Exercise Motivation

Motivation is an important factor to consider when investigating performance in general. Motivation to exercise refers to the degree of determination with which an individual is approaching or avoiding exercise situations (Lox et al., 2019). Several theories of motivation have been used in exercise settings, but a theory that is particularly relevant in achievement settings is the achievement goal theory (Elliot & McGregor, 2001). Achievement goal theory differentiates two types of goal orientation in achievement situations: task and ego. Individuals with task orientations judge competency on task mastery, while those with an ego orientation feel competent when they win or outperform others (Ames & Archer, 1988; Dweck, 1986; Nicholls, 1984; Senko et al., 2011). However, Senko and colleagues (2011) suggest that the sole goal of outperforming others can negatively affect attention (Senko et al., 2011). When individuals are other-focused, their attention diverts from the task at hand, causing a decrease in performance (Brophy, 2005; Hoffman, 1993; Senko et al., 2011; Steele-Johnson et al., 2000; Urdan & Mestas, 2006; Vansteenkiste et al., 2007; Van Yperen, 2003). In the physical activity context, Su and colleagues (2015) reported that students endorsing task goal orientations experienced greater enjoyment and less external regulation from peers when being physically active. Conversely, students endorsing ego goal orientations were more likely to engage in physical activity to avoid shame and experienced less enjoyment. Further classification divided goals into categories of valence, indicating whether the goal is focused on approaching positive outcomes or avoiding negative outcomes (Jury et al., 2015).

One area of exploration of achievement goal theory to increase exercise motivation is to focus on task goal orientations and a belief that effort determines success (Ames & Archer, 1988). A task approach climate has impacted exercisers' effort and competence positively (Haggar & Chatzisarantis, 2007), but the effect of individual task orientation on exercise performance is still unclear according to meta-analytic results (Hulleman et al., 2010).

Exercise Motivation and Activity Trackers

Social comparison tendencies have extended into the realm of physical activity with the expanding popularity of activity trackers and virtual exercise environments (Karapanos et al., 2016; NPD, 2013). Activity trackers, such as those used in Peloton bikes, enable exercisers to compare exercise data, leading to increased exercise motivation and awareness (Mauriello et al., 2014). Similarly, immersive virtual exercise environments have been shown to elicit higher motivation and adherence when compared to traditional cycling conditions (Annesi & Mazas, 1997; Liu et al., 2019). According to the Center for Disease Control and Prevention (2020), nearly 80% of adults did not meet the physical activity recommendations in the US for aerobic and muscle-strengthening activity. Activity trackers can help meet those recommendations, as those using a Fitbit have been shown to increase their moderate to vigorous physical activity by 62 minutes per week compared to non-Fitbit users (Cadmus-Bertram et al., 2015).

Wearable technology has also created social contagion amongst fitness communities (Aral & Nicolaides, 2017). Social contagion refers to the extent one's exercise behavior is influenced by their peers' exercise behaviors (Aral & Nicolaides, 2017). Research examining the display of exercise data (e.g., HR) on bike helmets (Walmink et al., 2014), on the back of runners' shirts (Mauriello et al., 2014), and the use of a virtual partner on an exercise bike (Irwin et al., 2012), reported that those exercising with a partner or group tend to persist longer than those exercising alone. Having access to others' exercise data appears to increase effort in terms of persistence and HR. Aral and Nicolaides (2017) highlighted this peer effect that catalyzes behavior and related this effect to the concepts of motivation and social comparison.

Many activity trackers and virtual exercise technologies compare exercise data and instill competition with others (Karapanos et al., 2016), which may increase exercise adherence, effort, and longevity of tracker use. Many activity trackers integrate exercise motivation strategies such as reinforcements (e.g., badges and rewards) and self-monitoring (data summaries) to increase exercise behavior (Karapanos et al., 2016). Both reinforcement and self-monitoring are often shared amongst peers, increasing competition in the exercise environment. Activity trackers promote autonomy, offer new social experiences, boost self-esteem, and provide social support in an online community (Karapanos et al., 2016). As such, it comes as no surprise that the virtual exercise market is growing exponentially from $15.65 billion in early 2022 to $21.82 billion in early 2023 (The Business Research Company, 2023). Because of the growing popularity of virtual exercise, more research needs to be done on how it can be leveraged for improving exercise performance.

The Present Study

The effect of exercise trackers on exercise performance has been investigated via the display of individual data or others' data in separate studies, but those two modes of data display have not been compared directly in the same study. Additionally, important motivational variables such as goal orientation and social comparison tendencies have not been investigated in combination with activity trackers. The purpose of this study was to address this gap by assessing whether group or individual display of exercise data while exercising impacts exercise performance (i.e., HR, calories burned, and distance) among Peloton users. The Peloton system allows the participants to exercise outside of the laboratory while providing the opportunity to display individual data, group data, or no data. It was hypothesized that group exercise data display would lead to higher HR, calories burned, and distance cycled compared to the individual data or no data display conditions. A secondary goal was to investigate to what extent goal orientation and social comparison tendencies can predict exercise performance. Based on goal achievement theory and social comparison theory, researchers posited that individuals who reported higher social comparison combined with a task orientation would have higher HR, calories burned, and distance cycled. To investigate this cause-effect relationship, the present study utilized an experimental design to test the impact of group, individual, and control (no data) conditions of data display on exercise performance measures.

Method

Participants

A power analysis using G*Power 3 (Faul et al., 2007) was employed to determine the number of participants required for the study. With α level set at .05 and power at .80, with a moderate effect (f = .27), the power analysis using a within-subject Repeated Measures (RM) ANOVA revealed a required sample size of 24. A sample of 26 Peloton bike users (23 females and 3 males, M_{age} = 34.81, SD_{age} = 8.7) self-selected themselves to participate in this study via a flyer posted on social media. This sample was purposeful because the bike has the appropriate instruments and system currently in place to monitor HR, calories burned, and distance, which is displayed to the participant. To be eligible for

the study, participants must have attended at least four Peloton cycling sessions in the last month to ensure familiarity with the technology (i.e., monitoring systems and data display) of the bike. Participants were excluded if they were taking medication for blood pressure that may affect their HR data during exercise. Data collection occurred in Spring 2020.

Instruments

Demographic Questionnaire

Demographic information collected from participants included age, gender, use of blood pressure medication, perceived fitness level, amount of Peloton bike use, and number of sessions attended in the past month.

Iowa-Netherlands Comparison Orientation Measure (INCOM; Gibbons & Buunk, 1999)

The INCOM assesses social comparison orientation and contains 11 items that are rated on a Likert scale from 1 (*I disagree strongly*) to 5 (*I agree strongly*). The INCOM is comprised of two subscales: comparison of performance (ability) and comparison of thoughts/emotions (opinion). Tested with an American adult sample, the INCOM has been reported to have an internal consistency ranging from .78 to .85 (Gibbons & Buunk, 1999). For this study, the purpose of the INCOM scale was to assess general social comparison orientation and the Cronbach's alpha for the scores analyzed was .80.

Goal Orientation in Exercise Measure (GOEM; Petherick & Markland, 2008)

The GOEM was developed to measure ego and task orientation in exercise settings. The 10 items of the GOEM are scored on a Likert scale from 1 (*strongly disagree*) to 5 (*strongly agree*). The GOEM is scored by calculating the means for the task and ego subscales. The GOEM has been reported to have internal consistencies of .78 and .88 for task and ego scales, respectively (Petherick & Markland, 2008). In the current study, Cronbach's alphas were .80 for the task scale and .75 for the ego scale. The GOEM was used in this study to assess task and ego orientations to control for goal orientation in the performance of participants.

Heart Rate Technology (Peloton HR Monitor)

The Peloton HR system is composed of a HR monitor worn around the upper abdomen and is connected to a system that transforms the HR data into various exercise data. For the purpose of this study, the exercise data used included HR, calories burned, and distance cycled.

Manipulation Checks

Likert-style questions were asked upon completion of the intervention condition (i.e., visual display of group data) to assess the extent to which individuals compared themselves to others, and to what extent they viewed the exercise data on the screen. Two items were developed: "I was comparing myself to other exercisers during the exercise session" and "I looked at the exercise data on the screen during the exercise session." Those items were measured on a scale from 1 (*never*) to 6 (*always*).

Visual Display

The Peloton bike employs a large screen located between the handles of the bike and was used for this study. This system recorded the individuals' exercise data and displayed them on the monitor. The monitor had the capability to display the participants' own data as well as the others participating in the same exercise class.

Intervention

Participants completed the following three conditions in a counterbalanced order: HR monitor + group data, HR monitor + individual data-only, or control (i.e., no visual display). In the HR monitor + group data condition, participants wore a HR monitor that displayed group exercise data (i.e., HR, calories burned, and distance cycled) on the Peloton bike screen and allowed other participants to access their data during the class. Each member of the group had their data displayed below their name. In the individual data-only condition, participants wore their HR monitor, but others' data were hidden from the screen so that only their data was visible for the duration of the session. In the control condition, participants wore their HR monitor, but the data display was turned off for the duration of the session.

Procedure

Upon Institutional Review Board (IRB) approval, participants were recruited via social media. Potential participants were asked to fill out a brief survey to gauge their eligibility for the study. After eligibility and consent were finalized, participants were instructed to fill out the INCOM and the GOEM and given instructions to complete each of the three exercise sessions, in the order given to them via a randomization spreadsheet. This order was concealed from them until after they completed the questionnaires. The first author generated the assignment sequence, enrolled participants, and assigned them to conditions. Only the first author was aware of the condition assignment. Participants were instructed to select a 30-minute cycling session on their own Peloton bike at home and completed the same

session for each of the three conditions and stopped the exercise session at 30 minutes. Following each session, participants submitted their exercise data to the principal investigator via email. Each participant participated in the three exercise sessions with at least 24 hours but no more than 7 days in between sessions. Following the third exercise session, participants completed the two manipulation check questions.

Design and Analysis

This research study employs an experimental, within-subject design. Differences in exercise data (i.e., HR, calories burned, distance cycled) among conditions were analyzed via repeated measures ANOVA. When the omnibus test was significant, post-hoc analyses were performed to identify the differences among the conditions. Then, the relationship among the outcome variables was explored via correlation analysis. Finally, a regression analysis was performed with goal orientation and social comparison as predictors and exercise performance (i.e., HR, calories burned, distance cycled) as the outcome. The alpha level was set at .05 for all analyses. Outliers were defined as absolute values with a z-score greater than 3. The normality of the data was checked via the Shapiro-Wilk test.

Results

No outlier or missing data emerged. All outcome variables were normally distributed ($p > .05$), and all participants completed the three exercise conditions. Table 1 presents participant characteristics.

Manipulation Check and Descriptive Results

The two manipulation check items revealed that participants viewed the exercise data displayed on the bike very frequently ($M = 4.69/6$, $SD = .74$) and compared themselves to others during the exercise session occasionally to frequently ($M = 4.27/6$, $SD = 1.08$).

Table 2 presents the main exercise performance variables in all three conditions.

Analyses Related to Participants Characteristics

To investigate a potential effect of participants' characteristics on outcome variables, we grouped class participation in the past month into two categories: 12 classes or less ($n = 10$) and more than 12 classes ($n = 16$). In the survey, participants had four response choices to report their class participation in the past month (0-3, 4-8, 8-12, and 12+), and the first three response choices (0-3, 4-8, and 8-12) were lumped together to create a large enough group that could be compared to the 12+. Perceived fitness levels were grouped into slightly to moderately fit ($n = 19$) and very to extremely fit ($n = 7$). Using HR, calories, and distance for all three conditions as outcome variables, a MANOVA revealed a non-significant effect of class participation in the past month, Wilks' $\lambda = .44$, $F(9, 16) = 2.23$, $p = .08$, $\eta p^2 = .56$. Similarly, no difference emerged between perceived fitness levels across all outcome variables, Wilks' $\lambda = .53$, $F(9, 16) = 1.55$, $p = .21$, $\eta p^2 = .47$.

Table 1. Characteristics of Participants

Variable	Number	Percentage
Gender		
Male	3	11.5
Female	23	88.5
Class participation in the past month		
4-8	7	27
8-12	3	11.5
12+	16	61.5
Perceived fitness level		
Slightly fit	5	19.2
Moderately fit	14	53.8
Very fit	6	23.1
Extremely fit	1	3.8

Table 2. Participant Means and Standard Deviations for Heart Rate, Calories Burned, and Distance Cycled in Each of the Three Exercise Conditions

	Control (no data) Mean (*SD*)	**Individual data only** Mean (*SD*)	**Group data** Mean (*SD*)
HR (bpm)	147.81 (15.17)	151.54 (15.71)	154.96 (12.88)
Calories (Kcal)	310.23 (85.52)	337.69 (105.28)	362.42 (125.70)
Distance (miles)	8.69 (1.15)	8.89 (1.12)	9.05 (1.13)

Note. HR = heart rate, Kcal = calories burned, distance = distance cycled.

Analyses Related to The Effect of Exercise Condition on Exercise Performance

Heart Rate

The analysis revealed a significant effect of condition on HR, Wilks' $\lambda = .72$, $F(2, 24) = 4.63$, $p = .02$, $\eta p^2 = .28$. Post-hoc analyses revealed that HR was higher when participants were seeing others' data than when they were not seeing any data ($p = .02$, $d = 0.51$). No HR difference emerged between the individual data and no data conditions ($p = .20$), or between the individual data and group data condition ($p = .43$).

Distance Cycled

Analyses revealed a significant effect of condition on distance cycled, Wilks' $\lambda = .39$, $F(2, 24) = 18.56$, $p < .001$, $\eta p^2 = .61$. Post-hoc analyses revealed significant differences among all conditions. Participants cycled the longest distance when they were able to see the group data, which was significantly higher than when they only saw their own data ($p < .001$, $d = 0.14$) or when they were unable to see any data ($p < .001$, $d = 0.32$). The distance covered in the individual data condition was also significantly higher than the no data condition ($p < .001$, d = 0.16).

Calories Burned

Analyses revealed a significant effect of condition on calories burned, Wilks' $\lambda = .77$, $F(2, 24) = 3.67$, $p = .04$, $\eta p^2 = .23$. Post-hoc analyses revealed calories burned were higher when participants were able to see the group data compared to when they were unable to see any exercise data ($p = .03$, $d = 0.49$). No calories burned difference emerged between the individual data and no data conditions ($p = .20$), nor between the individual data and group data conditions ($p = .16$).

Correlation and Regression Analyses

Correlations among exercise performance variables, goal orientation, and social comparison disposition are presented in Table 3.

The analysis revealed a strong positive correlation between social comparison disposition and calories burned, and a moderate to strong positive correlation

Table 3. Pearson's *r* Correlations Among Exercise Performance Variables, Goal Orientation, and Social Comparison Disposition

Variable	**1**	**2**	**3**	**4**	**5**	**6**
1. HR						
2. Calories	.20					
3. Distance	.00	.75**				
4. Ego orientation	-.45*	-.10	-.05			
5. Task orientation	.14	.16	.20	-.47*		
6. Social comparison	-.05	.52**	.45*	.02	.06	

Note. *$p < .05$, **$p < .01$.

between social comparison disposition and distance cycled. A moderate to strong negative correlation emerged between ego orientation and HR, and between task and ego orientations. Finally, calories burned were strongly correlated with distance cycled, but HR was not significantly correlated with either calories burned or distance cycled.

Linear regression analyses were performed to determine if social comparison tendencies and ego orientation predicted exercise performance (i.e., HR, calories burned, and distance). Those analyses were performed for the group data condition only.

Social Comparison Orientation

Regression analysis results are presented in Table 4.

Social comparison orientation was a significant predictor of distance cycled, $F(1, 24) = 5.99$, $p = .02$, $R = .45$, $R^2 = .20$. Social comparison scores accounted for 20% of the variance in distance cycled. The β coefficients revealed that the higher the social comparison orientation, the longer the distance cycled, $\beta = .45$, $t = 2.45$, $p = .02$.

Social comparison orientation was also a significant predictor of calories burned, $F(1, 24) = 8.94$, $p = .006$, $R = .52$, $R^2 = .27$. Specifically, social comparison accounted for 27% of the variance in calories burned. Inspection of the β coefficient revealed that the higher the social comparison, the more calories were burned, $\beta = 0.52$, $t = 2.99$, $p = .006$.

Ego Orientation

Regression analysis are presented in Table 5.

Ego orientation was a significant predictor of HR, $F(1,24) = 5.60$, $p = .03$, $R = .44$, $R^2 = .19$, with ego orientation accounting for 19% of the variance in HR in the group condition. Inspection of the β coefficients revealed that the higher the ego orientation, the higher the average HR, $\beta = -6.20$, $t = -2.37$, $p = .03$.

Discussion

The current study explored exercise performance amongst Peloton bike riders when exposed to varying exercise data displays. Participants exhibited a higher average HR and cycled for a longer distance in the group data display condition compared to the individual data or no data display condition. These results suggest that individuals who exercised with the ability to see other participants' exercise data during their session performed at a higher level than when seeing their data only or without any data display. This is consistent with previous research indicating that when exercisers have access to others' exercise data, whether that is a partner or group, individuals tend to increase effort (i.e., calories burned) and persist longer (i.e., run duration; Aral & Nicolaides, 2017; Irwin et al., 2012; Walmink et al., 2014). This study extends the literature by presenting evidence of the motivational benefits of group data display while exercising, without the physical presence of other exercisers.

Table 4. Regression Coefficients of Social Comparison on Exercise Performance

Variable	*B*	*SE*	*p*	R^2
HR	-2.01	8.35	.80	.00
Calories Burned	208.27	69.66	.006	.27**
Distance	1.61	.66	.02	.20*

Note. *$p < .05$. **$p < .01$.

Table 5. Regression Coefficients of Ego Orientation on Exercise Performance

Variable	*B*	*SE*	*p*	R^2
HR	-6.20	2.62	.03	.19*
Calories Burned	-13.28	28.26	.64	.009
Distance	-.06	.26	.82	.002

Note. *$p < .05$.

To gain a better understanding of the variables involved in this motivational benefit, we ran regression analyses with social comparison and ego orientation as potential predictors of exercise performance. Social comparison significantly predicted 20% of distance cycled and 27% of calories burned, indicating that those with a higher tendency of comparing to others had a higher exercise performance when group data was available for comparison. The amount of variance in performance explained by social comparison is substantial and provides group exercise leaders with a strategy to increase participants' engagement. By incorporating tracking technology in exercise, specifically when in group settings, exercise leaders can more intentionally create opportunities for social comparison of performance. Visually presenting data from the group, even virtually, increases participants' effort and benefits from the exercise session. Those results are consistent with Aral and Nicolaides (2017), who reported that cyclists with higher social comparison tendencies perform at a higher intensity when they can access others' exercise data. Specifically, the authors found that when cyclists were able to compare themselves with others, they cycled longer and burned more calories than those who did not have access to others' data.

While social comparison orientation significantly predicted calories burned and distance cycled, it did not predict HR. Social comparison was also not significantly correlated with HR. It is possible participants have been motivated to observe and compare to others while not trying to outperform them. Researchers using a virtual reality exercise similarly found no increase in HR across sessions (Chapman-Lopez et al., 2020), which was explained by a lack of competitive on-screen elements and a need for enhanced display. This may apply to Peloton screens as only a list of participants is available but no videos or pictures of participants exercising are displayed. Additionally, participating in the same cycling class for each condition, participants already had a high HR ($M_{control}$ = 147.8, M_{ind} = 151.5, M_{group} = 154.9) and had little room for improvement across conditions. The HR means were at the high end of the target HR range (93-157bpm) for maximum exercise benefits, which is considered high intensity (CDC, 2020) for the average participant's age in this study (M_{age} = 34.8, which lead to a theoretical HR max of 185).

Ego orientation was a significant predictor of HR in the group data condition, explaining 19% of the variance in HR. Previous research assessing task and goal orientation mostly focused on sport contexts and has shown mixed results in predicting performance. For example, Abdullah and colleagues (2016) found ego orientation significantly predicted sport performance across a range of athletes, whereas in a study with martial artists, ego orientation was not a significant predictor of sport performance (King & Williams, 1997). The current study addresses the limited research related to the inclusion of ego orientation in exercise settings, and the present results suggest that 19% of the variance in HR during exercise is explained by ego orientation. These results echo previous exercise research, which demonstrated that ego orientation significantly predicted exercise effort (Easton, 2018). Exercise trackers and display systems in a group setting facilitate comparison among participants and potential competition. Ego orientation is concerned with comparing to and outperforming others (Gråstén & Watt, 2016). Social comparison and ego orientation can be integrated in a two-step process: first, social comparison is used to collect information (i.e., the performance of others compared to your own), then ego orientation uses this information as a criterion to outperform others. It is unclear, however, why ego orientation was a significant predictor of HR but not calories burned and distance. Nevertheless, this study suggests that ego orientation can be a motivating factor to increase intensity in a virtual exercise setting.

Limitations

Potential limitations of this study on Peloton riders must be considered. First, the present results apply to virtual exercise settings, and the generalization to in-person exercise should be tested in future studies. Second, exercise sessions were completed individually within the home of each participant rather than in a lab setting, potentially impacting control and standardization. Specifically, the calibration of the bikes for HR, calories, and distance was not checked. Participants also "scheduled" the exercise sessions around their lifestyle and individual schedules, meaning variability of fatigue or energy levels and their respective impact on performance may need to be taken into consideration. Participants were also not instructed to forgo other exercises while participating in the study or to avoid caffeine, two factors that may have impacted participant performance. Next, most participants identified as female which may not accurately depict performance across all genders. Finally, it is important to understand there is considerable financial privilege for those able to afford a Peloton system, which further limits generalizability. Despite these potential limitations, the study findings are in line with current research findings and extend the literature on the effect

of visual exercise data, social comparison, and goal orientation on exercise performance.

Future Research and Implications

Future research should aim to control for the above limitations to further validify the present study's findings regarding the positive effects of exercise data display on exercise performance in a group setting. Future research should examine in-person group exercise sessions to better control and standardize the exercise sessions and equipment. Additionally, to provide a more holistic view of factors influencing exercise performance, self-determination theory, and the exercise climate—the environment created in the gym or by the leader/coach of the exercise session—should also be considered. For example, high extrinsic motivation and a climate favoring social comparison or competition might also lead to participants exerting too strenuously and increase the risk of injury. Finally, future research should include Body Mass Index, race/ethnicity, and household income to get a more inclusive demographic picture of the participants, along with a qualitative follow-up to complement objective data.

While exercise performed in a home setting could be perceived as a limitation, the future of the health and fitness industry has become increasingly virtual, a shift that was potentially expedited by the Coronavirus pandemic. As home-workout technology revolutionizes and new pieces of equipment are developed, it is necessary to research the impact of social comparison across multiple modalities of exercise and various forms of technology. For instance, FightCamp Gym (shadowboxing) and Tempo Studio (resistance training) are two at-home exercise machines with live classes and virtual trainers who the user follows and uses as a guide during workouts. Other companies, such as NordicTrack, sell multiple pieces of equipment, such as treadmills, bikes, ellipticals, and the Vault (interactive strength training), allowing users to participate in live classes at home. Similar to Peloton, live classes on the aforementioned devices allow participants to utilize leaderboards and stats to compare their performance to others taking classes.

Exercising with others can boost motivation to perform, increase enjoyment, and enhance effort or intensity (Irwin et al., 2012; Mauriello et al., 2014). Past social comparison in exercise research focused on using virtual partners when comparing exercise performance and group fitness has received limited attention (Feltz et al., 2011). Further, previous studies have focused on subjective experience in exercise and social comparison (Tholander & Nylander, 2015), whereas this study included both subjective and objective measures. As activity trackers have become a popular way to engage with others during exercise, they have granted the ability to explore factors affecting exercise performance. This study suggests that when an individual has access to group exercise data, their exercise performance increases (i.e., average HR, calories burned, and distance cycled). For fitness facility owners and group exercise leaders, this study provides support for visually presenting data from the group, even virtually, to increase participants' effort and engagement, ultimately increasing the benefits from the exercise session. For those who are not sufficiently active, seeing their data can allow them to monitor their progress. Then, as participants exercise more regularly, the presentation of group data of people with similar fitness levels can help them increase their engagement during exercise.

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Psychological Rest in Student-Athletes: Relationships Between Sport Demands, Mental Rest, Depressive Symptoms, and Well-Being

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The purpose of this study was to explore how sport demands and psychological aspects of rest are related to depressive symptoms and well-being among female college athletes. Eccles and Kazmier (2019) proposed that physical and psychological (i.e., cognitive and emotional) demands of sport negatively affect perceptions of being mentally rested, which in turn reduce well-being and elicit depressive symptoms. They also proposed that engaging in resting experiences buffers negative effects of sport demands on perceptions of being mentally rested. These model predictions were tested in this study. Female athletes (*N* = 179) in NCAA Division I sports provided online responses to the Demand-Induced Strain Compensation Questionnaire for Sport (Balk et al., 2018), Center for Epidemiologic Studies Depression Scale (Radloff, 1977), and Mental Health Continuum-Short Form (Keyes et al., 2008). They also completed measures of perceptions of recent resting experiences and perceived current level of mental rest that were developed for this study. Results showed that emotional demands but not physical or cognitive demands, significantly predicted current level of mental rest. Also, recent resting experiences significantly predicted current level of mental rest but did not significantly moderate the relationship between sport demands and current level of mental rest. Finally, athletes who reported a lower current level of mental rest experienced a lower level of well-being and more depressive symptoms. Monitoring of emotional demands and engaging in key psychological resting experiences might be useful for athletes as they attempt to obtain adequate mental rest and stay healthy mentally.

Keywords: college athletes, mental health, recovery

College student-athletes have a lifestyle of high demands and intense pressure, which can have an impact on their performance in both the athletic and academic domain (Bird et al., 2018; Humphrey et al., 2000). These high demands can be physically (e.g., muscle pain), cognitively (e.g., decreased attentional capacity), and emotionally (e.g., anxiety) taxing in ways that increase the need for recovery (Balk et al., 2017). Thus, adequate recovery, defined as a state in which the physical and mental resources diminished by engagement in sport are subsequently replenished, is important for student-athlete performance and health (Eccles et al., 2022). For athletes, research indicates that inadequate recovery can contribute to the onset of overtraining syndrome, where symptoms include fatigue, performance decline, and mood disturbances (Meeusen et al., 2013), and burnout, which is an experiential syndrome characterized by emotional and physical exhaustion, a sense of reduced accomplishment, and a devaluation of participation in one's sport (Eklund & DeFreese, 2015). Inadequate recovery and in turn overtraining and burnout are also associated with decreases in sport performance and well-being and increases in depressive symptoms (Eklund & DeFreese, 2015; Nixdorf et al., 2021).

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A substantial body of evidence suggests that physical activity (PA) can be an effective non-clinical intervention for reducing symptoms associated with poor mental health (see Wegner et al., 2014 for a review of meta-analyses). Physical activity refers to any movement that increases energy expenditure, with exercise being one sub-category of PA and is defined as structured, repetitive, and planned bodily movements undertaken for the

primary goal of increasing physical fitness (Caspersen et al., 1985). Research across a broad spectrum of mental health symptoms and populations has generally found that PA can help to reduce psychological distress (e.g., Morres et al., 2019), as well as anxiety and depression symptoms (e.g., Wegner et al., 2014). Furthermore, there is also evidence to suggest that PA can have mood-enhancing benefits (Chan et al., 2019) and can improve positive affect and psychological well-being (Elkington et al., 2017). In university students, a range of cross-sectional studies have identified positive relationships between levels of PA and mental health, whereby students who engage in PA more frequently report better mental health and well-being (e.g., Budzynski-Seymour et al., 2020; Murphy et al., 2018). This evidence suggests that strategies to increase levels of PA could not only enable students to reap the considerable physical health benefits associated with engagement in PA (e.g., Reiner et al., 2013) but also have a positive impact on their mental health.

Additionally, research reviews indicate that perceptions of the demands placed upon student-athletes by their sport can affect their mental health (Kegelaers et al., 2022). Specifically, psychological (e.g., role strain), social (e.g., moving away from home), financial (e.g., need to engage in additional vocational activities), academic (e.g., tasks and assignments), and performance (e.g., roster selection) demands all affect the mental health of student-athletes. These demands may be of greater concern in relation to female student-athletes because women, and young women in particular, experience greater depression (Hyde & Mezulis, 2020) and lower levels of well-being (Batz & Tay, 2018) than men. For example, Salk et al. (2017) meta-analyses indicate that women aged 16-19 years and aged 20-29 years are, respectively, 2.69 and 1.93 times more likely to experience depressive symptoms than age-matched men. Similar results have been obtained from research on gender differences in depression in athletes, including NCAA Division I student-athletes (for reviews, see Kegelaers et al., 2022; Perry et al., 2021). For example, Wolanin et al. (2016) reported that female athletes at the Division I level were 1.84 times more likely to report depressive symptoms than male athletes. Though there is little research on gender differences in well-being in student-athletes, Belz et al.'s (2018) study of German state and national athletes in different age categories (under 18, 18-20, 21-24, 25-40, & over 40 years) revealed that female athletes had significantly lower well-being than male athletes generally, and especially so for athletes aged 21-24 years, which approximates college age. The causes of gender differences in depression and well-being in both the general and athlete populations are not well understood but most explanatory frameworks include a combination of biological (e.g., hormonal differences), structural (e.g., inequality of training opportunities), and sociocultural (e.g., gender role expectations) factors (Hyde & Mezulis, 2020; Perry et al., 2021). One additional explanation is underreporting by men of depressive symptoms perceived as unmasculine (e.g., crying), but research suggests that this accounts for only a small proportion of the observed gender differences (Hyde & Mezulis, 2020).

Though female athletes appear at a higher risk in terms of greater depression and lower well-being compared to male athletes, relatively little attention has been paid to female athletes within the sports sciences generally (Cowley et al., 2021) and health conditions affecting female athletes in particular (Wolanin et al., 2016). For example, in their review, Kuttel and Larsen (2020) counted male and female participants across all extant studies of athlete mental health and found that twice as many males as females had participated in these studies. As Blodgett et al. (2014) observed, male athletes are typically considered the norm and as such are privileged within society, while female athletes are subordinated, considered exotic, and referred to as "other" athletes. As such, there is a clear need for research on the health and well-being of female athletes, which includes considerations of how these athletes recover from the considerable demands imposed by their sport.

Rest, which has both psychological and physical aspects, is considered to be a key component of recovery in athletes (Eccles, 2021; Kellmann et al., 2018). Psychological rest involves reduced psychological demands, whereas physical rest involves reduced physical demands. Researchers have proposed that "complete rest" is "the only efficient remedy" for overtraining (Hausswirth & Mujika, 2013, p. viii). Also, "genuine rest", which involves minimizing physical training and cancelling competitions, is a key treatment for burnout (Goodger & Kentta, 2010, p. 135). Empirical research appears to support these proposals, indicating that experiences of the overtraining and burnout syndromes are less likely if sufficient rest is provided within training and competition regimens (e.g., Cresswell & Eklund, 2007), presumably because rest involves a break from the contextual characteristics including prolonged sport demands that give rise to these syndromes.

Within the recovery literature, rest typically has been associated with "inactivity" (e.g., Kellmann et al., 2018), which is defined as the cessation or reduction of *physical* participation in training and competition. By

comparison, only recently have researchers turned their attention to better understanding what constitutes rest in psychological terms. As such, as a component of the recovery process, the psychology of rest is relatively under-researched in the field of sport psychology, yet holds theoretical and practical importance (Eccles et al., 2022).

Recently, however, Eccles and Kazmier (2019) proposed an initial model of the psychology of rest in athletes, and conducted qualitative, interview-based research to determine the experiences that female student-athletes associated with the concept of "mental rest" (i.e., the psychology of rest). An initial model of the psychology of rest proposed a distinction between: (a) an athlete's current level of mental rest (i.e., an experiential psychological state), and (b) a process of mentally resting that affects the athlete's level of psychological rest. In terms of an athlete's level of rest, mentally well-rested athletes reported feeling "fresh", valuing and appreciating their sport, being highly motivated to engage in their sport, applying a lot of effort to their sport, and enjoying their sport (Eccles & Kazmier, 2019). By contrast, athletes described being poorly rested as feeling "tired", not really valuing or appreciating their sport, lacking motivation, not applying much effort, and not finding much enjoyment in their sport. In addition, the model proposed that being chronically and poorly rested leads to poor health and well-being presenting as deleterious experiences of cognitive fatigue, lack of control, tedium, and stress and frustration from performance demands. The process of resting was proposed to depend on engagement in sleep and wakeful resting experiences. These wakeful resting experiences, which were identified as the primary components for the proposed process of mentally resting, included: (a) reduction in thinking about one's sport, (b) reduction in effortful thinking, (c) assuming internal control, (d) experiencing variety in one's daily routine, (e) reduction in stress associated with work-related opportunity costs, and (f) reduction in frustration associated with personal opportunity costs (Eccles & Kazmier, 2019).

In summary, the research reviewed here suggests that increases in sport demands might lead to decreases in feelings of being mentally rested, which in turn might lead to increases in depressive symptoms and decreases in well-being, which is of particular concern for female athletes who experience greater depression and poorer well-being. However, engaging in the process of resting might moderate the effects of sport demands on feelings of being mentally rested, with beneficial consequences in terms of depression and well-being.

Aim and Hypotheses

The aim of this study was to provide a first test of the model of the psychology of rest in athletes (Eccles & Kazmier, 2019). The following model-derived hypotheses were tested: (a) athletes reporting higher recent physical, cognitive, and emotional sport-related demands would report feeling less well-rested mentally, (b) recent engagement in psychological resting experiences would moderate the relationship between perceived demands and feeling mentally rested, and (c) student-athletes who reported feeling more mentally rested would report fewer depressive symptoms and higher levels of well-being.

Note that there are no established measures of rest and as such there is a need for the development of such measures. Measure development should be well grounded conceptually and therefore should not be groundlessly embarked upon. Given that the model proposed by Eccles and Kazmier (2019) is a new model such that its potential viability and utility are open questions at this point, we did not believe that we had the solid theoretical grounding needed to embark on formal measure development, particularly when considering the time and resources required for this endeavor. Instead, we used some initial exploratory measures in the present study to investigate the model's potential viability and utility with the aim of using the study findings to inform future decisions about whether more meaningful pursuit of the model is worthwhile, which would include engaging in more formal measure development procedures.

Method

Participants

Inclusion criteria specified that participants must be female NCAA Division I athletes, at least 18 years of age, in-season, and on the active roster for their respective programs. To ensure these criteria were met, prospective participants were asked to respond to demographic questions including NCAA division level, age, and season status at the beginning of the Qualtrics survey. If their responses did not meet the aforementioned inclusion criteria, they were redirected to the end of the survey. Prospective participants were not screened for mental health disorders.

Participants were 179 female Division I athletes aged 20.01 years on average (*SD* = 1.45) and averaged 10.31 years (*SD* = 4.50) of involvement in their sport. They included 39 (22%) freshman, 49 (27%) sophomores,

36 (20%) juniors, 42 (23%) seniors, and 13 (7%) graduate students. In terms of race, 136 (76%) participants were White, 12 (7%) African American, 10 (6%) Hispanic or Latinx, six (3%) Asian, and 13 (7%) of mixed race. Participants were athletes in track and field (*n* = 42), soccer (*n* = 28), softball (*n* = 19), cross country (*n* = 13), indoor volleyball (*n* = 13), swimming and diving (*n* = 11), tennis (*n* = 11), golf (*n* = 8), gymnastics (*n* = 7), beach volleyball (*n* = 6), ice hockey (*n* = 6), rowing (*n* = 5), lacrosse (*n* = 2), basketball (*n* = 2), field hockey (*n* = 2), and snow skiing (*n* = 1).

Measures

Sport-Related Demands

The demands subscales of the Demands-Induced Strain Compensation Questionnaire for Sport (DISQ-Sport; Balk et al., 2018) were used to measure athletes' perceptions of sport-related demands. Balk et al. (2018) adapted this instrument from the original DISQ (De Jonge et al., 2007). The DISQ-Sport consists of three demands subscales including physical demands, cognitive demands, and emotional demands each comprising four self-report items. The introductory statement was adapted to delimit responses on all subscales to the last two weeks. Athletes were then asked to indicate the extent to which their sport requires them to deal with those three types of demands. Example items for each subscale include: (a) "In my sport, I have to expend a lot of physical effort" (physical demands subscale), (b) "In my sport, I have to expend a lot of mentally taxing effort" (cognitive demands subscale), and (c) "In my sport, I have to deal with a negative atmosphere within the group I belong to" (emotional demands subscale). Responses were given on a 5-point Likert scale that ranged from 1 (never) to 5 (almost always). Balk et al.'s (2018) analyses of the DISQ-Sport not only indicated that acceptably reliable data were obtained on each subscale, but that the data also exhibited factorial invariance across sport type, competition level, and language.

Perceptions of Recent Experiences of Psychological Rest

Eccles and Kazmier (2019) identified that, for athletes, six resting experiences are involved in the process of resting psychologically. These experiences included (a) reduction in thinking about one's sport, (b) reduction in effortful thinking, (c) assuming internal control, (d) experiencing variety, (e) reduction in stress associated with work-related opportunity costs, and (f) reduction in frustration associated with personal opportunity costs. The extent to which athletes in this investigation engaged in these experiences in the last two weeks was measured using a researcher-developed questionnaire. First, one researcher drafted items that she felt captured engagement in each of the six resting experiences as described by Eccles and Kazmier (2019). Then, the draft of each item was refined through discussion with a second researcher. For example, engagement in the resting experience of "a reduction in thinking about one's sport" was measured by the item, "In your free time over the last two weeks, how frequently have you been able to spend time thinking about something other than your sport?" When responding to each item, athletes were asked to think about their free time outside of training, competitions, and class schedule over the last two weeks. Responses to each item were obtained via a visual analogue scale ranging from 0 (never) to 4 (always) and were captured to two decimal places (e.g., 2.27). No pilot testing of this measure was undertaken. As such, the data presented in the present study are the first available data yielded by this measure.

Perceived Level of Mental Rest

The degree to which an athlete felt mentally rested was measured using a single researcher-developed item. In their study, Eccles and Kazmier (2019) interviewed athletes about their experiences of being poorly and well rested. In their report of the study, these researchers presented athletes' common responses concerning these experiences. In the current study, participants were provided with brief versions of these descriptions of being poorly rested at one end of a visual analogue scale, which included feeling tired, not really valuing or appreciating my sport, lacking the motivation to engage in my sport, not applying much effort to my sport, and not enjoying my sport very much. At the other end of the scale, participants were provided with brief versions of the descriptions of being well-rested, which included feeling fresh, valuing and appreciating my sport, feeling highly motivated to engage in my sport, applying a lot of effort to my sport, and enjoying my sport a lot. A single-item response was given on a scale ranging from 0 (poorly rested) to 4 (well-rested), where responses were captured to two decimal places (e.g., 2.27). Participants were asked to consider the different descriptions for feeling poorly rested or well-rested and then indicate their current level of mental rest on the scale. No pilot testing of this measure was undertaken. As such, the data presented are the first available data yielded by this measure.

Depressive Symptoms

The Center for Epidemiologic Studies Depression Scale (CES-D; Radloff, 1977) was used to measure

depressive symptoms among student-athletes. The CES-D consists of 20 self-report items used to measure depressive symptoms over the last week and is representative of multiple dimensions of depression (Edwards et al., 2010). Participants respond to items such as "I had trouble keeping my mind on what I was doing" on a 4-point Likert scale ranging from 0 (rarely or none of the time; <1 day) to 3 (most or all of the time; 5-7 days). Before computing mean or sum score, items measuring positive affect (i.e., items 4, 8, 12, and 16) are reverse-coded. Then, item responses are typically summed to achieve a total score, which ranges from 0 to 60, with higher scores signifying greater severity of depression. However, in this study, we used the average score of the items so that we could compare the average score directly against the response scale. Because the CES-D was developed to measure recent level of symptomology, scores are expected to vary over time, which makes the test-retest reliability moderate, ranging between .45 and .70, depending on time interval (Radloff, 1977). Data obtained with the CES-D have been demonstrated to have high internal consistency reliability, with a Cronbach's alpha coefficient of .85 among the general population and .90 among patient samples (Radloff, 1977).

Well-Being

The Mental Health Continuum-Short Form (MHC-SF; Keyes et al., 2008) was used to measure well-being as experienced over the last month. The MHC-SF is a 14-item self-report questionnaire for assessing positive mental health on three dimensions (i.e., psychological, social, and emotional) and is adapted from the Mental Health Continuum-Long Form. Example items for each dimension include: (a) "During the past month, how often did you feel confident to think or express your own ideas and opinions" (psychological well-being), (b) "During the past month, how often did you feel that people are basically good" (social well-being), and (c) "During the past month, how often did you feel interested in life" (emotional well-being). Responses are provided on a 6-point Likert scale ranging from 0 (never) to 5 (every day). Typically, item responses are summed to produce a total response score that can range from 0 to 70. However, in this study, we used the average score of the items to compare the average score directly against the response scale. Data obtained with the MHC-SF have demonstrated high internal consistency reliability, with Cronbach's alpha coefficients greater than .80 having been observed for each subscale (Robitschek & Keyes, 2009). Additionally, the three-factor structure of the measure has been supported by data collected from many populations including the US adult (Gallagher et al., 2009) and college student populations (Robitschek & Keyes, 2009).

Procedure

Ethics approval for this study was obtained from the University's Institutional Review Board. The lead researcher identified the email addresses of the 1695 coaches of women's sports listed on the online directory of 201 NCAA Division I schools (NCAA, 2022). From October 2020 through January 2021, emails were sent out to each coach providing a brief overview of the study and an electronic link to the survey hosted by Qualtrics. Coaches were asked to pass the study information on to the athletes they coach. At the beginning of the Qualtrics survey, athletes were asked to identify their season status as one of the following: (a) in-season (20hr/week), (b) out of season (8hr/week), or (c) inactive (0hr/week). Data collected during the October 2020 to January 2021 timeframe consisted entirely of "in-season (20hr/week)" responses. This information specified that participation was entirely unrelated to athlete selection for competition. Athletes willing to participate followed the electronic link to the survey. Following provision of consent, athletes completed the questionnaire measures. The questionnaires were randomly ordered to reduce order effects.

Data Analysis

First, descriptive statistics for all study variables were computed. Pearson correlation coefficients between all study variables were reported and tested for statistical significance via a two-tailed test. Second, exploratory factor analysis was conducted to establish the factor structure for the resting experiences measure. Finally, three rational sequential entry (i.e., hierarchical) regression analyses were applied to assess the extent to which (a) the three forms of sport demands predicted perceived level of mental rest and (b) the resting experiences moderated the relationships between sport demands and perceived level of mental rest. All statistical analyses were conducted in SPSS version 26.0. Cleaning of the data (N = 179), which occurred prior to running all analyses, involved observing the data set for missing values and coding the missing data. Only three cases (i.e., 1.7% of the data set) had variables with missing values. The Little's MCAR test was not significant, χ^2 (16) = 29.56, p > .01. Given the small portion of missing data and non-significance of the MCAR test, the listwise deletion method was employed for regression analyses.

Results

Descriptive Statistics

Table 1 displays Pearson correlation coefficients between the study variables. Table 2 displays the sample size, mean, standard deviation, and internal consistency reliability coefficient for each study variable. All measures with multiple items had acceptable internal consistency reliability with alpha coefficients greater than .70 (see Table 2). Participants reported experiencing physical demands in the last two weeks at a value between "sometimes" and "often" (*M* = 3.48; *SD* = .83), cognitive demands at a value that was almost often (*M* = 3.86; *SD* = .95), and emotional demands at a value that was just above rarely (*M* = 2.23; *SD* = .92). Participants reported experiencing physical rest at a value that was just above "sometimes" (*M* = 2.11; *SD* = .72) and mental rest just above the halfway point between poorly rested and well-rested (*M* = 2.36; *SD* = .87). Depressive symptoms in the last week were experienced just below "some of the time/1-2 days" (*M* = .96; *SD* = .55). With regard to well-being, in the last month, positive mental health was experienced about 2 or 3 times a week (*M* = 3.23; *SD* = .93).

Exploratory Factor Analysis (EFA)

The inter-item correlations among the six resting experience variables indicate that most of the resting experience variables were moderately or strongly correlated (see Table 1). However, variable RE5 (reduction in stress associated with work-related opportunity costs) was weakly correlated with the other five variables (all $r < .30$) and with the total score, suggesting that the item might reflect a construct that differs from the ones reflected by the other items on the scale. To determine how to most appropriately represent the resting experiences in the planned regression models, exploratory factor analyses were performed using Principal Axis Factoring extraction method with oblique rotation (when there were at least two factors). Principal Axis Factoring is a commonly used extraction method and is appropriate for the current analysis because it focuses on latent factors that explain common variance among items (e.g., Henson & Roberts, 2006). When multiple factors are needed, oblique rotation is used to allow factors to be correlated because we do not have a theory that factors are uncorrelated. Item scores were on an interval scale and did not deviate from normality: Skewness ranged from -0.79 to 0.28 and kurtosis ranged

Table 1. Correlation Matrix for Study Variables

Variable	CDemands	EDemands	RE1	RE2	RE3	RE4	RE5	RE6	RE	MR	CES-D	MHC-SF
PDemands	.60**	.18*	-.12	-.06	-.20**	-.09	-.07	-.16*	-.15*	.04	.04	.06
CDemands	-	.24**	-.06	-.05	-.16	-.04	-.04	-.09	-.09	-.02	.02	.08
EDemands	-	-	-.16*	-.21**	-.21**	-.17*	-.13	-.25**	-.25**	-.30**	.29**	-.25**
RE1	-	-	-	.34**	.26**	.30**	.27**	.35**	.42**	.09	-.28**	.30**
RE2	-	-	-	-	.55**	.45**	.20**	.46**	.58**	.26**	-.40**	.37**
RE3	-	-	-	-	-	.67**	.20**	.54**	.65**	.17*	-.34**	.31**
RE4	-	-	-	-	-	-	.20**	.58**	.64**	.19*	-.38**	.42**
RE5	-	-	-	-	-	-	-	.27**	.30**	-.01	-.17*	.13
RE6	-	-	-	-	-	-	-	-	.64**	.22**	-.39**	.38**
RE	-	-	-	-	-	-	-	-	-	.25**	-.46**	.47**
MR	-	-	-	-	-	-	-	-	-	-	-.49**	.40**
CES-D	-	-	-	-	-	-	-	-	-	-	-	-.75**

Note. *$p < .05$, **$p < .01$; PDemands = Physical demands; CDemands = Cognitive demands; EDemands = Emotional demands; RE1 = Reduction in thinking about one's sport; RE2 = Reduction in effortful thinking; RE3 = Internal control; RE4 = Variety; RE5 = Reduction in stress associated with work-related opportunity costs; RE6 = Reduction in frustration associated with personal opportunity costs; RE = Resting experiences; MR = Mental Rest; CES-D = Depressive symptoms scale; MHC-SF = Well-being scale; Correlations between RE and RE1-RE6 were corrected item-total correlations with the item being deleted.

from -0.89 to 0.28. The sample data were adequate for conducting EFA, as evidenced by Kaiser-Meyer-Olkin = .81, and Bartlett's test statistic = 294.37, $df = 15$, $p < .05$. One factor was suggested based on the eigenvalue >1 rule (Kaiser, 1960) since the first two largest eigenvalues were 2.97 and .97. Parallel analysis using 500 random datasets and the 95th percentile of eigenvalues for comparison also revealed a one-factor solution. Factor loadings from the one-factor model ranged from .32 (RE5) to .78 (RE3). The RE5 item was the only one with a factor loading smaller than .40. Using loading ≥ .40 to determine a meaningful weight on a factor (Henson & Roberts, 2006), RE5 was considered a weak indicator. Therefore, the one-factor model including variables RE 1, 2, 3, 4, and 6 was re-run. The five-item one-factor model explained 47.22% of total variance. The factor loadings were sufficiently large (> .40). We also conducted a two-factor EFA model, but it failed to yield a meaningful interpretation regardless of including RE5. Specifically, only one item had a large loading on a factor; all other items had large loadings on the second factor. RE5 continued to be problematic as it did in the one-factor model. Therefore, we chose the one-factor model with five items and concluded that the five-item scale was unidimensional. The mean of five item scores was computed to represent resting experience and then used in the regression models. The alpha coefficient was .81 for the five-item scale.

Main Analyses

For the main analysis, three hierarchical regressions were run to test our hypotheses. For each analysis, the assumption of linearity was examined by checking the scatterplots between the outcome variable and predictors. In addition, residuals were checked for the assumptions of normality and homoscedasticity. The assumptions appeared to be tenable for each analysis based on the overall linear patterns observed in the scatterplots, approximately normal distribution of residuals, and roughly equal spread of residuals around the zero mean across predicted outcome values.

To test the hypotheses that physical demands would predict perceived level of mental rest and that the resting experiences would moderate this relationship, the predictor physical demands was added to the first block, and resting experiences and the interaction term between resting experiences and physical demands were entered into the second block. The hierarchical regression results reported in Table 3 indicate that physical demands alone had no significant effect on perceived level of mental rest, $F_{(1, 175)} = .214$, $p = .644$, $R^2 = .001$. The model with all three predictors explained a significant amount of variance in perceived level of mental rest, $F_{(3,173)} = 4.074$, $p = .008$, $R^2 = .066$. Adding resting experiences and the interaction term explained an additional 6.5% of variance in perceived level of mental rest. However, the only significant predictor of perceived level of mental

Table 2. Descriptive Statistics for Study Measures

Variable	*n*	*M*	*SD*	α
PDemands	178	3.48	.83	.74
CDemands	178	3.86	.95	.86
EDemands	178	2.23	.92	.85
RE	179	2.11	.72	.81
Mental rest	178	2.36	.87	-
CES-D	178	.96	.55	.90
MHC-SF	179	3.23	.93	.92
Valid N (listwise)	176			

Note. PDemands = Physical demands (Scale range = 1, denoting never – 5, denoting almost always); CDemands = Cognitive demands (Scale range = 1, denoting never – 5, denoting almost always); EDemands = Emotional demands (Scale range = 1, denoting never – 5, denoting almost always); RE = Resting experiences (Scale range = 0, denoting never – 4, denoting always); Mental rest = Perceived level of mental rest scale (Scale range = 0, denoting poorly rested – 4, denoting well-rested); CES-D = Depressive symptoms scale (Scale range = 0, denoting rarely – 3, denoting most or all of the time); MHC-SF = Well-being scale (Scale range = 0, denoting never – 5, denoting every day). The alpha coefficient for RE does not include Item 5, which was removed from the scale, as described in the Exploratory Factor Analysis subsection of the results.

Table 3. Hierarchical Regression Results for Physical Demands

Variable	Unstandardized Coefficient	Standard Error	Standardized Coefficient	*p*	Correlations		R^2	$\triangle R^2$
					Partial	Part		
Step 1							.001	-
Intercept	2.355	.065		<.001				
PDemands	.037	.080	.035	.644	.035	.035		
Step 2							.066	.065
Intercept	2.366	.065		<.001				
PDemands	.085	.079	.080	.285	.081	.079		
RE	.307	.091	.253	.001	.249	.248		
PDemands*RE	.075	.117	.047	.522	.049	.047		

Note. n = 176; PDemands = Physical demands; RE = Resting experiences.

Table 4. Hierarchical Regression Results for Cognitive Demands

Variable	Unstandardized Coefficient	Standard Error	Standardized Coefficient	*p*	Correlations		R^2	$\triangle R^2$
					Partial	Part		
Step 1							.000	-
Intercept	2.354	.065		<.001				
CDemands	-.013	.069	-.015	.848	-.015	-.015		
Step 2							.059	.059
Intercept	2.360	.064		<.001				
CDemands	.004	.069	.005	.952	.005	.004		
RE	.292	.090	.240	.001	.239	.239		
CDemands*RE	.041	.092	.034	.655	.034	.033		

Note. n = 176; CDemands = Cognitive demands; RE = Resting experiences.

Table 5. Hierarchical Regression Results for Emotional Demands

Variable	Unstandardized Coefficient	Standard Error	Standardized Coefficient	*p*	Correlations		R^2	$\triangle R^2$
					Partial	Part		
Step 1							.087	-
Intercept	2.352	.062		<.001				
EDemands	-.282	.069	-.296	<.001	-.296	-.296		
Step 2							.116	.028
Intercept	2.353	.064		<.001				
EDemands	-.238	.071	-.249	.001	-.246	-.239		
RE	.212	.090	.174	.020	.176	.168		
EDemands*RE	-.009	.100	-.006	.930	-.007	-.006		

Note. n = 176; EDemands = Emotional demands; RE = Resting experiences.

rest was the resting experiences, with standardized slope $b^* = .253$, $p < .01$. Therefore, we reject the hypotheses that physical demands would predict perceived level of mental rest and that the resting experiences would moderate that relationship.

We also hypothesized that cognitive demands would predict perceived level of mental rest and that the resting experiences would moderate this relationship. To test these hypotheses, the second hierarchical regression analysis was conducted in which the predictor cognitive demands was entered into the first block and resting experiences and the interaction term between resting experiences and cognitive demands were entered into the second block. As shown in Table 4, cognitive demands had no significant effect on the outcome variable, $F_{(1,\ 175)} = .037$, $p = .848$, $R^2 = .000$. Adding resting experiences and the interaction term between resting experiences and cognitive demands to the regression analysis explained an additional 5.9% of variance in perceived level of mental rest. However, the only significant predictor of perceived level of mental rest was the resting experiences, $b^* = .240$, $p < .01$. Therefore, we reject the hypotheses that cognitive demands would predict perceived level of mental rest and that the resting experiences would moderate that relationship.

Similar hierarchical regression analysis was conducted to test the hypotheses that emotional demands would predict perceived level of mental rest and that the resting experiences would moderate this relationship. As shown in Table 5, emotional demands were a significant predictor of perceived level of mental rest, $F_{(1,\ 175)} = 16.748$, $p < .001$, $R^2 = .087$. Adding resting experiences and the interaction term between resting experiences and emotional demands to the regression analysis explained an additional 2.8% of variance in perceived level of mental rest. The interaction term did not significantly predict perceived level of mental rest. However, both emotional demands ($b^* = -.249$, $p < .01$) and the resting experiences ($b^* = .174$, $p < .05$) were significant predictors. Therefore, we retain the hypothesis that emotional demands would predict perceived level of mental rest but reject the hypothesis that the resting experiences would moderate the emotional demands-mental rest relationship.

We also hypothesized that perceived level of mental rest would be negatively related to depressive symptoms but positively related to well-being. Pearson correlations were used to examine these relationships. The results support these hypotheses in that perceived level of mental rest was significantly negatively and moderately correlated with depressive symptoms, $r = -.49$ ($p < .01$; $n = 178$) and significantly positively and moderately correlated with well-being, $r = .40$ ($p < .01$; $n = 179$). Thus, we retain both hypotheses.

Discussion

The aim of this study was to explore the link between sport-related demands, psychological resting experiences, and perceived level of mental rest. The results of our study showed that among female student-athletes, the average reported value for cognitive demands was 3.86 (*SD* = .95), for physical demands was 3.48 (*SD* = .83), and for emotional demands was 2.23 (*SD* = .92). These values are quite comparable to those reported by Balk et al. (2020) who surveyed 118 male and female semi-professional and professional athletes. Balk et al. (2020) found that the average reported value for cognitive demands was 4.07 (*SD* = .62), for physical demands was 3.30 (*SD* = .77), and for emotional demands was 2.36 (*SD* = .59). On average, student-athletes seem to be engaging in psychological resting experiences only some of the time (*M* = 2.11, *SD* = .72), which is to be expected given their concurrent commitments. Finally, the results of our study showed that among female student-athletes, the average reported value for perceived level of mental rest was 2.36 (*SD* = .87).

Based on the model by Eccles and Kazmier (2019), it was hypothesized that athletes reporting greater sport-related demands would report feeling less well-rested mentally. In line with this hypothesis, the emotional demands variable was a significant, inverse predictor of perceived level of mental rest. However, by contrast, the physical demands and cognitive demands variables did not significantly predict perceived level of mental rest. The reason for these results is unclear. It is possible that, when compared to the psychological effects of physical and cognitive demands, the effects of emotional demands are more chronic. The emphasis of the emotional demands subscale within the DISQ-Sport is on recent experiences of challenging (e.g., angry & negative) social interactions involving teammates and coaches. These types of interactions likely lead to recurring post-event rumination, which prolong physiological activation and thus lower perceptions of feeling mentally rested (Kinnunen et al., 2017). By contrast, it is possible that effects of physical and cognitive demands do not include prolonged rumination and thus dissipate more rapidly.

We also hypothesized that recent engagement in psychological resting experiences would moderate the relationship between sport-related demands and perceived level of mental rest. While recent resting

experiences were a significant positive predictor of perceived level of mental rest, recent resting experiences were not a significant moderator between sport-related demands and perceived level of mental rest. The reason for these results is unclear. It is possible that when compared to the effects of recent resting experiences on perceived level of rest, sport-related demands have a greater effect on rest level and thus a propensity to disrupt the resting process. This reiterates the importance of using a mental rest plan to monitor changes in rest level and resting experiences (Eccles et al., 2021), especially when sport-related demands are high.

With regard to depressive symptoms, a total item score is normally reported for the CES-D but we reported the average of the 20 items so that we could compare this value against the response scale. The cut-off recommended by Radloff (1977) for risk of clinical depression is 16 or higher; thus, the averaged cut-off score is .80. Additionally, the cut-off for moderate to severe levels of depressive symptoms is 27 or higher (Wolanin et al., 2016); thus, the averaged cut-off score is 1.35. The prevalence of individuals reporting clinically relevant depressive symptoms (CES-D ≥ .80) in our sample was 56.4% (n = 101), while the prevalence of individuals reporting moderate to severe levels of depressive symptoms (CES-D ≥ 1.35) was 22.9% (n = 41). These prevalence levels are notably higher than those found in Wolanin et al.'s (2016) study of 263 female Division I athletes, which were 28.1% for clinically relevant depressive symptoms and 7.5% for moderate to severe levels of depressive symptoms. We suggest three possible explanations for these differences between studies. The first explanation involves a selection effect. Recruitment in our study depended upon athletes becoming interested in our study after reading about it and then actively taking steps to complete the study. As such, we might have recruited athletes motivated to participate because they were experiencing increased depressive symptoms. By contrast, Wolanin et al. asked all athletes completing a required college medical assessment to participate and consequently their sample might have been more representative of the general female college athlete population. Second, Wolanin et al.'s study was published in 2016 and our data were collected in 2021, and research indicates that US college students are reporting more mental health concerns over time (Duffy et al., 2019), with the Covid-19 pandemic exacerbating this trend (Son et al., 2020). Finally, evidence suggests that athletes in individual sports report greater depression than those in team sports (Hoffmann et al., 2022) and Wolanin et al.'s study involved a smaller percentage of individual sport athletes (27%) than our study (52%). However, when we compared depressive symptoms and well-being between the individual sport (e.g., track & field) and team sport (e.g., soccer) athletes in our sample, we found very small and non-significant effects of sport type on these variables.

With regard to well-being, on the MHC-SF, individuals can be classified as "flourishing" or "languishing" depending on scoring criteria proposed by Keyes (2009). According to these criteria, 45.25% (n = 81) of our sample were "flourishing", 3.91% (n = 7) were "languishing", and 50.84% (n = 91) were "neither flourishing nor languishing" (i.e., they had only moderately positive mental health). It is notable that 37 of the 41 participants who reported moderate to severe depression via the CES-D (see above) also reported that they were either "languishing" or "neither languishing nor flourishing." These findings concerning depressive symptoms and well-being in female athletes are concerning and highlight the need for more studies of the kind we have conducted here that attempt to identify factors affecting the health of female athletes.

The results of our study were in line with the hypothesis that student-athletes who report feeling more mentally rested would show fewer depressive symptoms. Perceived level of mental rest was moderately and negatively related to self-reported depressive symptoms. This finding is consistent with existing literature in which highly demanding athlete lifestyles are associated with experiences of psychological distress and depression (Udry et al., 1997; Wolanin et al., 2016; Yang et al., 2007). Our results also supported the hypothesis that student-athletes who felt more mentally rested would report higher levels of well-being. Perceived level of mental rest was moderately and positively related to self-reported well-being. These two findings (i.e., concerning depressive symptoms and well-being) are consistent with Eccles and Kazmier's (2019) model in which feeling mentally rested is associated with athlete health and well-being.

Research has provided evidence that insufficient recovery in athletes can lead to negative outcomes including overtraining and burnout syndromes and in turn decreases in sport performance and well-being and increases in depressive symptoms (Eccles et al., 2022; Eklund & DeFreese, 2015). These consequences of inadequate recovery prompted Eccles and Kazmier (2019) to focus on the under-researched component of the recovery process (i.e., psychological rest). They

conducted research on the psychological aspect of rest in which they identified key psychological resting experiences that play an important role in athletes' feelings of being mentally well-rested (Eccles & Kazmier, 2019). However, their study did not assess the extent to which athletes were engaging in these experiences, nor link this concept of psychological rest to potential outcomes. Our study contributes to the literature on rest and recovery by furthering the research on the psychological component of rest by exploring the relations between physical, cognitive, and emotional aspects of demands, psychological resting experiences, and current level of mental rest, and relate negative (depressive symptoms) and positive (well-being) outcomes in college student-athletes.

When considering the next steps in the research on the psychology of rest, the present study provided some support for the model proposed by Eccles and Kazmier (2019). Several predictions of the model were supported by the data such as finding that most forms of resting experience relate positively to perceptions of being rested, which in turn relate negatively with depressive symptoms and positively with well-being. However, some aspects of the model were not supported. In particular, one resting experience proposed in the model by Eccles and Kazmier (2019) was not significantly related to the remaining resting experiences nor with the hypothesized downstream variables including perceptions of being rested mentally. Consequently, there is an imperative to conduct further tests of the viability and utility of the model to enhance our understanding of the psychology of rest in athletes and before engaging in more formal measurement development procedures.

The results of our study imply that it may be worthwhile for athletes to monitor their experience of emotional demands because these appear to predict perceptions of mental rest, which are, in turn, associated with well-being and depressive symptoms. Sport psychology consultants could regularly monitor their athletes' emotional demands and teach their athletes to monitor themselves using the emotional demand scale employed here (i.e., Balk et al., 2018) as well as other validated scales created for this purpose (for a review, see Hamlin et al., 2019). Consultants could also promote greater awareness by athletes of the emotional demands they experience by supporting their development of emotional self-reflection skills. For example, to promote these skills in military performers, Crane et al. (2019) employed a 15-minute weekly writing session guided by reflection questions that asked the performers to describe a difficult event that they experienced during the previous week and then what they did to try to minimize the stress or maximize their performance in response to the event.

Another finding from this study was that resting experiences were positively related to perceptions of mental rest, which were in turn positively related with well-being and negatively related with depressive symptoms. So, it seems worthwhile to consider engaging in the types of resting experiences outlined by Eccles and Kazmier (2019) and measured here given the links between resting experiences and positive downstream outcomes. Eccles et al. (2021, 2022) recently made recommendations for how practitioners such as sport psychology consultants, coaches, athletic trainers, and sport medicine professionals can help athletes obtain these experiences. For example, thinking explicitly about rest in psychological terms will be relatively new to athletes and, consequently, practitioners should engage in psychoeducation on this topic with their athletes. More specifically, athletes would benefit from learning about several key principles concerned with the psychology of rest. First, avoiding burnout and overtraining, and maintaining health and well-being, depends in large part on effective recovery. Second, recovery does not just involve recovering physically but also involves recovering mentally. Third, athletes can achieve the mental rest they need if they engage in some key resting experiences. These resting experiences can then be introduced using the questions outlined in Table 6, which is based on the model proposed by Eccles and Kazmier (2019). Practitioners can then help athletes track their emotional demands (as described above), and when increased demands are identified, encourage engagement in the resting experiences outlined in Table 6.

Limitations and Future Research

Study limitations included the use of two instruments developed for the study, as described above. Second, with regard to the validity of the DISQ-Sport (Balk et al., 2018), the measure is also relatively new, and it is unclear at this time how measurements obtained via this measure converge with other measurements of sport demands; for example, how do athletes' perceptions of physical demands relate to their logs of recent training volume and competition schedules? Furthermore, this study only involved female collegiate athletes within the United States. While our study helps to answer calls for more research on women given their underrepresentation in the sport sciences (e.g., Cowley et al., 2021), it is unclear how these findings generalize beyond this specific

population and future research should address this shortcoming. For example, it is unknown whether gender shapes perceptions of sport-related demands, resting experiences, and level of mental rest. For instance, men of the same age group may perceive fewer emotional demands and more cognitive demands due to hormonal differences between the genders (Taylor, 2006).

Third, there was some non-correspondence of timeframes across measures used in this study. The DISQ-Sport (Balk et al., 2018), the perceptions of recent experiences of psychological rest questionnaire, and the perceived level of mental rest scale measures concern the previous two weeks. The CES-D (Radloff, 1977) measures depressive symptoms over the last week. The MHC-SF (Keyes et al., 2008) measures well-being as experienced over the last month. Valid recall for retrospective self-reports requires the engagement of both the episodic and semantic memory systems, meaning that this form of recall requires both spatio-temporal information gathered from the specific timeframe as well more general information (Walentynowicz et al., 2018). Thus,

Table 6. Questions designed to promote reflection in athletes about their engagement in psychological resting experiences

Question to ask your athlete	Why is this question relevant to helping your athlete rest mentally?	What can your athlete do to achieve this resting experience?
Does your athlete have a "switching-off" plan?	Resting involves "switching off" from constantly thinking about sport. Therefore, a key resting experience involves spending time thinking about something other than one's sport for a while.	Has your athlete planned to spend some time: (a) with people who are not their teammates and coaches? (b) in venues that do not include their training facility and where they cannot see their playbook, sport equipment, and apparel? (c) without viewing media and TV related to their sport?
Has your athlete arranged a "quiet zone"?	Resting involves giving your athlete's brain a break from thinking hard. Therefore, a key resting experience involves "doing not much slowly."	Has your athlete planned to spend time: (a) alone or with close friends or family with whom they can be themself? (b) doing activities that are fun and do not involve the need to think very hard (e.g., a favorite TV show)? (c) in a relaxed venue (e.g., bed, room, home, café) with few distractions?
Has your athlete scheduled some "me time"?	Resting involves giving your athlete a break from having the day structured and scheduled by someone else (e.g., their coach). Therefore, a key resting experience involves your athlete deciding what they want to do and when, where, and for how long they want to do it.	Has your athlete planned to spend some time: (a) doing what they want? (b) when they can be their real self? (c) when it's just fine to feel that they are doing nothing "useful" at all?
Is your athlete "doing it different"?	Resting involves a break from all the tedious aspects of being an athlete: same people, same gym, same schedule, same food, same bedtime, every day, all week, for weeks at a time. Therefore, a key resting experience involves enjoying some variety in one's life.	Has your athlete planned to spend some time: (a) following different (i.e., from normal) routines and travel routes? (b) with different people? (c) eating different food? (d) in different venues and locations?

the incongruence among measure timeframes could have impacted our results. Finally, burnout was not explicitly measured in the present study. Researchers should expand upon the current research by explicitly measuring burnout given evidence of its connection to rest, depression, and well-being.

Conclusion

Our study provides a first insight into relationships in athletes between sport-related demands, psychological resting experiences, and current level of mental rest, while also examining the extent to which being mentally rested is associated with depressive symptoms and well-being. The results of the study indicate that emotional demands but not physical or cognitive demands, significantly predict current level of mental rest. In addition, recent resting experiences significantly predict current level of mental rest but do not significantly moderate the relationship between sport demands and current level of mental rest. Finally, athletes who report a lower current level of mental rest experience a lower level of well-being and more depressive symptoms. Consequently, monitoring of emotional demands and engaging in key psychological resting experiences might be useful for athletes as they attempt to obtain adequate mental rest and stay healthy mentally.

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