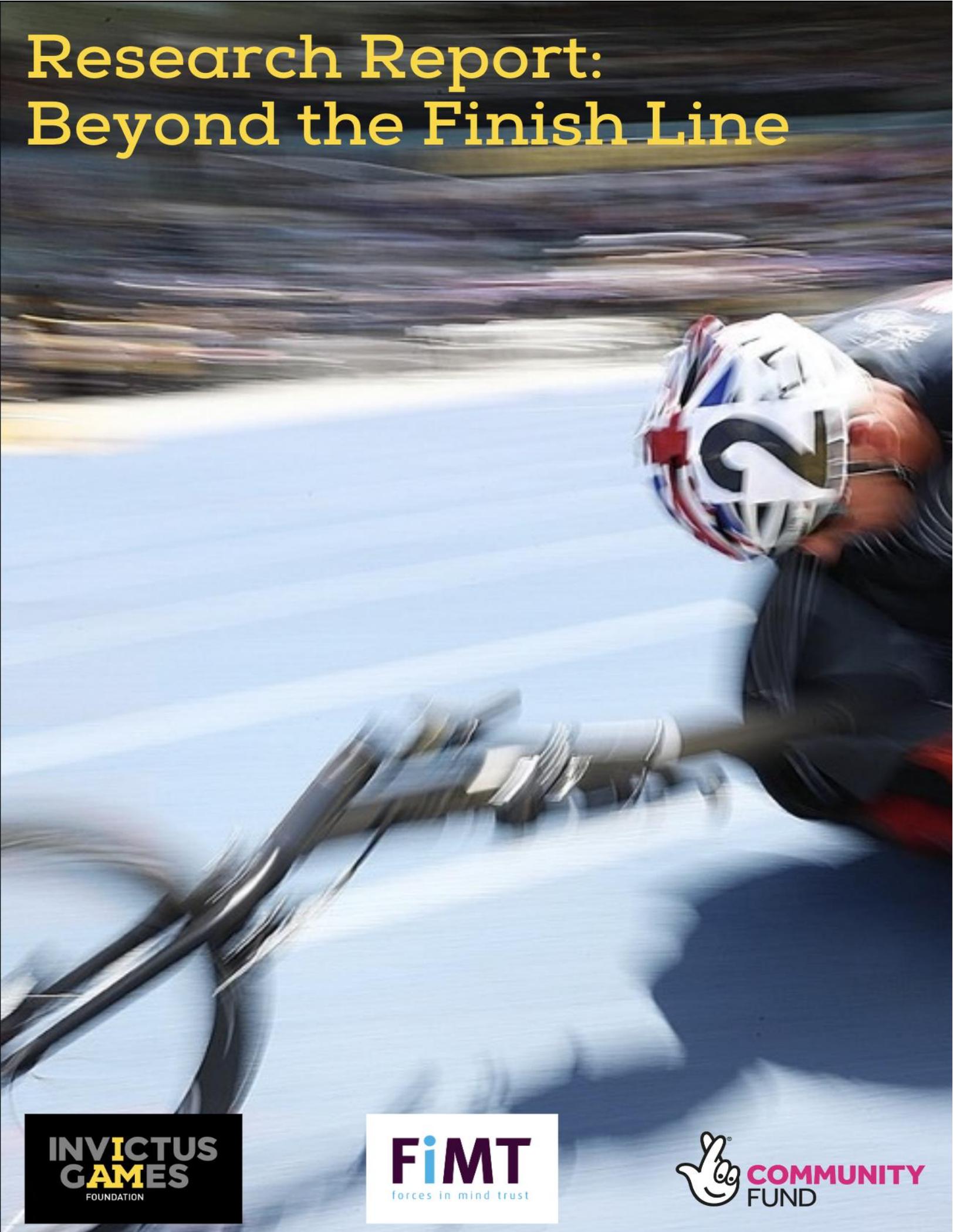


Research Report: Beyond the Finish Line



**INVICTUS
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FUND**

Authorship

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Acknowledgements

The authors would like to thank Invictus Games nation staff, coaches, and volunteers, as well as competitors, non-competitors, and their families for their participation. We understand the significant time and commitment required to engage in longitudinal research. We are humbled by your trust and are most appreciative for your continued participation and support.

We would also like to thank the individuals from each nation who helped make this research possible by assisting in study logistics, including ethics applications, and dissemination of recruitment information. These individuals include Dr. Anna Lewis who assisted in research ethics approval for data collection with Team Australia by sponsoring our application to the Australian Departments of Defence and Veterans' Affairs Human Research Ethics Committee. We note that the information shared and opinions expressed in this report are representative of study participants and/or the conclusions of the authors and may not represent the opinions of the Departments of Defence or nations included in this report.

Our thanks also extend to current and past members of the Invictus Games Foundation (IGF). All members of IGF played an integral role in developing this research and supporting successful completion.

The authors would like to recognize research staff who contributed to data collection and management, including Dragana Javorina, OT Reg. (Ont.), MSc (University of Toronto) and Julia Shabani, BS (Cedars-Sinai Medical Center).

Finally, we would like to express our gratitude to Forces in Mind Trust for funding this research, as well as their further support when COVID-19 changed the planned trajectory of this project.

Foreword

Forces in Mind Trust



Forces in Mind Trust's mission is that all ex-Service persons and their families make a successful and sustainable transition to civilian life, a principle closely aligned to Invictus objectives. The publication of this report also marks the Trust's enduring support for the Invictus vision. Through several iterations of the Invictus Games, interviews with a multitude of participants and families and addressing the unforeseen consequences and impact of the COVID pandemic, this report is significant as the first longitudinal investigation of the benefits of international adapted sport competition for Service Members and Veterans experiencing physical and/or psychological illnesses and injuries.

As such, our hope is that it can be of use to Invictus Games and groups such as Help 4 Heroes, Walking With The Wounded and others offering any sort of sports or activities-based rehabilitation and recreation for wounded, injured and sick veterans, and, perhaps as well, those paralympic organisations where the ultimate competitive challenge might be found.

The study's general findings might seem self-evident: long-term competitive adaptive sports are valuable; sports are a good platform for personal growth; strengthening of the entire community of competitors, non-competitors and entourage in both physical and mental health is important. But the findings go further than this. The default view that 'para-sports' or adaptive games are only for the physically injured is comprehensively re-addressed and importantly recognises the complexity of participants conditions including their psychological impact. The short and longer-term dividends for improved personal resilience in all its dimensions are also empirically recorded with useful findings of where best practice can be found. The recognition of families and of those who might not compete is also important and recognising the importance of their resilience in the long road toward rehabilitation is a welcome aspect. The positivity of preparing for competition and competing itself is a genuine 'team effort' however broadly one defines that 'team'.

As the Invictus Games Foundation looks forward, reflecting upon the experience of Dusseldorf and looking ahead to Vancouver, this independent report can hopefully be seen as a validation of the founding aim of Invictus, to inspire through the power of the unconquered human spirit. But it also should be seen as a comprehensive and objective evaluation of the benefit of sport, with findings upon which to evolve and continually improve the experience for all concerned.

Tom McBarnet

Director of Programmes, Forces in Mind Trust

Invictus Games Foundation



The central importance of sport in the recovery and rehabilitation process has long been recognised in scientific and medical circles as well as by society at large. This report uses the lens of the Invictus Games to examine this, which has given rise to some significant findings. Drawing on a longitudinal study of participants from the Invictus Games in Sydney in 2018 through to those in The Hague in 2022, the report underlines the significant benefit to the overall wellbeing of those competitors, drawn from over twenty nations, who are fortunate enough to take in the Games themselves. Crucially, it also highlights the reinforcing effect of associated training camps, physical challenges and sport-related activities both before and between the Games. This also positively affects those seeking selection as well as the competitors themselves. The composition and conduct of these programmes benefits from the application of transformational behaviour on the part of the coaches and training staff. This has a focus on addressing the multi-faceted incidence of physical, psychological and social injury. The report also addresses the unique and sometimes severe implications of the COVID-19 pandemic. While presenting the challenges of isolation and separation for some, this period also showed the importance of belonging, of resilience, and an ability to adapt which was well reflected in the development of a comprehensive Invictus programme of online sporting challenges. So much of this encompasses the core characteristics of the international Invictus movement. The Invictus Games Foundation is extremely grateful to the Forces in Mind Trust for commissioning this report and for the invaluable contribution which it makes in highlighting new and innovative areas of research.

Dominic Reid OBE
CEO, Invictus Games Foundation

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List of Abbreviations

CI	Confidence Interval
CISM	Conseil International du Sport Militaire (International Military Sports Council)
CNSD	Centre National de Sports de la Défense (National Center of Defense Sports)
COVID-19	Coronavirus Disease of 2019
eSports	Electronic Sports
IGF	Invictus Games Foundation
NGOs	Non-Governmental Organizations
NIH	National Institutes of Health
OR	Odds Ratio
PTG	Post-Traumatic Growth
PTSD	Post-Traumatic Stress Disorder
USA	United States of America
UK	United Kingdom

Glossary

Affect

Affect represents a person's positive or negative emotions. Affect can provide information about a person's mood; however, it is different from mood in that a person's mood is seen as more consistent, whereas affect is reactive and changeable.

Biopsychosocial Model of Functioning, Disability, and Health

The biopsychosocial model of disability suggests that the experience of disability results from the interaction of biological factors relating to the illness and/or injury (e.g., physical functioning and anatomical structure), psychological factors (e.g., self-esteem, mental health), and social factors (e.g., family relationships and social interactions).¹

Competitor

Competitors are individuals who participated in the Invictus Games Sydney or The Hague. The Invictus Games use this designation as opposed to "athlete" to denote the focus on recovery and well-being over competition and medals.

eSports

eSports is also called virtual sports, gaming, electronic sports, and cyber sports. For purposes of the current report, we highlight active eSports or Motion-based Games. Active eSports include any games that require physical activity or movement to compete. Traditionally played on Nintendo Wii, X-box Kinect, and PlayStation. However, multiplayer online physical activity apps with virtual fantasy worlds and leagues are increasingly popular. Examples of eSports in the current report included:

- Strava: a platform that allows individuals to track their exercise. It is most commonly used for running

and cycling. Strava also integrates a social network allowing individuals to connect one-on-one, join groups and activities, as well as comment on posts.²

- Zwift: a platform that allows participants to train and compete in running and cycling (on stationary trainers) in a virtual world. Zwift includes interactive components to promote social interaction. Participation can consist of group rides or races. In March 2023, Zwift was chosen as the cycling event for the Olympics eSports series.³

Flourishing

The current research uses a scale assessing the concept of flourishing to represent a domain of psychological well-being. Flourishing represents an individual's self-perceived success. The scale used in this report assesses this perceived success in different domains including relationships, self-esteem, purpose, and optimism.⁴

Non-Competitor

Non-competitors are defined as individuals who were not participating in the Games. These individuals may have tried out for the Games and not been selected or have participated in previous Games and were no longer eligible to participate. Some non-competitors may have had no affiliation with the Games but have found out about the study through discussion groups and recruitment flyers and posts on social media.

Post-Traumatic Growth

The concept of post-traumatic growth suggests that some individuals may experience positive changes and improvements as the result of trauma from a major life crisis.⁵ Factors related to post-traumatic growth include appreciation of life, relating to others, personal strength, new possibilities, and spiritual growth.^{6,7} Based on previous research on service members and veterans sport-based rehabilitation, the

current report focuses on three domains: appreciation of life, personal strength, and new possibilities.⁸

Post-traumatic growth differs from resilience in that resilience represents how an individual adapts to trauma, whereas post-traumatic growth represents the positive change that occurs for some individuals as the result of trauma or adversity.

Quality Parasport Participation Framework

This framework⁹ suggests that quality participation experiences occur when an individual experiences different elements of participation, including autonomy, belongingness, challenge, mastery, engagement, and meaning. In order to have quality participation experiences, different program conditions must be addressed in the physical environment, the social environment, and activity itself. This framework guides the assessment of competitor experiences and nation observations.

Transformational Leadership

Transformational leadership is an approach to leadership in which leaders inspire change in individuals and social systems. The theory suggests that transformational leadership is achieved through four factors: idealized influence, inspirational motivation, intellectual stimulation, and individual consideration.¹⁰

Medical Model of Disability

The medical model of disability (also called biomedical model) suggests that disability is the result of the individual's physical or psychological condition. It suggests that disability is a limitation that should be fixed through medical methods to achieve or approximate normalcy.¹¹

Social Model of Disability

The social model of disability suggests that disability is the result of social barriers, particularly societal discrimination and oppression towards individuals with physical and/or psychological illnesses and injuries.¹²

Social Relational Model of Disability

The social relational model of disability^{13,14} suggests that the experience of disability results from both functional barriers relating to the illness and/or injury, as well as psychological and emotional dimensions of disability. These psychological and emotional dimensions include “barriers to doing” (i.e., structural or social barriers to participation) and “barriers to being” (i.e., stigma and social structures that impact the identity, confidence, and well-being of the individual with the illness and/or injury).¹⁵

Ethics Approval

All research presented in this final report was approved by the Research Ethics Board of Dalhousie University and the Institutional Review Board of Cedars-Sinai Medical Center. Based on each Invictus Games nation's requirements for study participation, additional approval was either obtained through chain of command approval or national defense research ethics board approval.

Executive Summary

Physical activity has been used to support the health and well-being of Service Members and Veterans with illnesses and injuries for over 100 years. Over the past 20 years, with wars in Iraq and Afghanistan, programming proliferated internationally as nations sought to promote opportunities for physical, psychological, and social rehabilitation among Service Members and Veterans experiencing physical and/or psychological illnesses and injuries. While research was conducted to support the benefit of physical activity programming, questions remained:

- What are the long-term benefits of large scale international competitive sport programming implemented to promote rehabilitation? The commonly undisputed benefits of sport participation have, to date, lacked long-term follow-up regarding the impacts of participation.
- As nations develop their own military sport recovery programming, what are best practices for achieving long-term health and well-being? It is imperative that methods be identified for supporting long-term physical health, as well as psychological and social well-being.

Using longitudinal mixed methods (i.e., surveys, interviews, focus groups, observations, and document collection), the research presented in this report sought to fill these knowledge gaps through the lens of the Invictus Games. Our findings and recommendations are best summarized through the following three themes: the value of competitive adapted sport, sport as a platform for personal growth, and strengthen the entire community.



The value of competitive adapted sport



Sport as a platform for personal growth



Strengthen the entire community



The value of competitive adapted sport

Individuals who competed in the Invictus Games Sydney 2018 demonstrated greater well-being than those who did not compete (i.e., non-competitors).ⁱ This finding occurred even when differences between competitors and non-competitors are removed at baseline. The benefit to participating in the Invictus Games was clearest during training when individuals are coming together regularly with their community and taking on new challenges, or when participating in the Invictus Games. In the long-term post-Sydney, when non-competitors were included in the Invictus community and provided with access to Hague 2020 training opportunities, including sport camps, selection trials, and eSport programming, they began to demonstrate improvements in well-being, sometimes narrowing the gap with competitors. Thus, while the Invictus Games may be an important motivator, one cannot underestimate the substantial contribution of training and the important sense of belonging that may come from being a part of the Invictus Games community and having an Invictus identity. For competitors, this finding highlights the importance of the post-Games period for reinforcing lessons learned in order to optimize long-term outcomes. For non-competitors, this finding suggests the importance of providing additional opportunities for belonging with the Invictus Games community, such as non-Games physical activity challenges and endeavours.

The Invictus Games The Hague were significantly impacted by the COVID-19 pandemic. Due to the shared global experience of the pandemic among competitors and non-competitors, changes in national program delivery due to the pandemic, as well as decreases in study participation due to the burden of COVID-19, there were no significant differences. However, graphical trends suggest value to Invictus Games participation for competitors. These trends are reinforced by qualitative research with competitors and their families that describe participating in the Invictus Games The Hague as having a significant impact on competitor and family well-being.



Sport as a platform for personal growth

While all competitors may share their Games experience together at one place in time, the perception of this experience and its impact are shaped more broadly by each participant's context leading up to and after the Games – including their military experiences, family, and nation. Our comprehensive global study included 23 countries, over 600 Service Members and Veterans with illnesses and injuries, and over 40 coaches and nation staff. We were able to learn from their combined decades of adapted sport experience in both military and civilian contexts and identified 71 best practice strategies for optimizing military sport recovery programming (see *Chapter 7*).

During active service, military systems globally have developed training tools to improve troop readiness, resilience, and psychological performance – including goal setting, imagery, meditation, stress management, and building social support. Our research suggests that these same

ⁱ Non-competitors are individuals who were not participating in the Games. Some had no affiliation with the Games, while others had applied to participate but were not selected for their nation's team.

tools – delivered consistently over time during training and reinforced after the Games through post-Games participation opportunities – also support wellbeing during rehabilitation. Furthermore, many of the identified strategies relate to the importance of coaches demonstrating transformational leadership behaviours, which are used in sport and other life domains to promote empowerment, inspiration, and self-improvement.¹⁶ Thus, a key finding is that *the strategies that promote optimal outcomes from sport recovery programming are less about sport development and more about focusing on mental fitness skills by integrating formal resilience training alongside sport, as well as reinforcing resilience training after competition*. This approach helps a Service Member or Veteran experience growth after illness and/or injury and find ways to harness what was learnt in sport to achieve new goals and excel in life after the Games.

These findings, both the importance of specific skills as well as the value of the time between competition for developing and reinforcing personal growth, can be implemented internationally within adapted sport programs at both the grassroots community and national levels, informing training for coaches, program staff, and program developers. Implementation of these strategies can help create quality adapted sport experiences and support Service Members and Veterans experiencing physical and psychological illnesses and injuries in achieving optimal outcomes in recovery and rehabilitation.



Strengthen the entire community

One factor that was consistently important in determining outcomes was type of illness and/or injury. Individuals experiencing both physical and psychological illness and injury often demonstrated poorer health outcomes regardless of whether an individual was a competitor or a non-competitor. This must be taken into consideration in how we approach rehabilitation and programming.

Programming and sport strategies are often siloed with a focus on either physical or psychological illnesses or injuries. However, the experience of illness and injury is multi-faceted. For example, one cannot separate a physical illness or injury from the mental health sequelae of having experienced that physical trauma. The current study asked participants to self-disclose their illnesses and injuries rather than providing medical letters or access to medical files. This approach provided participants with opportunities to fully express the range of their medical conditions beyond any formal diagnosis, particularly the integrated physical and psychological components of their illness and/or injury. Knowledge continues to grow of the systemic nature and implications of polytrauma. As evidence grows of poorer outcomes among individuals experiencing multiple types of illnesses and injuries, more needs to be done to recognize and diagnose co-occurring illnesses and injuries, and programming must be tailored to the complex needs of this population. Furthermore, we encourage future program staff and researchers to seek to fully understand the complete profile of participants at greatest risk for negative outcomes.

The COVID-19 Pandemic

The timeline of this research project coincided with a cataclysmic global event: the COVID-19 pandemic. As research on the Invictus Games The Hague had already begun well in advance of the pandemic, this project provided an unparalleled opportunity to explore the effect of the pandemic on military personnel across the globe participating in sport-based rehabilitation programming. The shifts required by the pandemic (sheltering at home, social distancing, closure of training facilities, etc.) had high likelihood of impacting a population in the vulnerable period of rehabilitation from physical and/or psychological illness and injury. Thus, the research project expanded to include an additional question:

- What was the impact of COVID-19 on Service Members and Veterans experiencing physical and/or psychological illnesses and injuries?

The research included competitors and non-competitors, thus presenting a range of rehabilitation experiences. However, participation in sport-based rehabilitation programming at the time of the pandemic was most common in our sample. The findings from the COVID-19 research reinforced our understanding of the value of social connection for this population. Early in the pandemic, both competitors and non-competitors demonstrated sharp decreases in measures of post-traumatic growth. Many had only recently overcome some aspects of their illness or injury, which may have included maladaptive coping mechanisms such as agoraphobia, social isolation, and inability to feel comfortable in public spaces. The imposed isolation, for some individuals, brought back these symptoms and side effects, particularly if there was no outlet to continue to work on their rehabilitation. The mental health implications of isolation were potentially compounded by Service Members and Veterans (depending on nation or even region within a nation) having significant changes in access to basic needs, including food and medical care.

However, many participants demonstrated an ability to adapt. For some, the pandemic was an opportunity to focus on themselves – whether that be other commitments or reducing their social network to individuals who were more supportive of their goals. Individuals who demonstrated greater well-being also linked their growth to the ability to adapt their physical activity participation and maintain a strong link to their community. As stay at home measures were implemented, some competitors voluntarily took on leadership roles to ensure that their team could meet regularly to train together virtually. Others found ways to co-engage in activity with their families. These adaptations supported not only the ongoing rehabilitation of the Service Member or Veteran, but also the health of their family members who experienced physical and mental health benefits by being active while sheltered at home.

Finally, the COVID-19 pandemic resulted in new virtual advancements in adapted sport. Among the new initiatives developed by the Invictus Games Foundation (IGF) was active eSports programming. Research participants were excited by these new opportunities to connect and be active with the military community. They also appreciated the flexibility of active eSports which better allowed them to schedule their sport around the needs of their family. Many identified these virtual opportunities to connect with the community as pivotal for their well-being during the pandemic. Connected to the point above of providing non-competitors access to IGF sport opportunities, non-competitors demonstrated the greatest uptake of active eSports (virtual bike

rides, virtual rowing championships, and eSport leagues). It provided non-competitors with the opportunity to connect with competitors and build a sense of belonging and identify affiliated with the Invictus family, while also providing opportunities for competitors to maintain connections that would enhance their experiences when once again together in person. The Invictus eSport programs thus provide new opportunities to explore the value of competitive adapted sport in military recovery programming.

Conclusion

The current report provides, to our knowledge, the first international longitudinal investigation of the benefits of international adapted sport competition for Service Members and Veterans experiencing physical and/or psychological illnesses and injuries. Having examined approaches to military sport recovery programming across 23 countries, we also present the first global guide to evidence-based best practices for competitive military adapted sport. Finally, the context in which the research happened – COVID-19 – provided opportunities to explore new virtual approaches to adapted sport and how they may have unique value for training and social connection. Findings have important implications for future research and practice to support optimization of sport-based rehabilitation programming for Service Members and Veterans experiencing physical and/or psychological illnesses and injuries.

Summary of Practice Recommendations

This research resulted in the identification of global evidence-informed best practices to support long-term physical, psychological, and social health through competitive military sport recovery programming. A summary of recommendations is highlighted below:

- **Broadening programming to support non-competitors.** Program staff should explore ways they can support individuals who are not selected for competition so that they continue to work towards their goals. Best practice strategies identified in this report include providing access to other program opportunities that are tailored to the interests of the non-competitor and are still linked to the spirit of the competition. For example, when provided with access to IGF and national training opportunities between Games or to active eSports during the pandemic, non-competitors began to demonstrate improved outcomes. These improvements can be linked to opportunities to be active, reconnect, and feel a sense of belonging with other military personnel, and the opportunity to build an identity as a member of the IGF family.
- **Implement resilience training.** Based on their goals, programs may find value in including resilience training (mental skills training, goal setting, etc.) alongside sport programming throughout the pre-Games period to improve health and well-being. For example, some nations use this training to focus on how individuals will apply what they are learning in training outside of sport and in life post-rehabilitation. Programs may also choose to reinforce resilience training practices through group meetings and one-on-one discussion with training staff two to three months after the event to review and monitor goals and progress, as well as reinforce social connection.
- **Tailoring for each participant.** When developing sport training programs, special consideration should be given to the type of illness and injury experienced by participants. Our research suggests that those experiencing both physical and psychological illnesses and injuries demonstrated poorer physical health outcomes regardless of sport participation. Individuals experiencing both physical and psychological illnesses and injuries may need additional support and consideration to achieve the health benefits experienced by those with solely physical or solely psychological illnesses and injuries. Based on best practice findings (see *Chapter 7*), this may start by working with Service Members and Veterans to learn, acknowledge, and respect the complex nature of their trauma.
- **Screening and responding to COVID-related experiences.** Rehabilitation programs should screen for the impact of COVID-19 experiences on well-being. Data from the Invictus Games The Hague surveys suggested that individuals experiencing psychological illnesses and injuries demonstrated poorer psychosocial well-being outcomes than individuals experiencing physical illnesses and injuries, a finding that was not present for the Invictus Games Sydney. Our COVID-19 data further indicates that Service Members and Veterans may have lacked access to basic needs, have experienced a reduced social network, or experienced a return to baseline PTSD symptoms as a result of social distancing policies. However, in contrast, some individuals may have benefitted from the pandemic by having the opportunity to slow down, focus on themselves, prioritize their activities, pare down their social network to improve the quality of their social connections, and adapt their physical activity. These differing responses should be explored so individuals can receive support to address any difficulties or to maintain their growth.

Summary of Research Recommendations

The findings have also resulted in the identification of future research questions:

- **Explore the experiences of family.** Research interviews with family on COVID-19 and Invictus Games The Hague experiences highlighted that they value adapted sport as a means of rehabilitation and have a desire to co-engage in programming with their Service Member or Veteran. Results also included the value of the Games for supporting family rehabilitation and improving family relationships. These findings reinforced a previous conceptual framework on military families in competitive adapted sport developed by the research team as part of an examination of experiences with the Invictus Games Toronto 2017.¹⁷ Future research should test this framework, as well as further explore the important role that families play in outcomes after illness and injury, the impact of programming on family, and how families themselves can be supported through the rehabilitation process.
- **Further examine and evaluate implementation of resilience training.** The findings of this final report will result in the development of training workshops and tools for military adapted sport programs. However, future research should examine implementation and uptake of best practices, as well as how strategies may need to be adapted for different nations based on factors such as financial resources, availability of accessible training facilities, and staffing.
- **Explore transformational leadership in military sport recovery programming.** Transformational leadership was not a framework used in the current research. However, findings suggest the value of this leadership approach during training, the Games, and life after the Games. Future research could explore the value of transformational leadership as an approach to coaching in military sport-based rehabilitation.
- **Build an evidence base on sport programming for Service Members and Veterans experiencing both physical and psychological illnesses and injuries.** Research often focuses on Service Members and Veterans experiencing physical illnesses and injuries or psychological illnesses and injuries. However, when asked to self-report their illnesses and injuries many participants identified having both. This is a unique group that demonstrated poorer physical health outcomes than individuals with only one type of illness and injury. While the best practice guidelines developed for this report are an important component of this integrated approach, researchers must continue to investigate how to support the distinct needs of this population in sport-based rehabilitation programming. This need to consider how to approach programming for individuals with both types of illnesses and injuries is of further importance given growing acknowledgement that one cannot separate physical and psychological illness or injury.¹⁸
- **Evaluate active eSports programming as an approach for sport-based rehabilitation.** Virtual physical activity, particularly active eSports, was widely adopted by both military and civilian populations during COVID-19. Findings suggest that the physical activity and social connection experienced through virtual programming, including IGF active eSports, may have supported well-being for study participants. Future research should examine virtual sport activities as a means to support rehabilitation among Service Members and Veterans, particularly for individuals from countries that may not have resources to regularly bring individuals together for in-person training programs.

Summary of Chapters

Chapter 1 Introduction

Chapter 1 introduces physical activity-based rehabilitation in the military and the Invictus Games. This chapter also presents the Quality Parasport Participation Framework that guided the research on best practices, as well as defines the social relational model of disability which was the lens used for understanding experiences of illness and injury in this project.

Chapter 2 Research Objectives

Chapter 2 defines the original research questions for this project, which focused on assessing the short- and long-term outcomes of participating in the Invictus Games, as well as identifying best practices that support long-term positive outcomes. With the onset of the COVID-19 pandemic, and its extensive global impact, the research objectives extended to examining the effect of the pandemic on Service Members and Veterans with illnesses and injuries.

Chapter 3 Methods

Chapter 3 details the qualitative and quantitative research methods used in this project.

Chapter 4 The Invictus Games Sydney 2018

Chapter 4 presents longitudinal findings on the impact of participating in Sydney 2018. Individuals who participated in Sydney 2018 training and competition demonstrated greater physical health and psychosocial well-being than individuals who did not compete (i.e., non-competitors). However, these benefits decreased over time. The findings highlight the importance of the “between Games” period. Specifically, as noted in the best practices findings (see *Chapter 7*), the personal development experienced during training and the Games must be reinforced after the Games. Furthermore, findings highlight the value for non-competitors being involved in non-Games Invictus opportunities. The decrease in the gap between competitors and non-competitors coincided with the beginning of the selection process for The Hague. Over half of non-competitors in the study began to have access to Invictus opportunities including training camps and related resilience training. Finally, findings also highlight the importance of type of illness and injury for health outcomes. Individuals experiencing both physical and psychological illnesses and injuries demonstrated poorer outcomes across multiple measures of health and well-being, regardless of whether they were competitors or non-competitors.

Chapter 5 The COVID-19 Pandemic

As the Sydney 2018 Games came to a close, all eyes were on The Invictus Games The Hague 2020. However, only two months before The Hague, COVID-19 resulted in stay-at-home policies, and changes to activities of daily living, including sport participation. While the duration, frequency, and extent of the impact of COVID-19 depended on an individual’s location, the profound effect of the pandemic cannot be overstated. Competitors and non-competitors implemented many coping strategies in the first eight months of the pandemic, with most individuals focusing on positive health behaviours and a smaller number implementing negative health behaviours. Some participants indicated being unable to meet basic food and medical health care needs. Furthermore, some participants reported either partial or total loss of contact with family and friends. Also important to stress is that some participants felt they had lost

improvements in their mental health due to imposed isolation and lack of health care access. However, many participants adapted, demonstrating post-traumatic growth due to adapting physical activity participation (including team Zoom calls and Invictus Games active eSports) and maintaining social networks. These findings emphasize a previously known critical element for this population: the importance of social connection for well-being.

Chapter 6 The Invictus Games The Hague 2020 conducted in 2022

The pandemic impacted the type, frequency, intensity, and duration of training for competitors in many nations, with many turning to virtual programming for the first time. In this virtual training, particularly the IGF active eSports, they were often accompanied by non-competitors. Given the non-traditional context of training for the Games, the increases in opportunities for engagement of non-competitors, and the major shared social and political changes experienced by competitors and non-competitors from Sydney 2018 through to The Hague in 2022, it is not surprising that the “competitor effect” demonstrated in 2018 was not present in 2022. However, again, type of illness and injury was an important determinant of outcomes for both competitors and non-competitors – individuals experiencing both physical and psychological illnesses and injuries demonstrated poorer physical health, while individuals experiencing psychological illnesses and injuries demonstrated poorer well-being than individuals experiencing physical illnesses and injuries. Furthermore, the data trends which start in 2019 and continue through the end of 2022 provide interesting understandings of the health and well-being trajectories of Service Members and Veterans experiencing illnesses and injuries during this complex time in modern history. Specifically, while findings were not significant – likely due to participant dropout because of the increased burden of activities of daily living during the pandemic – graphical trends indicate greater well-being post-pandemic for most outcomes among both competitors and non-competitors. The significance of these graphical trends is reflected through qualitative data on competitor and family experiences, which highlight the Games as saving and/or changing lives, providing opportunities for acceptance and accomplishment, and bringing families closer together.

Chapter 7 Best Practice Strategies

This chapter highlights mechanisms that promoted improvements in well-being among competitors, as well as specific strategies implemented as best practices across the nations of the Invictus Games. Findings highlight the value of resilience training being included alongside sport prior to the Games. We also present a final list of 71 strategies that can be adapted by military sport recovery programs to promote quality experiences and long-term health and well-being. In addition to supporting the value of implementing quality participation frameworks to promote rehabilitation in this population, findings also suggest that transformational leadership approaches may be important for achieving greater outcomes through sport participation, including personal growth and development.

Chapter 8 Conclusions and recommendations

This final chapter presents key findings and makes recommendations for research and practice. These findings and recommendations are reviewed at the beginning of this Executive Summary.



Chapter 1: Introduction

Key Points

- There is a long history of sport being used in the military to support rehabilitation of Service Members and Veterans experiencing illnesses and injuries.
- While the benefits of sport are well-understood, the long-term impact of competitive adapted sport on health and well-being has been less commonly examined. Furthermore, mechanisms for achieving optimal benefits through sports programming remain unclear.
- The Invictus Games are an international adapted sport competition for Service Members and Veterans experiencing physical and psychological illnesses and injuries experienced during or because of their military service. The Invictus Games provided the lens for examining the aforementioned research gaps.
- Sport participation experiences were examined through the lens of the Quality Parasport Participation Framework, a framework which was developed through research on quality participation in both civilian and military adapted sport contexts.
- This research was guided by the social relational model of disability, which suggests that the experience of disability is impacted by impairment or illness effects (e.g., amputation, PTSD, cancer, hearing loss) and psycho-emotional dimensions of well-being (e.g., social reactions to an illness or injury, and the individual's emotional response to being the recipient of hurtful responses to their condition).

1.1 Physical Activity-Based Rehabilitation for Service Members and Veterans with Illnesses and Injuries

Service Members and Veterans experience a significant number of challenges when undergoing recovery processes after illness or injury, particularly when compared with civilians.¹⁹ These difficulties are often the result of a multitude of factors including the circumstances of their illness or injury, the complex nature of the trauma experienced, and accompanied unexpected life transitions such as a transition to civilian life, alongside coping with the physical and psychological outcomes of their illness or injury.^{19,20} Different approaches have been taken to support well-being and rehabilitation for this population. A prominent approach is physical activity-based rehabilitation.^{21,22} Physical activity programming has taken the form of different types of activities, including sport, exercise, therapeutic recreation, and adventurous training.²³ The focus of the current report is on sport-based rehabilitation.

Sport as a form of rehabilitation was first used in World War I for Veterans experiencing physical disability.²⁴ During this conflict, all nations experienced large numbers of injuries, with some estimates suggesting over 15 million military personnel acquired a physical impairment resulting in the experience of disability in the First World War.²⁵ When approaching sport as rehabilitation, medical professionals at the time framed disability using a medical model. Sport was viewed as a way to promote “reconstruction”²⁴ of physical health, as well as return the individual experiencing disability to work and daily life. Notably, such was the value for sport during this time, that sport competition was also used to promote morale at the end of the First World War.²⁶ From June 22-July 6, 1919, the Inter-Allied Games were held in Paris, France. These international sporting events were developed with the goal of promoting morale for the Allied Forces after the end of conflict, while maintaining fitness should hostilities recommence.²⁶ The Inter-Allied Games also formed an important part of demobilisation plans for Allied countries. Eighteen nations competed, with 1500 Service Members participating in 24 different sports (military activities, including hand-grenade throwing and tug of war; team sports, including basketball and cricket; and individual sports, including athletics and boxing).²⁷ A large audience was also present. This event was viewed as an important indicator that sport would still be valued after World War I.²⁸ It also formed the foundation for future sporting events among allied countries, including the International Military Sports Council (also known as CISM) and the Invictus Games.

While sport as rehabilitation may have been implemented in World War I, the modern usage of sport as a form of rehabilitation for military personnel has its roots in World War II and the work of Dr. Ludwig Guttmann at Stoke Mandeville Hospital in the United Kingdom.²⁹ Dr. Guttmann pioneered techniques for individuals using wheelchairs, using sport to support mobility. This approach was linked to significant improvements in the survival rates of military personnel with spinal cord injuries.²² Dr. Guttmann took a more biopsychosocial approach to understanding the value of sport, viewing sport as a way to not only restore physical health but also improve psychosocial well-being among patients.²²

This tradition of valuing sport-based rehabilitation continued to an extent over time but was truly reinforced beginning in the early 2000s with the conflicts in Afghanistan and Iraq.^{21,22} While improvements to modern medicine, military medical response, and military equipment can

be linked to decreases in casualties, critical and arguably more complex injuries were being experienced.^{22,30,31} Research suggests that the risk of disability, including multiple co-occurring conditions, from these injuries was seven times higher in 2005 compared to 1980.^{31,32} Sport was viewed to both improve fitness and physical health, support mental health, and promote reintegration to military or the transition to civilian life.^{21,22} Of importance from this modern approach to sport-based rehabilitation was a growing understanding of PTSD, depression, and anxiety among military personnel,³³⁻³⁶ as well as the value of sport in supporting Service Members and Veterans experiencing physical and/or psychological illness and injury.³⁷

With the increased usage of physical activity, particularly sport, programming to support the physical health and psychosocial well-being of Service Members and Veterans with illnesses and injuries, there was a call for research to examine the benefits of programming and how to optimize delivery. Systematic reviews and scoping reviews have sought to synthesize this evidence and reinforced the numerous physical, psychological, and social benefits to physical activity programming.^{23,37-39} However, there are knowledge gaps that limit our understanding of the value of sport for military sport recovery programming. These gaps include minimal longitudinal research and limited research seeking to understand how to optimize delivery programming to improve short- and long-term physical and psychosocial outcomes.²³ Finally, few research studies have examined large-scale competitive sport, which has become popularized through the Warrior Games and the Invictus Games.²³

1.2 The Invictus Games

The Invictus Games were founded by Prince Harry, The Duke of Sussex, in 2014. During his time serving in the military, and particularly when returning from Afghanistan in 2008, he became aware of the experiences of Service Members and Veterans experiencing disability. His exposure to military personnel with illnesses and injuries stayed with him and created a pressing desire to ensure recognition and celebration of this often overlooked population. In 2013, the Duke of Sussex visited the Warrior Games in the USA.ⁱⁱ Seeing the benefits experienced by competitors at the Warrior Games, and the way the Games allowed them to celebrate their accomplishments after illness and injury, led to the development of the Invictus Games.

The initial idea of the Invictus Games was to create an adapted sport competition like the Warrior Games but at a larger scale. The Warrior Games only included a few countries and, at the time, the number of spectators mostly consisted of competitors' friends and family. Prince Harry sought to take the concept but elevated to the scope of international competition so more Service Members and Veterans could enjoy the benefits of military adapted sport participation. Furthermore, the international scope and substantial media coverage would ideally increase visibility and support for Service Members and Veterans with illnesses and injuries in the civilian world.

The name "Invictus" was chosen, which is Latin for "Unconquered." Beyond its formal translation, the name also had relevance to a poem *Invictus* by William Ernest Henley. Henley

ⁱⁱ The Warrior Games, first launched in 2010, are hosted by the United States Department of Defense and are an annual adapted sport competition for Service Members and Veterans with illnesses and injuries.

wrote *Invictus* to reflect his experiences with illness and injury, including multiple surgeries and limb amputation.^{40,41} The message of the poem was seen as reflecting aspects of the illness and injury experiences of military personnel. The final two lines “I am the master of my fate, I am the captain of my soul”⁴² became an important slogan for the Games, and a rallying cry for competitors, reflecting the desired message of determination and perseverance.

The first Invictus Games was held in London in 2014. Over 300 Service Members and Veterans with illnesses and injuries from 13 nations competed in 10 adapted sports. Participants were labelled “competitors” as opposed to athletes to highlight the focus on sport as a springboard for recovery and a spirit of camaraderie among all military personnel as opposed to a focus on winning and medals. A precedent for future Games was set with no official medal count or medal table kept. Seeing the positive impact experienced by many competitors and with additional nations seeking to participate, the Games continued. London was followed by Orlando in 2016, Toronto in 2017, Sydney in 2018, and The Hague (originally scheduled for 2020 but conducted in 2022 due to COVID-19). At the time of writing, the number of nations participating has continued to grow with a total of 23 countries now members of the Invictus Community of Nations.

As the Games developed, family and friends became an integral part of the competition. Friends and family are recognized as vital for supporting an individual’s recovery. However, there is also understanding of the impact of illness and injury on family and friends, and the need to support their well-being in addition to that of Service Members and Veterans. Since 2016, each competitor has had the option to bring two family and friends with them to experience the Games with travel, accommodations, and food covered. These friends and family get their own national branded kit and VIP treatment throughout the Games, including special events, seating, accommodations, etc.

As the Invictus Games Foundation has grown to include programming and activities outside of the actual Invictus Games competition itself, including connecting Service Members and Veterans with illnesses and injuries with employment opportunities, adventurous challenge, active eSports, and community-building, the mission of the Games has evolved to include three pillars: Inspire, Improve, and Influence.⁴³ The *Inspire* pillar focuses on promoting recovery and resilience through activities including the Invictus Games competition, family and friends programming, innovative developments in categorisation, and active eSports. The *Improve* pillar consists of activities designed to “improve lives through sports recovery and adventurous challenge to build an international active support network that continues to serve”,⁴³ including adventurous challenge funding and support, a private community app, awards, and non-Games related events and opportunities. Finally, the *Influence* pillar involves sharing best practices and collaboration to “influence research and knowledge.”⁴³ Activities for this latter pillar include global community and partner engagement, knowledge sharing conversations in the form of webinars and physical symposia, medical and academic research, strategy and policy, and the current research study.

1.2.1 Invictus Games Research

Academic research has been conducted on the Invictus Games outside of the current report. This research has included quantitative, qualitative, and mixed methods research on the experiences of competitors and their families, as well as media representations. Summaries of

competitor-focused research are presented here. These studies and their findings can assist in interpreting the results of the current research.

- Roberts and colleagues⁴⁴ sought to explore patterns of change in stress among 40 Invictus Games Orlando 2016 competitors from Team UK and a control group. Participants completed questionnaires at multiple timepoints over a 12-week period from 6 weeks before Games through 6 weeks after Games. Findings indicated that subjective stress during competition was linked to performance, health, and well-being using both psychological outcome measures and salivary cortisol biomarkers.
- Roberts and colleagues⁴⁵ also conducted a second study on Team UK Orlando 2016 competitors exploring Veteran experiences prior to, during and after competition. Findings included that participants had many different sources of motivation for participating, including connection with the military and being a role model. Furthermore, the research team identified that participants experienced stressors during competition and, much like competitive full-time athletes, experienced a decrease in well-being after the Invictus Games. Findings also suggested that competitors could benefit from the implementation of psychoeducational programming prior to the Games to better support well-being after the Games.
- Brittain and colleagues⁴⁶ conducted qualitative research with competitors, family, and team members again during the Orlando 2016 Games. Findings suggested that participation in the Games supports post-traumatic growth through mechanisms including supporting physical competence, psychological improvement, and social connection. Findings further emphasized the value of goal setting and team mentality to support benefits of participation.
- Mixed methods research was also conducted by the current research team in the context of the Invictus Games Toronto 2017.^{17,47,48} English and French speaking competitors took part in interviews prior to the Games, immediately after the Games, and three months after the Games. Competitors also completed surveys at the same timepoints. Surveys did not indicate significant improvements. However, interview data suggested that this lack of significant finding was because most improvements in physical and psychosocial well-being occurred during the months of training, which were not examined in the quantitative research. This information served to inform the design of the Sydney 2018 and The Hague 2022 research presented in this report, particularly inclusion of pre-Games and pre-selection timepoints.
- Lewis⁴⁹ conducted survey-based research with the Australian Defence Force Adaptive Sports Program prior to competitor selection for Invictus Games The Hague and the US Warrior Games. Findings suggested that participation in the program increased physical activity and promoted rehabilitation.

In sum, these findings highlight benefits to participating in the Invictus Games but note the importance of more in-depth and longitudinal research on outcomes experienced, as well as considering mechanisms of delivery to support optimal outcomes.

1.3 Quality Participation in Adapted Sport

Individuals experiencing disability have a basic right to “full and effective participation and inclusion”⁵⁰ in all domains of society, a right upheld by the United Nations and national policies in countries across the globe. However, this right is not experienced, particularly within the domain of physical activity.⁵¹ People experiencing physical and/or psychological illnesses and injuries are significantly less likely to be physically active than individuals who do not experience illnesses and injuries resulting in disability,⁵¹⁻⁵⁴ and as such are at greater risk of critical health conditions linked to physical inactivity.

As a first step to rectifying this inequity in physical activity participation, researchers sought to understand what constitutes “full and effective participation” and to develop frameworks that would promote full participation in adapted physical activity. Imms and Granlund⁵⁵ suggested that full participation in health consists of two domains of participation: quantity and quality. Quantity is easily definable as the frequency or total amount of participation. However, what constitutes quality participation was less readily understood. Conceptualizing the concept of quality in adapted physical activity became an important focus in adapted physical activity research. While several frameworks were developed (e.g.,^{56,57}), they had significant drawbacks including difficulty in applicability to physical activity contexts. Following a review of the diverse definitions of participation, Martin Ginis and colleagues⁵⁸ identified six aspects of participation: (1) autonomy (i.e. a sense of independence, choice, and control); (2) belongingness (i.e., feeling accepted, respected, and a sense of belonging); (3) challenge (i.e. sufficient level of challenge); (4) engagement (i.e., feeling motivated and fully involved); (5) mastery (i.e. feeling competent); and (6) meaning (i.e., feeling as if one is contributing to both an individual and socially meaningful goal). Researchers associated with the Social Sciences and Health Research Council of Canada-funded Canadian Disability Participation Project (www.CDPP.ca) proceeded to conduct qualitative and quantitative research, as well as systematic reviews exploring these subjective elements of participation in diverse adapted physical activity contexts (e.g., exercise, sport), among diverse ages (e.g., youth, adult), and in diverse communities experiencing disability, including military and civilian adapted sport. This research resulted in the Quality Parasport Participation Framework.⁹

1.3.1 The Quality Parasport Participation Framework

The Quality Parasport Participation Framework⁹ (*see Figure 1-1*) defines quality participation as “an athlete’s broad subjective evaluation that his or her sport involvement is (or has been) satisfying, enjoyable, and generates personally-valued outcomes.”⁹ Quality participation occurs when an individual has had multiple quality experiences, which are defined by experiencing the six elements of participation experiences (autonomy, belongingness, challenge, mastery, engagement, and meaning). While promoting quality participation elements are important for fostering quality participation experiences, research also identified key foundational aspects of a program that must be addressed for quality participation experiences. These foundational aspects are called “program conditions.”⁹ There are 25 program conditions across three domains: physical environment (i.e., physical and structural components of the sport setting and physical community, including accessibility, safety, and equipment); activity conditions (i.e., the nature of the activity itself, including the type of sport, program size, funding, activity options, safety, classification,

inclusiveness); and the social environment (i.e., personal relationships with other athletes, peers, coaches, family, and wider society, including coach knowledge, coach support and interpersonal skills, group environment, mentorship, family support and integration, and the status of sport in the community).

The Quality Parasport Participation Framework has demonstrated applicability for understanding the participation experiences of military Service Members and Veterans experiencing physical and psychological illnesses and injuries.^{17,47,48,59-66} It was used in this research for understanding competitor participation experiences and exploring international best practices for military sport rehabilitation programming (see *Chapter 7*).

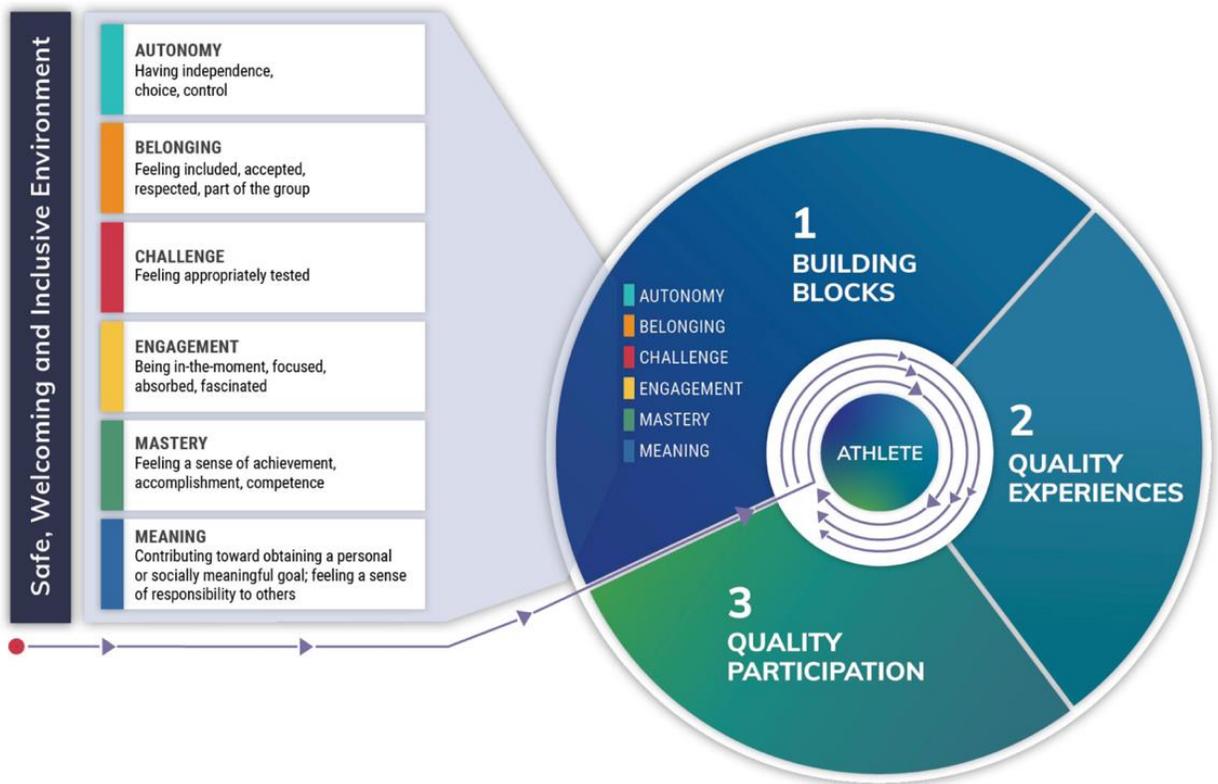


Figure 1. Quality Parasport Participation Framework ⁱⁱⁱ

1.4 Framing the Experience of Illness and Injury

Given the experiences of Service Members and Veterans with their illnesses and injuries, the framing of the Invictus Games, and previous research in the field of disability and military

ⁱⁱⁱ Reproduced with permission of the Canadian Disability Participation Project (www.cdpp.ca)

health, this research takes an approach that frames both the physical and psychological illnesses and injuries within the context of the social relational model of disability.

The social relational model of disability, the usage of which has been encouraged in the field of physical activity research,^{67,68} builds upon previous models of disabilities (e.g., medical model, social model, biopsychosocial model), addressing the limitations of each. The interaction between two critical constructs, impairment effects and psycho-emotional dimensions of well-being, is presented in the model.⁶⁹ Impairment effects describe the functional barriers that may be experienced due to the organic components of illness or injury (e.g., loss of sight, inability to use a limb, brain injury). These interact with psycho-emotional dimensions of disability, which include how an individual with an illness or injury responds to experiences of structural disability (e.g., a lack of accessible infrastructure or transportation), social interactions with others (e.g., ableist gaze, rude questions), and internalized oppression (i.e., how an individual internalizes ableism in their views of their illness or injury).⁶⁹ These psycho-emotional dimensions have been summarized as ‘barriers to doing’ (i.e., structurally or socially imposed limits) and ‘barriers to being’ (i.e., words or actions that influence the identity, confidence, and well-being of the individual with the illness or injury).¹⁵

While no model is without limitations, this model has significant merits by fully embracing the subjective experience of the individual living with an illness or injury in understanding the experience of disability. Furthermore, the concept can be applied to both physical and mental illness and injury. Given these merits, the social relational model of disability is the lens through which the illness and injury experiences of Service Members and Veterans are understood in this report. Applied to this research:

- ***Impairment-based restrictions***⁶⁹ can include physical and/or psychological illness or injury. These illnesses and injuries may influence the way in which an individual can participate in sport, requiring certain adaptations. For example, someone with a mobility impairment may require mobility aids. Meanwhile, an individual with anxiety or PTSD may benefit from quiet rooms where they can rest if overstimulated. The illnesses and injuries may also significantly impact an individual’s physical health and well-being.
- ***Social restrictions***⁶⁹ include both structural barriers and attitudinal barriers. Structural barriers can include a broad range of barriers in the physical environment, including the accessibility of training locations and transportation options available. Attitudinal barriers can also be diverse (e.g., feeling excluded from the civilian or military communities). In relation to our current and previous research, we first highlight potential stigma that may exist towards type of illness or injury, such that there may be varying levels of stigma based on whether an individual experiences a visible or non-visible injury or illness, and/or a physical and/or psychological injury or illness. A second stigma, particularly relevant among the military population with illnesses and injuries, may relate to how the illness or injury was acquired (i.e., combat or non-combat based). These may impact the ability to participate in physical activity programming, as well as the experience of engaging in physical activity, and thus whether positive or negative outcomes are experienced.

- ***Internalized oppression***⁶⁹ can include a competitor or non-competitor's response to social interactions and any ableist attitudes and perspectives from the military, other Service Members and Veterans, their families, and civilians. The internalized response could vary from social isolation and feeling disempowered on one end of the scale to a sense of post-traumatic growth and resilience on the other. For example, an individual with a non-visible injury or illness may have trouble receiving accommodations in the civilian world and this may impact their willingness to put their name forward for participation in the Games as they may feel that adapted sport is predominantly for visible illness or injury rehabilitation. However, as they meet fellow Service Members and Veterans with similar conditions, their perspectives may change.

1.5 Summary

Physical activity can have numerous benefits for Service Members and Veterans after illness and injury. However, knowledge gaps remain regarding the benefits of large-scale international sport competition, the longitudinal benefits of participation, and best practices for program delivery. The Invictus Games are an international adapted sport competition for Service Members and Veterans experiencing physical and/or psychological illness and injury. Given the global nature of the Games, the focus on adapted sport competition as context for rehabilitation, and the international scope, the Invictus Games provide an optimal lens for addressing existing knowledge gaps. The research presented in this report sought to examine the short- and long-term impact of the Invictus Games on Service Members and Veterans with illnesses and injuries, as well as mechanisms and practices that may support greater well-being. This research was framed by the Quality Parasport Participation Framework and the social relational model of disability.



Chapter 2: Research Objectives

Key Points

- This research project sought to respond to the following three research questions:
 - What are the short- and long-term outcomes of participating in the Invictus Games?
 - What components of competitor experiences best support health and well-being?
 - What are best practices for delivering competitive sport rehabilitation programming?
- With the onset of COVID-19 during the research process, a fourth research question was added:
 - What was the impact of COVID-19 on Service Members and Veterans experiencing physical and/or psychological illnesses and injuries?

This research, set against the backdrop of the Invictus Games Sydney 2018 and the Invictus Games The Hague 2020, was developed to respond to three knowledge gaps:

- What are the short- and long-term outcomes of participating in the Invictus Games?
- What components of competitor experiences best support health and well-being?
- What are best practices for delivering competitive sport rehabilitation programming?

With the onset of COVID-19 and its dramatic impact on health and quality of life across all populations, a fourth research question was developed:

- What was the impact of COVID-19 on Service Members and Veterans experiencing physical and/or psychological illnesses and injuries?

To answer these research questions, this final report consists of multiple research studies. The first three studies are presented chronologically. Specifically, we start by examining the impact of the Invictus Games on the well-being of competitors by comparing pre- and post-Games outcomes between competitors and non-competitors of the Invictus Games Sydney 2018 (*Chapter 4*). While the Invictus Games The Hague 2020 were meant to follow, they were interrupted by the COVID-19 pandemic. Thus, *Chapter 5* highlights the experiences of Service Members and Veterans experiencing physical and/or psychological illnesses and injuries during the pandemic. The Invictus Games The Hague 2020 were conducted in 2022. Findings related to the impact of participation in these Games are presented in *Chapter 6*. In *Chapter 7*, we present research seeking to determine best practices for military sport recovery programming. This includes quantitative research based on the Invictus Games Sydney 2018 dataset identifying training and competition experiences associated with greater improvements in the well-being of competitors, as well as mixed methods research on delivery strategies implemented by the 23 nations participating in the Invictus Games during this research project. In *Chapter 8*, we present a conclusion and a list of recommendations for future research and practice. Beyond contributing to scientific knowledge on the short- and long-term impact of competitive adapted sport for Service Members and Veterans experiencing physical and/or psychological illnesses and injuries, these findings also form the foundation of an additional project deliverable: a training workshop for individuals seeking to develop military sport recovery programming.

Chapter 3: Methods



Key Points

- A mix of quantitative and qualitative longitudinal methods were used to answer the research questions identified in Chapter 2.
- For more detailed information, the research protocol approved by regulatory boards can be accessed [here](#) on Open Science Framework.

Information in this chapter is organised according to the research objectives in Chapter 2.

3.1 What are the short- and long-term outcomes of participating in the Invictus Games?

3.1.1 Design

A longitudinal questionnaire approach was taken whereby participants were invited to complete surveys assessing their physical and psychological health across a series of time-points.

3.1.2 Participants

Once ethics approval had been received, recruitment occurred through flyers and e-mails sent out to national teams, social media posts by the research team and IGF, and posts on a private social network for Service Members and Veterans experiencing illnesses and injuries hosted by IGF. We sought to recruit competitors (i.e., individuals who had been selected to participate in Sydney 2018 or the Hague 2020) and non-competitors (i.e., individuals who either had applied to participate in the Games but were not selected OR Service Members or Veterans experiencing illnesses and injuries who had not applied or tried out for selection and had no affiliation with the Games). No exclusion criteria existed around language. Some questionnaires already had existing translations (e.g.,⁷⁰⁻⁷²). All other questionnaires, consent forms, and e-mails were translated into the languages of all participating nations by a research translation company: Language Scientific. Demographic information on the final participant sample for Sydney 2018 and Hague 2020 is provided in Chapters 4 and 6 respectively.

3.1.3 Procedure

The design for this component of the final report was determined based on previous research,^{23,48,62,64} and focused on longitudinal quantitative research that encompassed all Invictus Games nations. Our team's previous research demonstrated that quantitative research should not just focus on the Games but also include selection and training.⁴⁸ As such we aimed to include this earlier period in the current research. The final planned data collection timepoints were:

- T1: 1 year pre-Games
- T2: 6-months pre-Games
- T3: 3-months pre-Games
- T4: immediately pre-Games
- T5: immediately post-Games
- T6: 3-months post-Games
- T7: 6-months post-Games
- T8: 1-year post-Games

For Invictus Games Sydney, the totality of the training period was not included as selection and training had begun prior to the start of the research project. Training was, however, included for Invictus Games The Hague, though latter timepoints were impacted by COVID-19. As selection

and training timelines differed by country, the selection date was based on one nation: Team UK. Full details on the timeline for each Games is provided in Chapters 4 and 6, respectively.

Survey links were shared with nation staff for distribution at each time-point using Qualtrics. Participants received Amazon gift card compensation in their chosen currency after completing each survey.

3.1.4 Survey Measures

Survey measures were determined based on prior research and had been piloted by the research team during the Invictus Games Toronto 2017.^{23,48,62,64} An overview of the measures is provided below with additional information provided in the open source protocol linked above:

Demographic information. Participants were asked to share their nation, gender, age, marital status, highest level of education completed, employment status, race and ethnicity, military status (serving or veteran), and sport experience. Participants were also asked to self-disclose any illnesses or injuries and years since onset of illness/injury. The decision to have participants self-disclose was based on previous interviews with military personnel with illnesses and injuries (some have mentioned additional trauma experienced in receiving diagnoses or getting documentation), as well as the fact that access to records may differ by nation. Conditions were then organised according to three categories: physical illness or injury, psychological illness or injury, or both. The classification into these categories was based on the International Classification of Functioning, Disability and Health (ICF).¹ In scenarios where ICF classification was not clear, the categorisation system for the Invictus Games served as additional guidelines for evidence-based categories.

Psychosocial outcomes. (see *Table 1*) Psychosocial outcomes assessed included affect (i.e., positive and negative feelings),⁴ flourishing (i.e., self-perceived success),⁴ satisfaction with life,⁴ post-traumatic growth (with a focus on three subscales, particularly whether the participant was experiencing greater appreciation of life, understanding of new possibilities, and greater personal strength after illness and injury).^{6,73} Further detail on these measures is provided on the following pages.

Physical health. (see *Table 2*) Items were selected from the Short Form Health Survey (SF-36)⁷⁴ and focused on general health, health compared to the previous year, bodily pain, and pain interference with activities of daily living. Further detail on these measures is provided on the following pages.

Table 1. Psychosocial Measures

Dimension	Survey information	Scoring
Affect	<p>Measured using the Scale of Positive and Negative Experiences.</p> <p>12 items that assess positive and negative feelings (e.g., joy, sadness) over the previous 4 weeks</p>	<p>Each item is scored on a scale from 1 to 5 indicating frequency that the feeling is felt (<i>very rarely or never/very often or always</i>). The positive and negative item scores are averaged. The negative average is then subtracted from the positive score for a final measure of affect balance.</p>
Psychosocial well-being	<p>Measured using the Flourishing Scale. Consists of 8 items assessing self-perceived success.</p>	<p>Items are scored on a scale from 1 to 7 (<i>strongly disagree/strongly agree</i>). The item responses are averaged for a final score.</p>
Satisfaction with life	<p>Measured using the Satisfaction with Life Scale. Consists of 5 items assessing an individual's general cognitive judgment of their satisfaction.</p>	<p>Items are scored on a scale from 1 to 7 (<i>strongly disagree/strongly agree</i>). The item responses are averaged for a final score.</p>
Post-traumatic growth	<p>Assessed through three sub scales (appreciation of life, personal strength, new possibilities) from the Post-Traumatic Growth Inventory. These assess whether an individual has grown as the result of their traumatic illness or injury.</p>	<p>Items are scored on a scale from 0 to 5 (<i>I did not experience this change/I experienced this change to a very great degree</i>). Each subscale is averaged for a final score in each domain.</p>

Table 2. Physical Health Measures

Dimension	Survey information	Scoring
<p>General Health</p>	<p>1 item assessing how participants perceive their health.</p>	<p>Item is scored on a scale of 1 to 5 (<i>excellent/poor</i>). This is then translated to a scale of 0 to 100, with higher scores indicating better health.</p>
<p>Health compared to the previous year</p>	<p>1 item assessing general health compared to one year prior.</p>	<p>Item is scored on a scale of 1 to 5 (<i>much better/much worse</i>). This is then translated to scale of 0 to 100, with higher scores indicating better health compared to the previous year.</p>
<p>Bodily pain</p>	<p>1 item assessing pain felt in the body over the previous 4 weeks.</p>	<p>Item is scored on a scale of 1 to 6 (<i>none/very severe</i>). This is then translated to a scale of 0 to 100, with higher scores indicating less bodily pain.</p>
<p>Pain interference with activities of daily living</p>	<p>1 item assessing whether pain interfered with work or housework over the past 4 weeks.</p>	<p>Item is scored on a scale of 1 to 5 (<i>not at all/extremely</i>). This is then translated to a scale of 0 to 100, with higher scores indicating less pain interference.</p>

3.1.5 Analysis

Variables were summarized by count and percentages for categorical variables or mean \pm standard deviation for continuous variables. Multiple imputation with 5 iterations was used to impute missing values for key covariates, with predictive mean matching (pmm) used for continuous variables and polytomous logistic regression (polyreg) used for unordered categorical variables. Linear mixed effects models was the primary analysis for comparing continuous outcomes between competitor vs. non-competitor groups (mixed effects) with participant IDs as random effects. Outcomes on Likert scale were analyzed using cumulative link mixed models with participant IDs as random effects. All hypotheses were two-sided and p value < 0.05 was considered statistically significant. All analyses was done using R package version 4.2.2.

3.1.6 Limitations

As with most longitudinal research, attrition was high. The Sydney data had fluctuations from 26.3% to 67.3% missing data, with highest amount of missing data at the 1-year timepoint. The Hague data had similar fluctuations (35% to 72.5% missing data) which can be linked to longitudinal research but also the impact of the pandemic on research. Maintaining participant engagement during the pandemic became more difficult. Furthermore, due to the rescheduling of the Games first from 2020 to 2021 then from 2021 to 2022, some participants had been participating in the study for 3 years. Highest missing data was at the 1-year timepoint and during the height of the pandemic. The missing data for the Hague is also linked to changes in team composition due to delays in the Games (e.g., competitors no longer being able to compete in the Games due to changes in employment or family responsibilities). Finally, New Zealand did not participate in the Games due to COVID-19 travel restrictions. This resulted in a number of study participants having to be removed from our data analysis.

Jordan, Iraq and Afghanistan were not included in the surveys due to an inability to provide the gift card compensation being provided to all other nations (either unable to distribute gift cards or unable to purchase gift cards that could be used by residents in each country). As such, to capture their participation experiences, representatives from these nations engaged in in-person focus group interviews with the lead investigator at the Invictus Games Sydney. While Jordan and Afghanistan were not present at The Hague, Iraqi competitors and staff participated in an additional focus group during Invictus Games The Hague. This focus group data was then integrated into the best practice research question.

A final limitation is that the non-competitor sample included both individuals who had applied to participate in the Games but were not selected, as well as those who had not applied to participate in the Games. These two groups of non-competitors will have different relationships with the Games which could impact their perceptions of the research and engagement with the study. Each group would also potentially have different trajectories following selection, which would be particularly important in interpreting the non-competitor data from the Invictus Games The Hague which capture pre-selection data. Future research could explore differences between each group.

3.2 What components of competitor experiences best support health and well-being?

3.2.1 Design

The same design was implemented as 3.1.1. with additional questions at two time-points assessing competitor experiences.

3.2.2 Participants

See 3.1.2. Participants consisted of competitors already completing surveys.

3.2.3 Procedure

Survey measures were included in immediate pre-Games and immediate post-Games timepoints from section 3.1.3.

3.2.4 Survey Measures

Participants completed surveys assessing coaching behaviors⁷⁵ and quality participation experiences.⁷⁶ (see *Table 3*)

Table 3. Competitor Experience Measures

Dimension	Survey information	Scoring
Coaching Behaviours	Assessed using the Coaching Behaviour Scale for Sport (47 items). Participants are asked to rate the frequency that they experience coaching behaviours related to: physical training and conditioning, technical skills, mental preparation, goal setting, competition strategies, and head coach negative or positive rapport.	Items are scored on a scale of 1 to 7 (<i>never/always</i>). An average score is created for each subscale, except for the head coach subscale where two scores were created (one for positive rapport and one for negative rapport).
Quality Participation Experiences	Assessed using the Measure of Experiential Aspects of Participation. This measure assesses the six elements of participation (autonomy, belongingness, challenge, engagement, mastery, meaning).	Items are scored on a scale of 1 to 7 (<i>strongly disagree/strongly agree</i>). An average score is created for each quality element.

3.2.5 Analysis

Similar approaches were used as in section 3.1.3. such as multiple imputation, LMMs and CLMMs for exploring the effects of coaching behaviour and quality participation items in training and at games on the outcomes, adjusting for time points, type of illness or injury but not baseline outcomes (since analysis was applicable to competitors only). All hypotheses were two-sided and p value < 0.05 was considered statistically significant unless otherwise specified. All analyses were done using R package version 4.2.2.

3.2.6 Limitations

The initial desire was to conduct this research question across data from Invictus Games Sydney and Invictus Games The Hague. However, due to changes in training approaches due to COVID-19 and decreases in participation for the Hague research (see *section 3.1.5*), analysis for this research question focused on data from Invictus Games Sydney.

3.3 What are best practices for delivering competitive sport rehabilitation programming?

3.3.1 Design

A mixed methods exploratory sequential design was implemented, consisting of interviews, observations, document collection, and surveys.

3.3.2 Participants

Interviews. Once ethics approval had been received, recruitment occurred through e-mails and texts to nation team managers for distribution amongst nation staff and coaches. Anyone who was involved in the Invictus Games from team operations, team selection, team training, team support, and family support was eligible to participate in interviews.

Nation visit observations. Nations were identified for observational visits at selection trials and training camps based on scheduling, the languages fluently spoken by the research team (English and French), as well as the opportunity to capture diversity in approaches. Final nation visits included Team UK (2018 and 2019 team trials), Team France (2020; this visit also included an opportunity to interact with and observe Team Belgium who were in attendance to use facilities for their training camp), and Team USA (2022 pre-Hague training camp).

Invictus Games observations. All nations attending each Games were included.

Surveys. All nation staff were invited to participate. However, the list of strategies was only available in English which may have limited participation among some nations.

Demographic information on the final participant sample is provided in Chapter 7.

3.3.3 Procedure

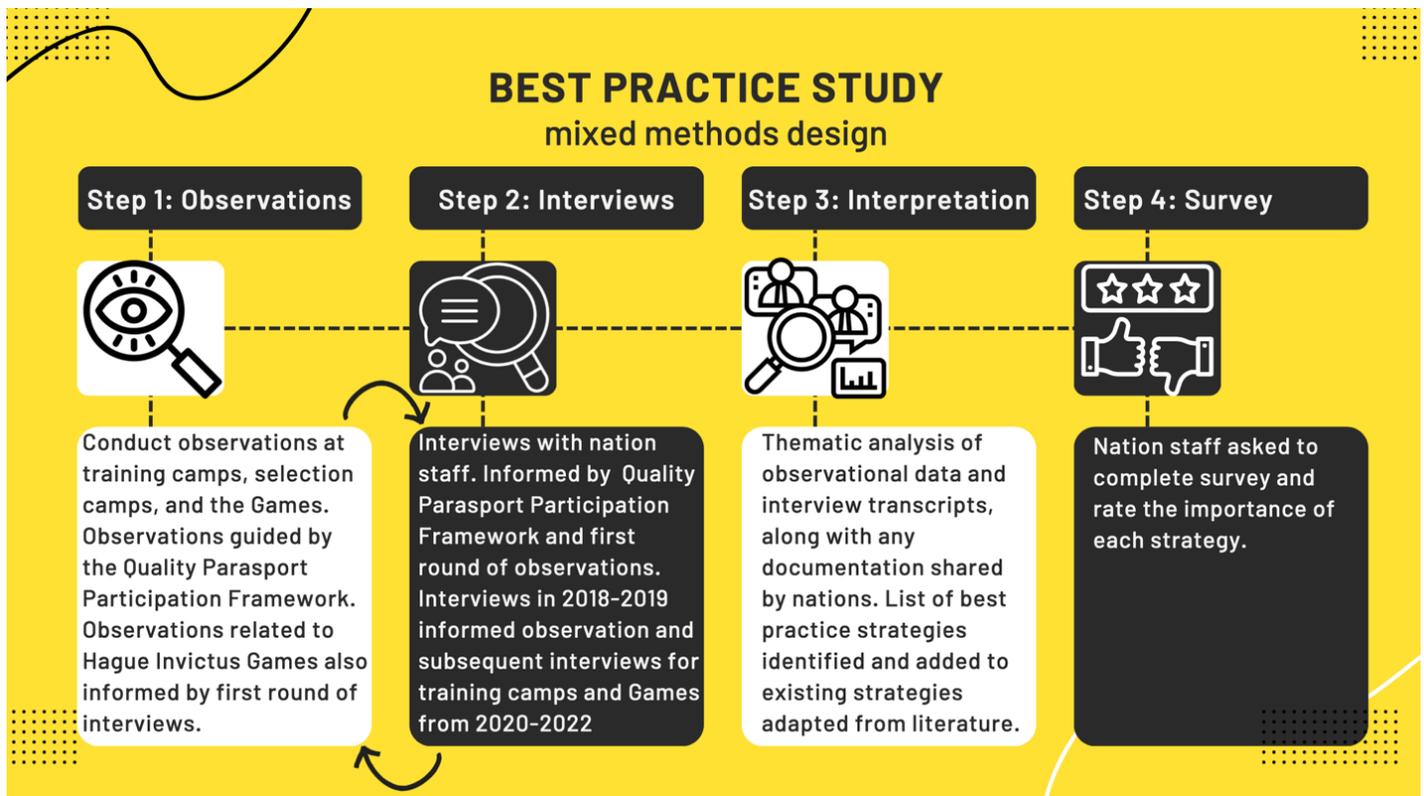


Figure 2. Best Practices - Data Collection

Nation visit observations. Nation visit observations were all conducted in person by the same member of the research team. The researcher was kindly allowed full access to all activities during training and selection camps and trials, including competition, practices, team meals, team meetings, and family and friend events.

Invictus Games observations. The member of the research team who attended the nation visit observations and conducted all interviews attended all Invictus Games events, as well as pre-Games training days to observe team interactions and competition approaches.

Interviews. Interviews took place via Zoom, on the phone, or in person. Mode of interview was based on participant preference and availability. However, in-person interviews during the Games were prioritized in scenarios where language barriers could exist as translators were present. Multiple interviews were conducted with each nation using an iterative approach where questions would be added based on observations and information shared in previous interviews.

Document collection. If nations mentioned any materials or manuals during interviews, they were asked if they would be willing to share those documents with the research team. The

research team also conducted online searches on each nation's Invictus Games programming, including available selection materials, training schedules, and additional programming.

Surveys. Strategies identified from qualitative analysis were integrated with previous strategies from the Quality Parasport Participation Framework adapted to the context of the Invictus Games. These strategies were then organised according to quality elements and distributed via survey to nation staff.

3.3.4 Measures

Interviews. Interviews ranged in duration from 30 minutes to over an hour depending on the availability of the participant. The first round of interviews was unstructured and focused on gaining an understanding of how the team viewed the Invictus Games (particularly in relation to other nation programming), as well as training and Games experiences. As the importance of selection, participant readiness, training, and long-term outcomes were identified, further interviews focused on each nation's approach to these topics.

Observations. Observations were guided by Quality Participation Checklist Audit Tool which is based on the Quality Parasport Participation Framework. The audit tool includes a worksheet with strategies and checklists for different components of the framework. The researcher would take notes and pictures as appropriate during observations using the audit tool as a guide, and adding strategies as they were observed.

Surveys. Strategies were presented according to each element. Nation staff were presented with a definition of the element and then asked to rate the importance of the strategy for achieving that outcome on a scale of 1 to 7 (*very unimportant/very important*).⁷⁷

3.3.5 Analysis

Qualitative Analysis. Qualitative analysis was conducted twice: first to determine key areas of decision-making for teams, and then to identify strategies. The first analysis was conducted using thematic analysis.⁷⁸ Per thematic analysis, the first step consisted of deep familiarisation with the data, which included re-reading transcripts, notes, and documents; watching any videos from the Games and training camps; and looking at pictures. The data was then analysed by hand first through the identification of initial codes followed by grouping of codes into themes. These themes were then refined and re-organised in discussion with members of the research team. The second analysis consisted of a content analysis, in particular line by line coding of written materials and section coding of videos and photos for systematic identification of strategies and organisation of strategies into the six elements of quality participation. Descriptive labels were used for strategies to assist nation staff in recognising strategies and determining their importance.

Quantitative Analysis. Means and standard deviations, as well as response ranges, were calculated across each strategy. We first sought to identify strategies with average ratings indicating importance (average score of 5 or greater indicating *slightly important* or higher) and then further refined the list by identifying strategies rated as important by all participants (as

opposed to solely an average score). Strategies were then presented in Chapter 7 in order of importance.

3.3.6 Limitations

We were unable to translate the strategy surveys into different languages due to time limitations. As such, many nations were unable to participate in the survey. The plan is thus to bring the final list of surveys to the next Invictus Games for review and feedback from the nations that were unable to participate as translators will be present.

3.4 What was the impact of COVID-19 on Service Members and Veterans experiencing physical and/or psychological illnesses and injuries?

3.4.1 Design

The same design was implemented as 3.1.1. with additional survey questions during the pandemic assessing pandemic experiences.

3.4.2 Participants

Surveys. The research focused on a sub-sample of the participants identified in section 3.1.1. Specifically, the COVID-19 survey measures were only available in English, and as such were distributed solely to participants completing English language surveys. Given the desire to capture the early days of the pandemic, there was no opportunity to delay distribution for translation.

Interviews. Guided by the language fluency of the research team (English and French), interview requests were sent out via e-mail to all participants in the larger study (see section 3.1.1.) who were completing English or French surveys. They were asked to share the interview requests with family (e.g., parents, siblings, spouses/partners, children).

Demographic information on the final participant sample for the COVID-19 research is provided in Chapter 5.

3.4.3 Procedure

Surveys. Additional survey items were added to Invictus Games The Hague timepoints during the pandemic that coincided with the majority of nations implementing shelter at home and COVID-19 mitigation measures: T4 (May 2020); T5 (August/September 2020), T6 (November 2020).

Interviews. Interviews took place via Zoom based on participant availability and preferences. Interview participants received an Amazon gift card in their chosen currency after each interview.

3.4.4 Measures

Surveys: Measures were identified based on a list distributed by the United States of America’s National Institutes of Health (NIH) to behavioural scientists in the early months of the pandemic. The final surveys assessed (a) coping strategies; and (b) changes during the pandemic.

Table 4. COVID-19 Measures

Dimension	Survey information	Scoring
Coping Strategies	One item was obtained and modified (removal of self-harm strategy) from the US Center for Disease Control COVID-19 Community Survey Question Bank. The item presented a list of 15 positive and negative coping strategies and asked participants to indicate which they had implemented to cope with social distancing and isolation.	Participants were asked to check all that applied. No scoring or rating scale was used to determine frequency.
Life Changes	Another item from the same question bank examined changes in family income and employment, access to food, medical health care access, and social support.,	Participants had four options for each life domain. Wording changed based on the life domain; however, the options sought to capture varied experiences from <i>no change</i> to substantial changes (e.g., frequently without food).

Interviews. Interviews were semi-structured and ranged from 30 minutes to 1 hour in duration. They were conducted by two members of the research team to accommodate participant availability and time zones. The interview guide was developed based on responses to the quantitative surveys. All interviews (competitors, non-competitors, family) included questions that dug deeper into the life changes resulting from COVID-19, including health, relationships, routines, and physical activity. Physical activity questions also included probing related to active eSports participation. Competitor and family of competitor interviews also asked about Invictus Games and training experiences.

3.4.5 Analysis

Quantitative Analysis. Survey data were analyzed using descriptive analyses, particularly frequencies and percentages.

Qualitative Analysis. Following verbatim transcription of interview audio recordings, interviews were anonymized and pseudonyms assigned to participants. Qualitative analysis was

then conducted using thematic analysis.⁷⁸ The first step consisted of deep familiarisation with the data, which included re-reading transcripts, notes, and documents; watching any videos from the Games and training camps; and looking at pictures. The data was then analysed by hand first through the identification of initial codes followed by grouping of codes into themes. These themes were then refined and re-organised. Each step included meetings among interviewers and members of the research team for full discussion and reflection as to participant experiences.

3.4.6 Limitations

As noted in section 3.1.5, there was substantial decrease in study participation during the pandemic. As such, the quantitative data was conducted across a more limited sample. Due to missing data as participants coped with the early days of the pandemic, we were unable to conduct comparisons between competitors and non-competitors or comparisons over time. Finally, in addition to the dropout, participation was also limited by the surveys only being available in English. This latter factors also limited our ability to conduct any analysis examining interactions between the COVID-19 findings and the physical and psychosocial health outcomes examined in question 1.

Chapter 4: The Invictus Games Sydney 2018



Key Points

- Training for and competing in the Games results in better outcomes for competitors compared to non-competitors, even adjusting for any initial differences between the groups which may have impacted selection. We label this the “competitor effect.”
- For most values, the “competitor effect” decreased over time. This is most likely due to two factors:
 - The Invictus Games The Hague 2020 selection processes for most nations began immediately after the closing ceremonies for Sydney 2018. Most non-competitors in our study began participating in Invictus training and selection camps in the post-Games timepoints. This finding promotes the value of IGF-related activities even for those individuals not participating in the Invictus Games. It also emphasizes the importance of activities between Games to support Service Members and Veterans.
- It is important to consider that competitors are changing in ways that might not be captured in our surveys. In discussions with competitors and families during training camps and at Sydney 2018, many indicated that the Games saved and/or changed lives (a finding mirrored in our COVID-19 and Invictus Games The Hague interviews; see *Chapters 4 and 5*). While we can assess different aspects of life satisfaction or post-traumatic growth, no one measure can fully capture the depth of this sentiment.
- The type of illness and injury was an important factor for physical health outcomes, with individuals experiencing both physical and psychological illnesses and injuries demonstrating the poorest outcomes. This speaks to the importance of programming tailoring approaches for different conditions.
- Readers must consider that data collection for Sydney 2018 began only 3 months before the Games. Most competitors had been training for approximately a year prior to the beginning of the study. Thus, early benefits of training – when our prior research indicates most benefits are experienced - were not captured in our findings.

This chapter presents longitudinal findings on the impact of the Invictus Games Sydney 2018 on physical health and psychosocial well-being. Sydney 2018 took place from October 20 – 27, 2018. A total of 491 competitors participated in the Games representing 18 nations. Competitors had the option to compete in 13 sports (11 medaled sports), including archery, athletics, golf, indoor rowing, Jaguar Land Rover driving challenge, powerlifting, road cycling, sailing, sitting volleyball, swimming, wheelchair basketball, wheelchair rugby, and wheelchair tennis. Data collection with competitors and non-competitors for Sydney 2018 began three months before the Games and continued through 1 year after the Games (see *Figure 2*). Thus, when reviewing the data, it is important to consider that selection had occurred 6 to 9 months prior, and some competitors had been training for approximately a year prior to the beginning of the study. As a result, early benefits of training may not have been captured in our findings. For a full review of methods for Invictus Games Sydney 2018, please see *Chapter 3*.



Figure 3. Invictus Games Sydney - Data Collection

4.1 Demographic Information

A total of 298 Service Members and Veterans experiencing illnesses and injuries participated in the Sydney 2018 research surveys, including 116 competitors (23.6% of all Sydney 2018 competitors) and 182 non-competitors. An overview of key demographics is provided below.^{iv}

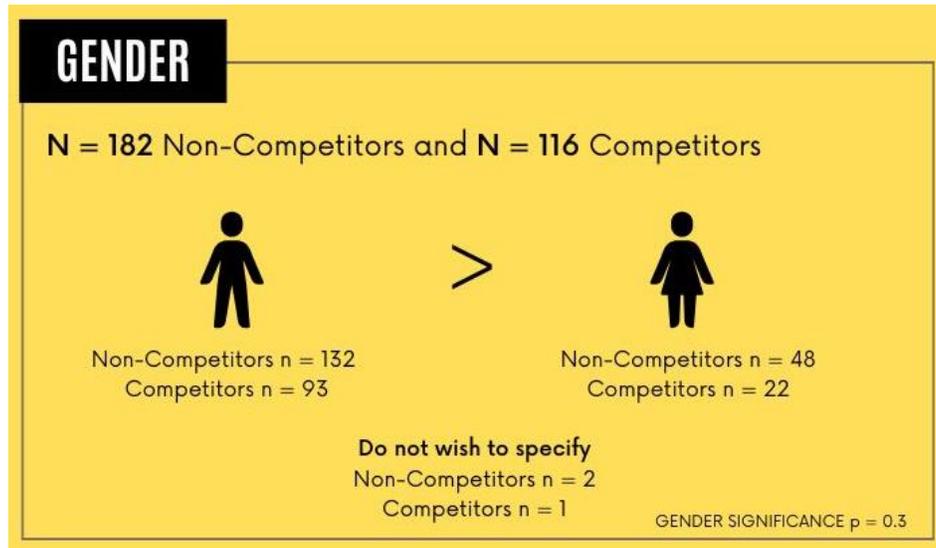


Figure 4. Invictus Games Sydney - Gender

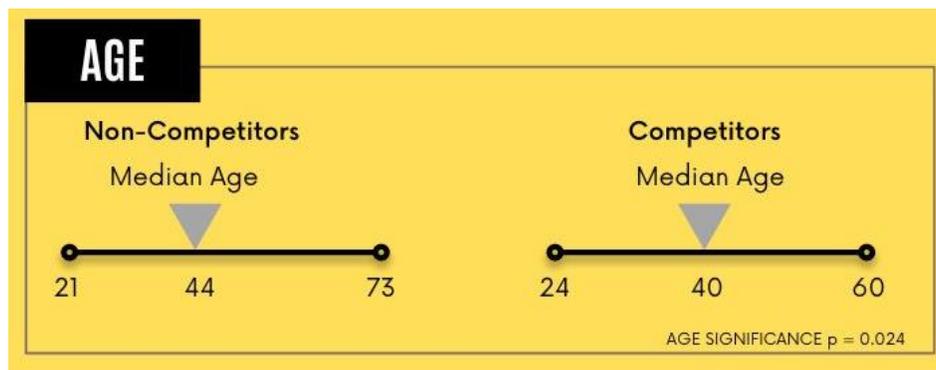


Figure 5. Invictus Games Sydney - Age

^{iv} In this report, for each demographic variable (gender, age, etc.) where we seek to compare characteristics between groups, we present a p-value. If the p-value is less than .05, that means there is a difference between groups. For example, there is no difference between competitors and non-competitors for gender ($p = 0.3$) but there is a difference in age between both groups ($p = 0.024$).

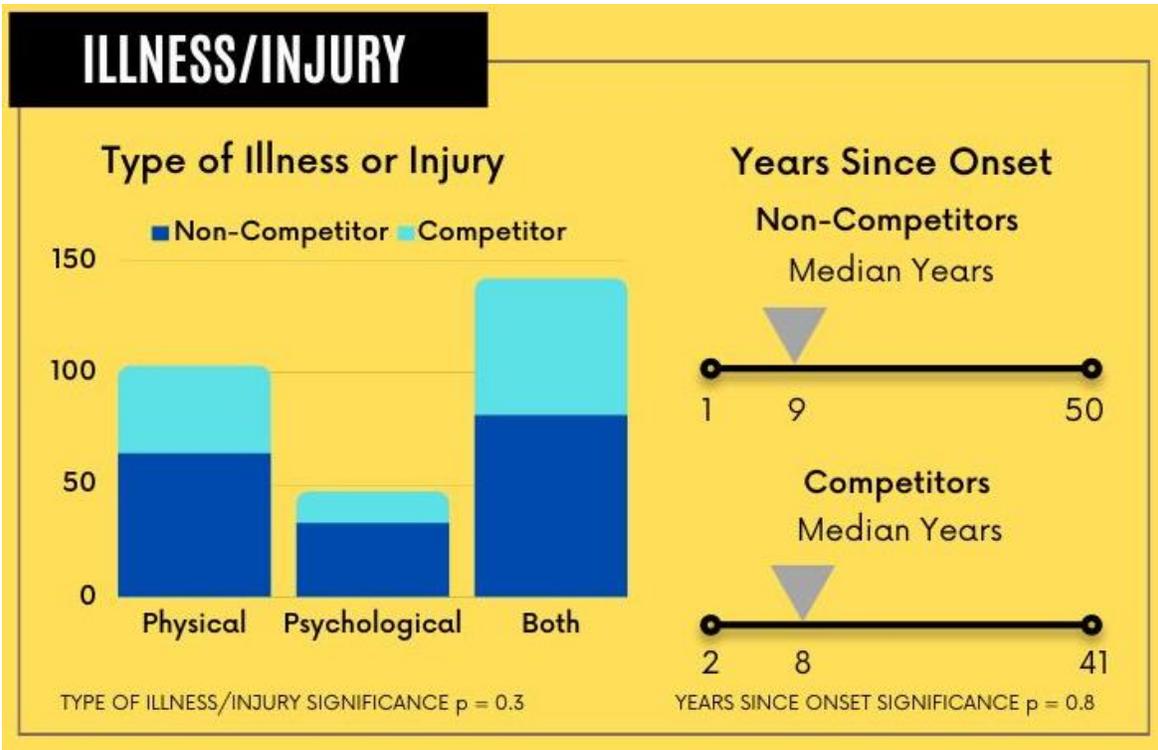


Figure 6. Invictus Games Sydney - Illness and Injury

Note. Years of onset relates to the time since the individual first started experiencing symptoms related to their primary illness or injury.

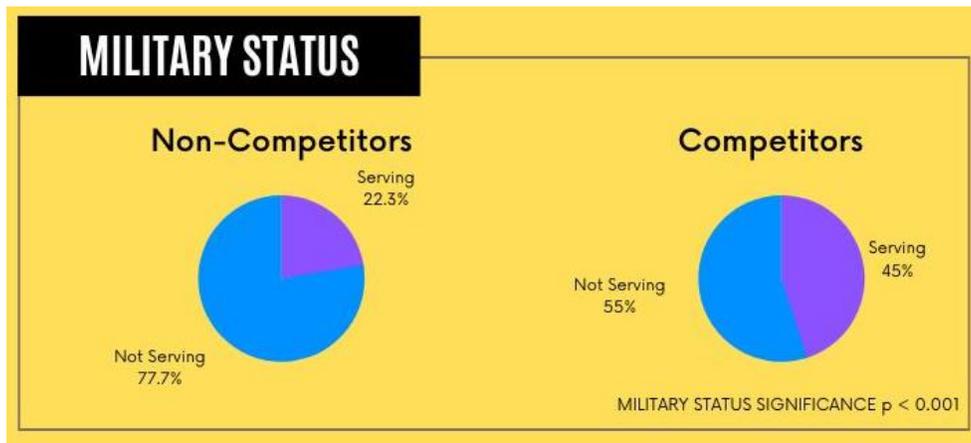


Figure 7. Invictus Games Sydney - Military Status

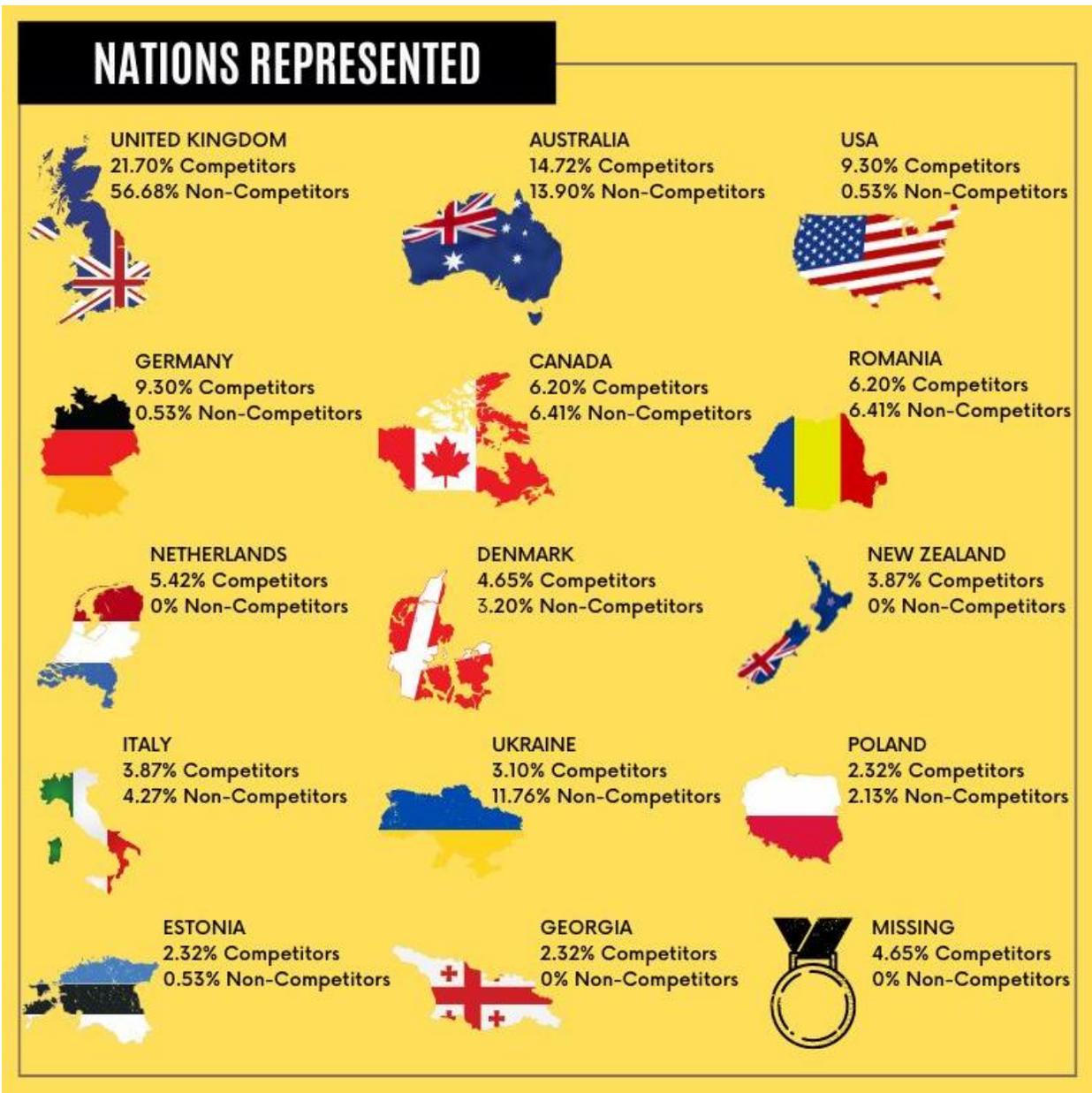


Figure 8. Invictus Games Sydney - Nations Represented

4.2 Results

In the graphs below, we present the data across all timepoints for readers to gain an understanding of trends over time. However, to answer our primary research question of short- and long-term outcomes of participation, analysis was conducted comparing T1 (3-months pre-Games) with T4 (short-term outcomes, 3-months post-Games), T5 (long-term outcomes, 6-month post-Games), and T6 (long-term outcomes, 1-year post-Games).^v As can be seen across the different graphs, competitors' baseline was often greater than that of non-competitors. This is likely reflective of the fact that training that had already been occurring for 6 – 9 months prior to the start of the survey. It may also reflect selection procedures which focus on identifying individuals demonstrating readiness for competitive sport (see *Chapter 7*). To answer the research question while accounting for this initial difference, the statisticians controlled for the baseline score in the main analysis. This means that the difference between groups at baseline was removed in order to capture differences that occurred over the course of the study as opposed to differences that may exist naturally based on groups (e.g., as noted in *Chapter 7*, different factors may influence selection and we aimed to remove as much of this potential initial differences between groups as possible). This allows us to determine what changes are reflective of experiences from T1 through T6 rather than whether changes are reflective of any initial differences between groups.

Graphs are presented for all outcomes allowing for comparison of the trajectories between competitors and non-competitors. If there were differences in outcomes based on demographic features, these differences are presented in an additional graph. When reading the graphs, please note that the vertical 'y' axis changes for each measure. These changes are based on how each measure was scored. For example, some measures were scored on a scale of 1 to 7, whereas others were scored on a scale of 0 to 100. Further information on each measure is presented in the methods chapter (see *Chapter 3*) as well as in the study's technical protocol which can be accessed [here](#).

^v For Sydney Data: T1: 3 months pre-Games; T2: immediately pre-Games; T3: immediately post-Games, T4: 3 months post-Games; T5: 6 months post-Games; and T6: 1-year post-Games

4.2.1 Physical Health

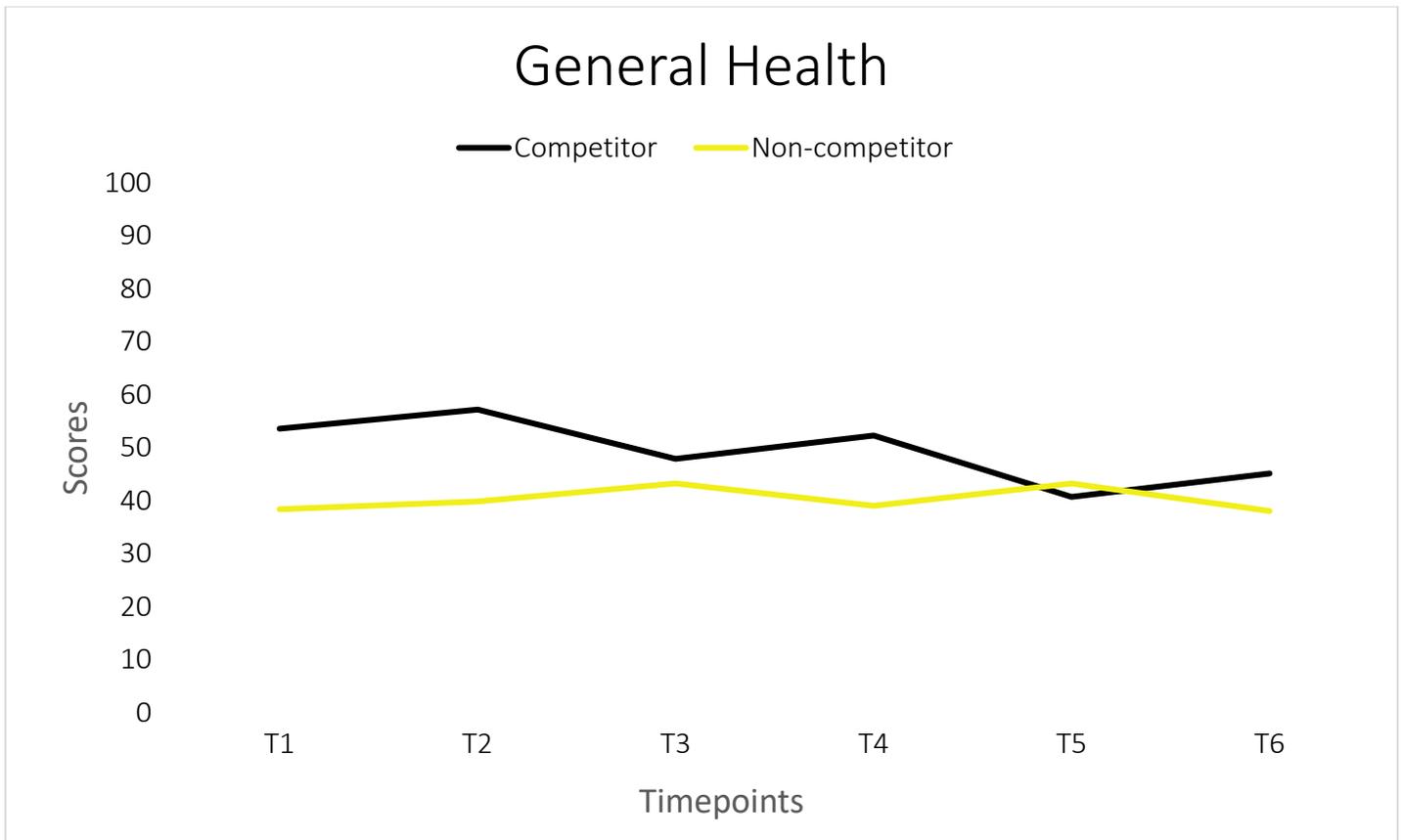


Figure 9. Invictus Games Sydney - General Health by Competitor Status

Findings indicated that competitors were 5.96 times more likely to have better general health compared to non-competitors (OR 2.22 95% CI 1.22 – 4.03, $p = 0.009$). This difference was maintained 3-months post-Games (OR 2.11, 95% CI 1.11-3.99, $p = 0.022$). However, there was no difference between groups at 6-month or 1-year post-Games.

Reminder:

T1: 3-months pre-Games

T2: pre-Games

T3: post-Games

T4: 3-months post-Games

T5: 6-months post-Games

T6: 1-year post-Games

Selection for the Invictus Games The Hague began between T3-T5 for most nations.

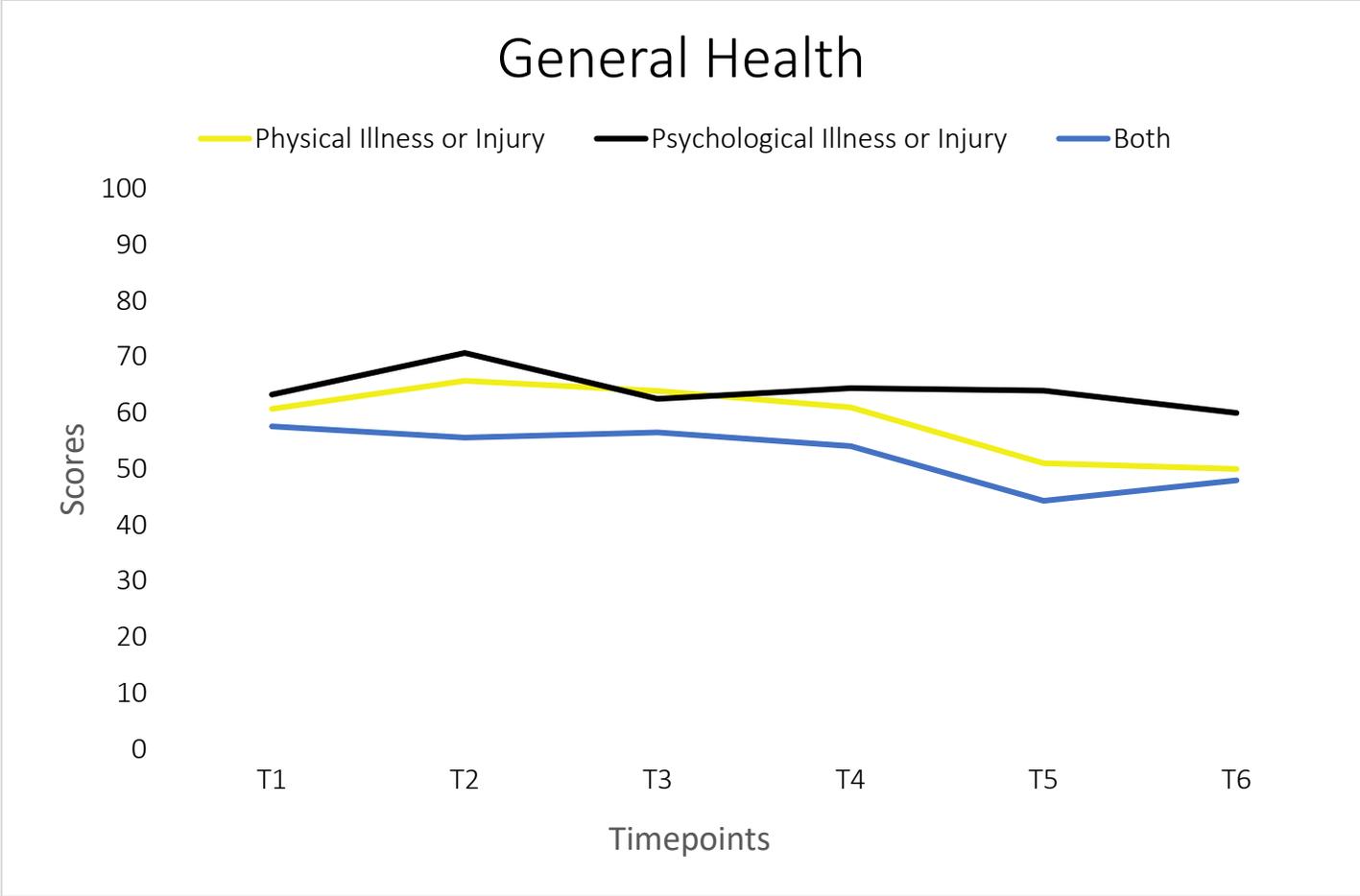


Figure 10. Invictus Games Sydney - General Health by Type of Illness or Injury

A further significant and interesting finding relates to the type of illness and injury (*Figure 9*). Across both competitors and non-competitors, individuals experiencing both psychological and physical illnesses and injuries were 37.4% less likely to be in better general health than those experiencing solely physical illnesses and injuries (OR 0.63, 95% CI 0.41 – 0.96, $p = 0.031$).

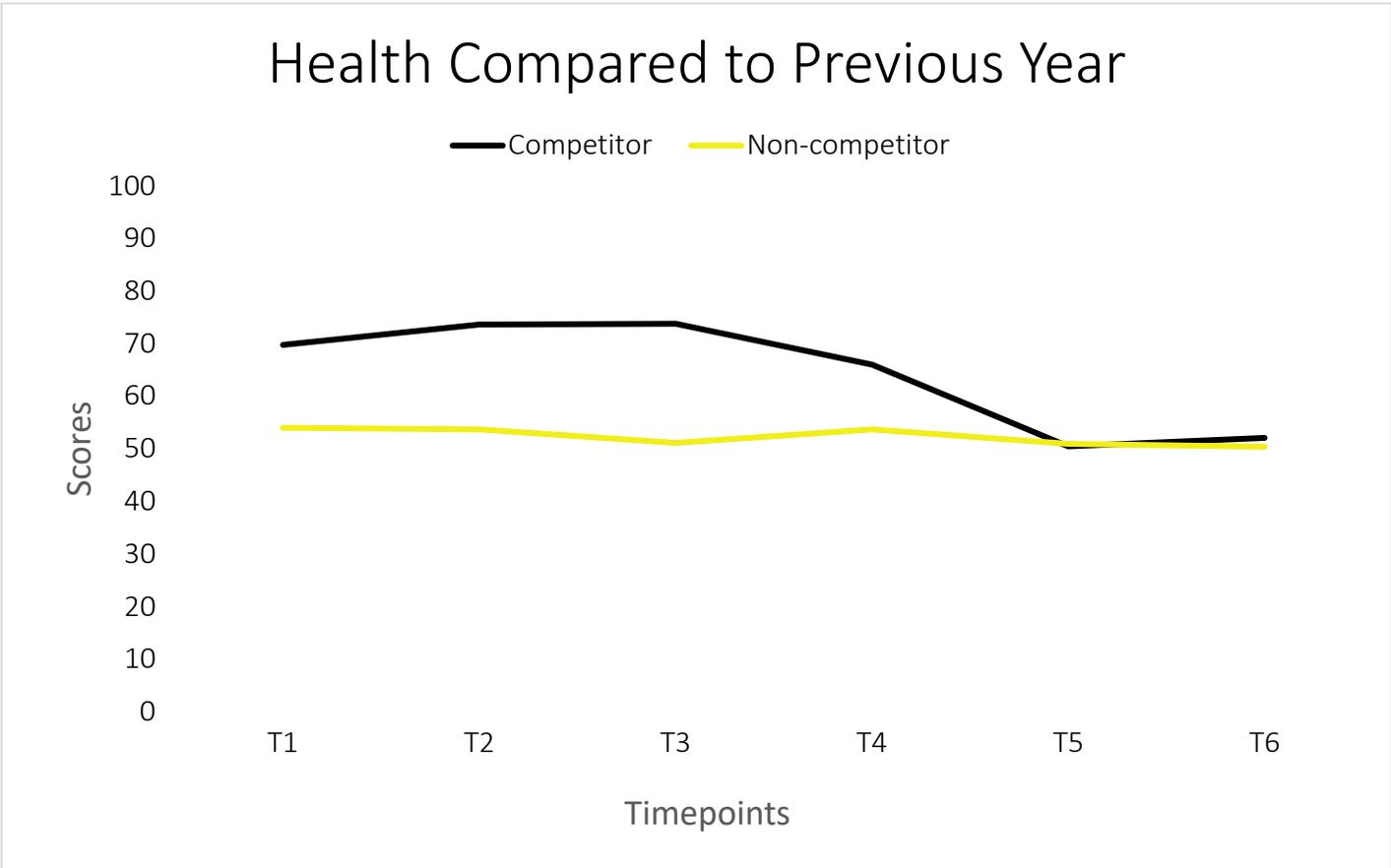


Figure 11. Invictus Games Sydney - Health Compared to the Previous Year by Competitor Status

Findings indicated that competitors were 2.17 times more likely to rate their health as better than the previous year compared to non-competitors (OR 2.17, 95% CI 1.27-3.71, $p = 0.005$). This difference between groups was maintained 3-months post-Games (OR 2.39, 95% CI 1.33-4.28, $p = 0.003$) but not at 6-months post-Games or 1-year post-Games. This outcome likely speaks to the importance of providing competitors with opportunities to continue physical activity participation and/or program connections and a sense of belongingness as an “Invictus competitor” long-term.

Health Compared to Previous Year

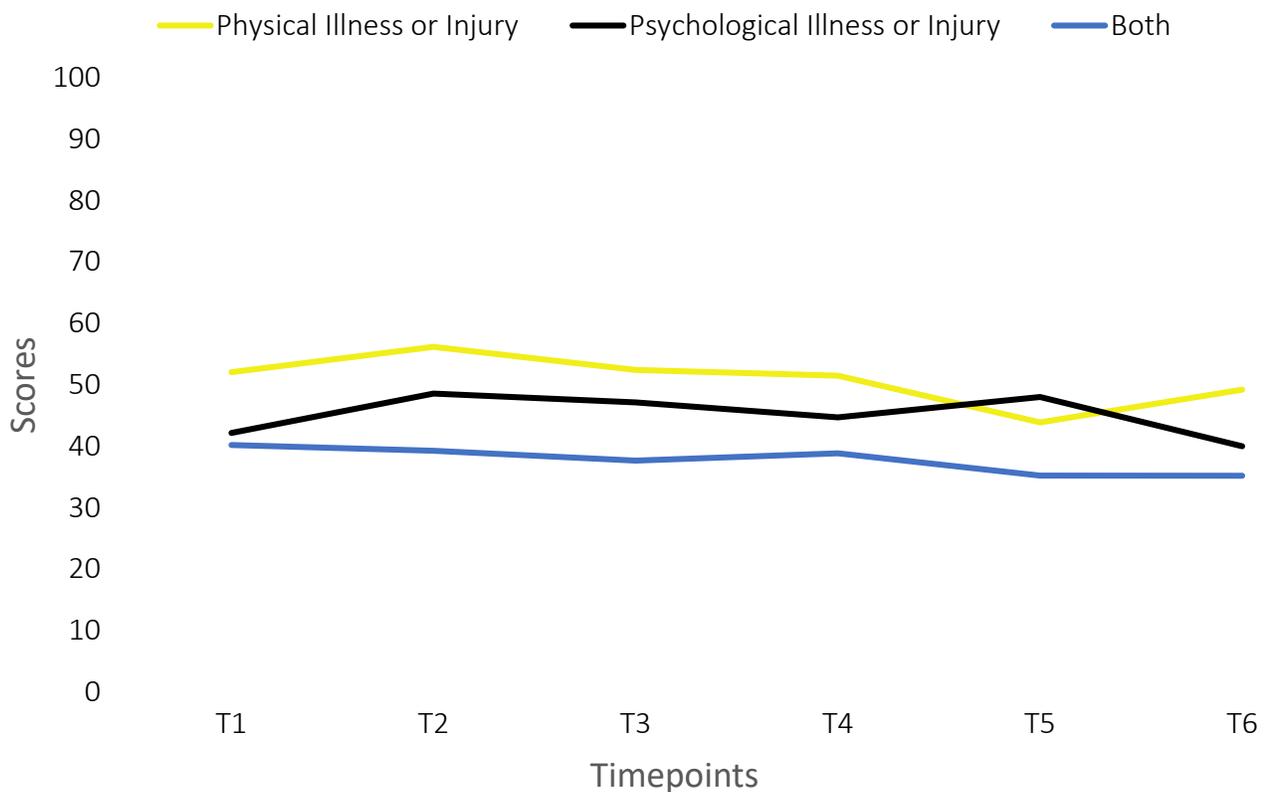


Figure 12. Invictus Games Sydney - Health Compared to the Previous Year by Type of Illness or Injury

As with general health, regardless of whether individuals were competitors or non-competitors, individuals experiencing both psychological and physical illnesses and injuries were 30.9% less likely to rate their health as better than the previous year when compared to those experiencing solely physical illnesses and injuries (OR 0.69, 95% CI 0.50-0.96, $p = 0.027$).

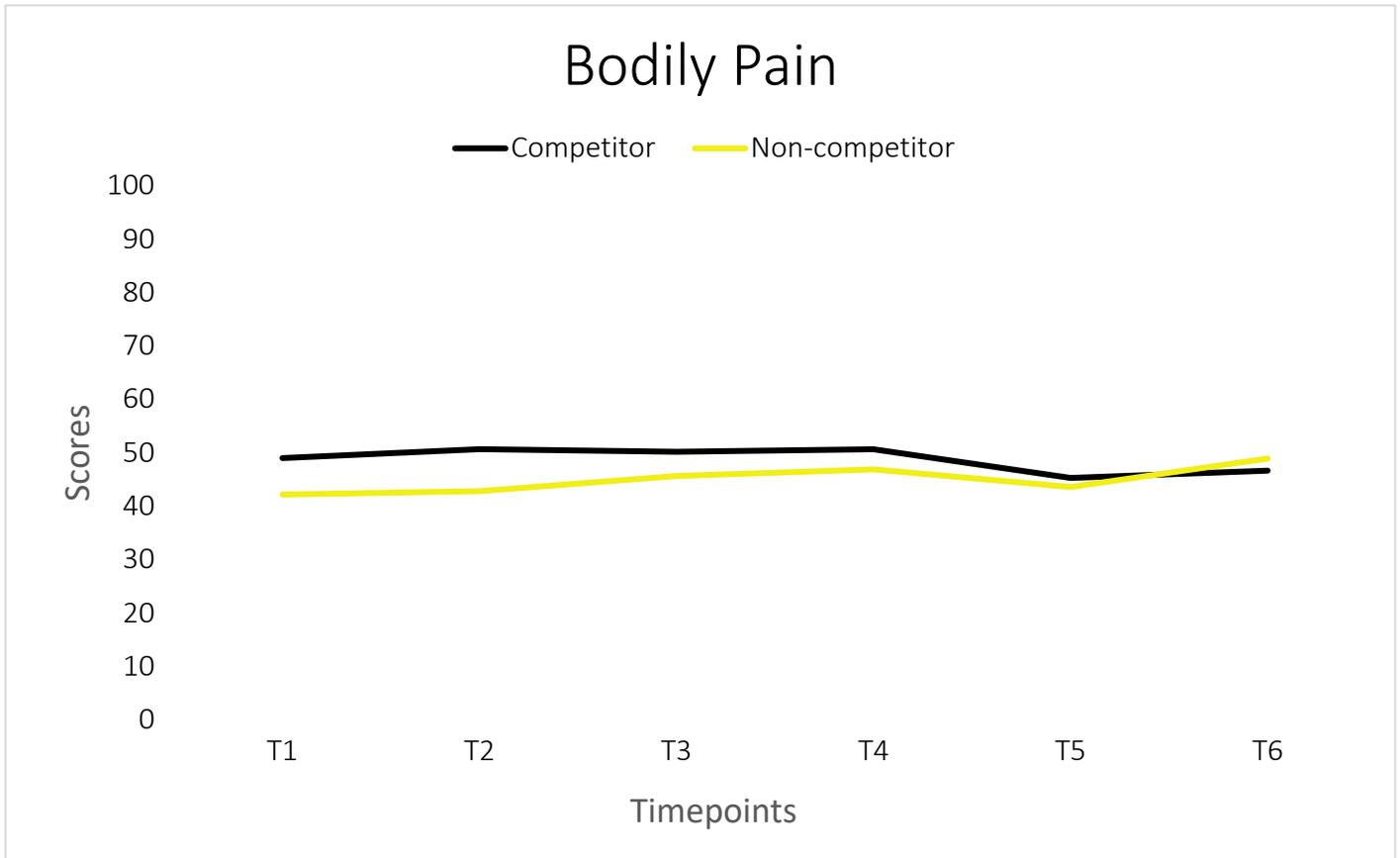


Figure 13. Invictus Games Sydney - Bodily Pain by Competitor Status

Findings indicate no statistically significant difference between competitors and non-competitors on ratings of bodily pain (OR 1.64, 95% CI 0.93-2.88, $p = 0.086$), indicating that both experience similar levels of physical pain. This finding likely reflects the complexity of injuries and illnesses among both competitors and non-competitors. Indeed, research on physical activity and pain suggests that whether physical activity decreases or increases, pain relates to an interaction between fitness levels, physical activity levels, and the state of the injury or illness.⁷⁹ The finding may also reflect the complexity of the concept of pain, with some suggesting that pain has physical, psychological, social, and spiritual components.⁸⁰

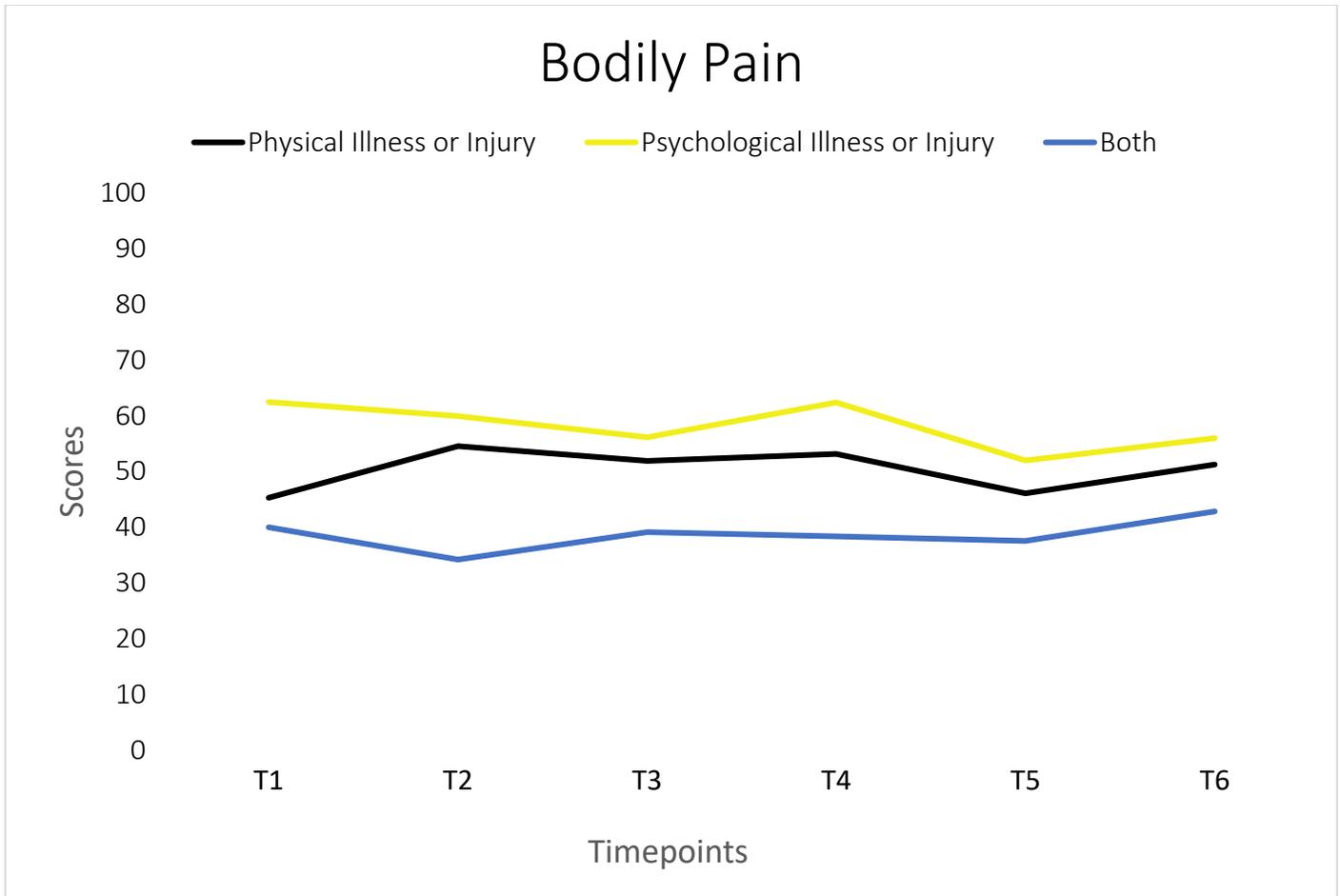


Figure 14. Invictus Games Sydney - Bodily Pain by Type of Illness or Injury

As with other physical health measures, individuals experiencing both psychological and physical illnesses and injuries were 62.7% more likely to have bodily pain (lower scores indicate more pain) compared to those experiencing solely physical illnesses and injuries (OR 0.63, 95% CI 0.41-0.96, $p = 0.031$), regardless of whether they were competitors or non-competitors. This finding reflects the potentially multidimensional nature of pain as not just physical but also having psychological components.

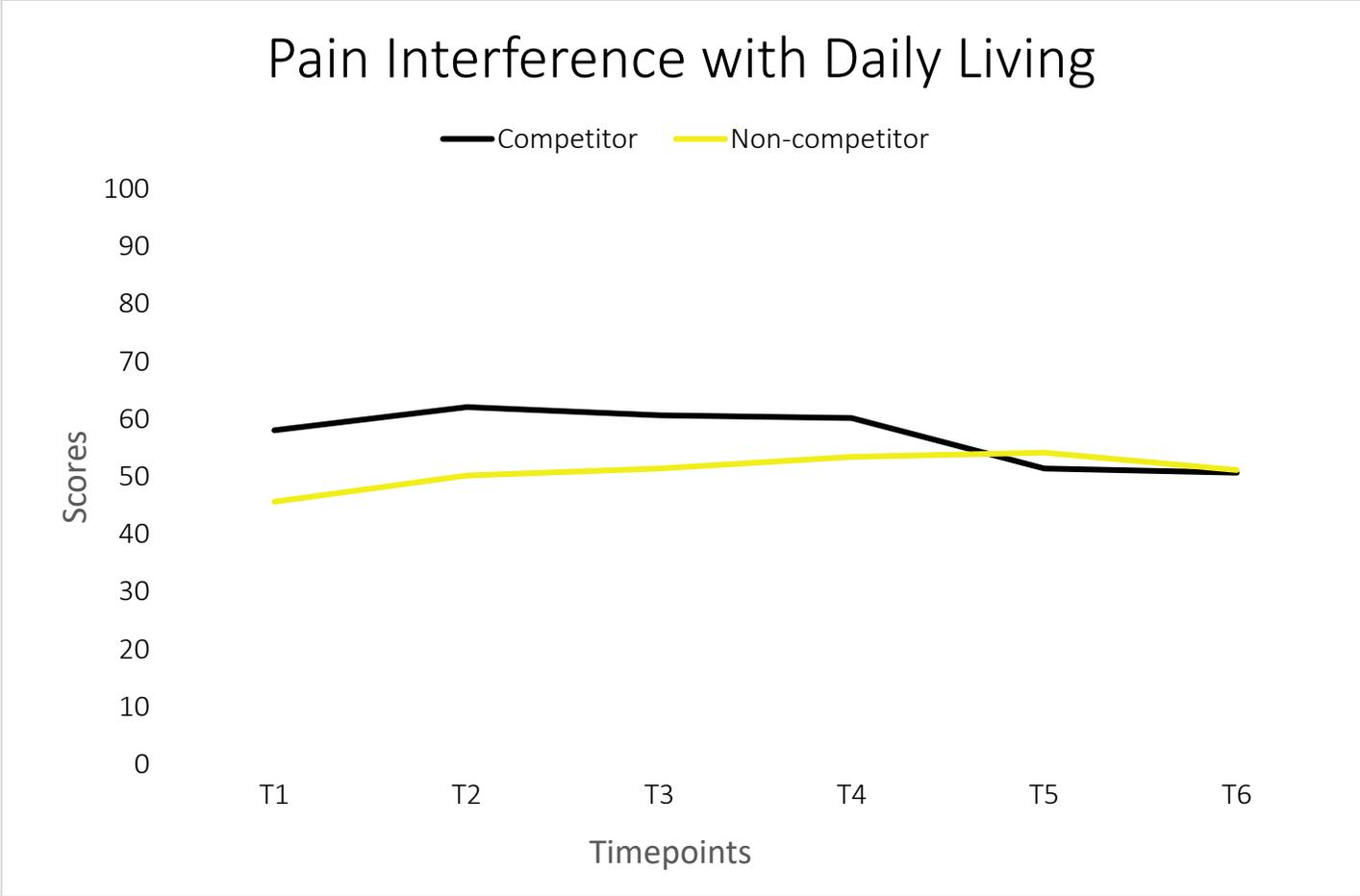


Figure 15. Invictus Games Sydney - Pain Interference with Daily Living by Competitor Status

While bodily pain relates to pain severity, pain interference with daily living examines whether that pain causes interruption to regular daily activities, including work. In contrast to the finding above on bodily pain, findings indicated that competitors are 1.66 times likely to have less pain interference with activities of daily living compared to non-competitors (OR 1.66, 95% CI 0.93-2.95, P = 0.086). Thus, while both groups may experience similar pain, competitors are less likely to view that pain as interfering with their daily life. However, this difference is not significant at all four time points.

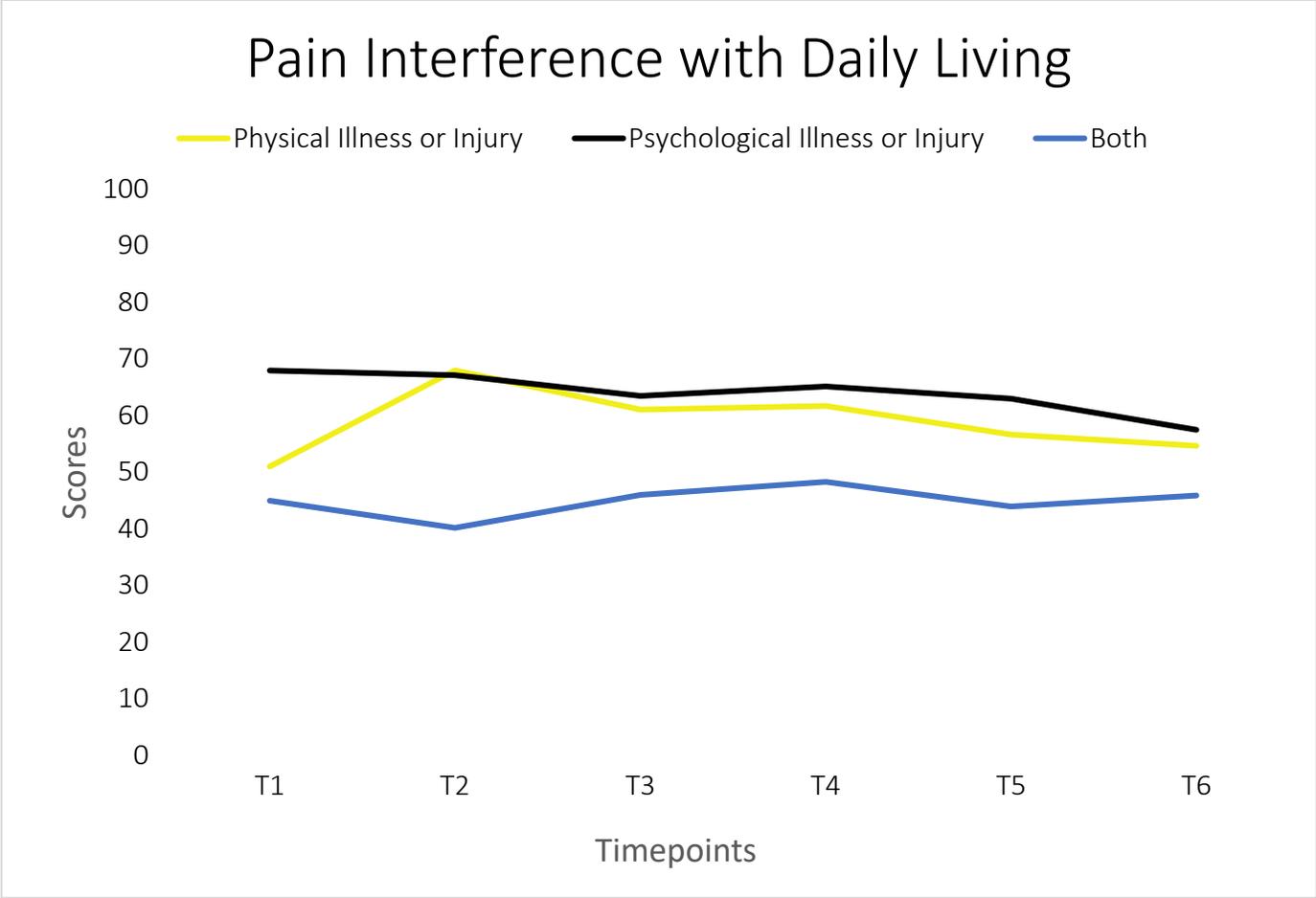


Figure 16. Invictus Games Sydney - Pain Interference with Daily Living by Type of Illness or Injury

As with other physical health measures, across both competitors and non-competitors, individuals experiencing both psychological and physical illnesses and injuries were 61.4% more likely to have pain interfering with daily living compared to those experiencing solely physical illnesses and injuries (OR 0.61, 95% CI 0.41-0.92, $p = 0.018$). Furthermore, notably, individuals experiencing psychological illness or injury did not have differences in pain interference compared to individuals experiencing physical illness or injury (OR 1.06, 95% CI 0.66-1.71, $p = 0.806$). As with the bodily pain measure, these two findings speak to the complicated types of illnesses and injuries present among Service Members and Veterans, as well as the complexity of the concept of pain.

4.2.2 Psychosocial Well-being

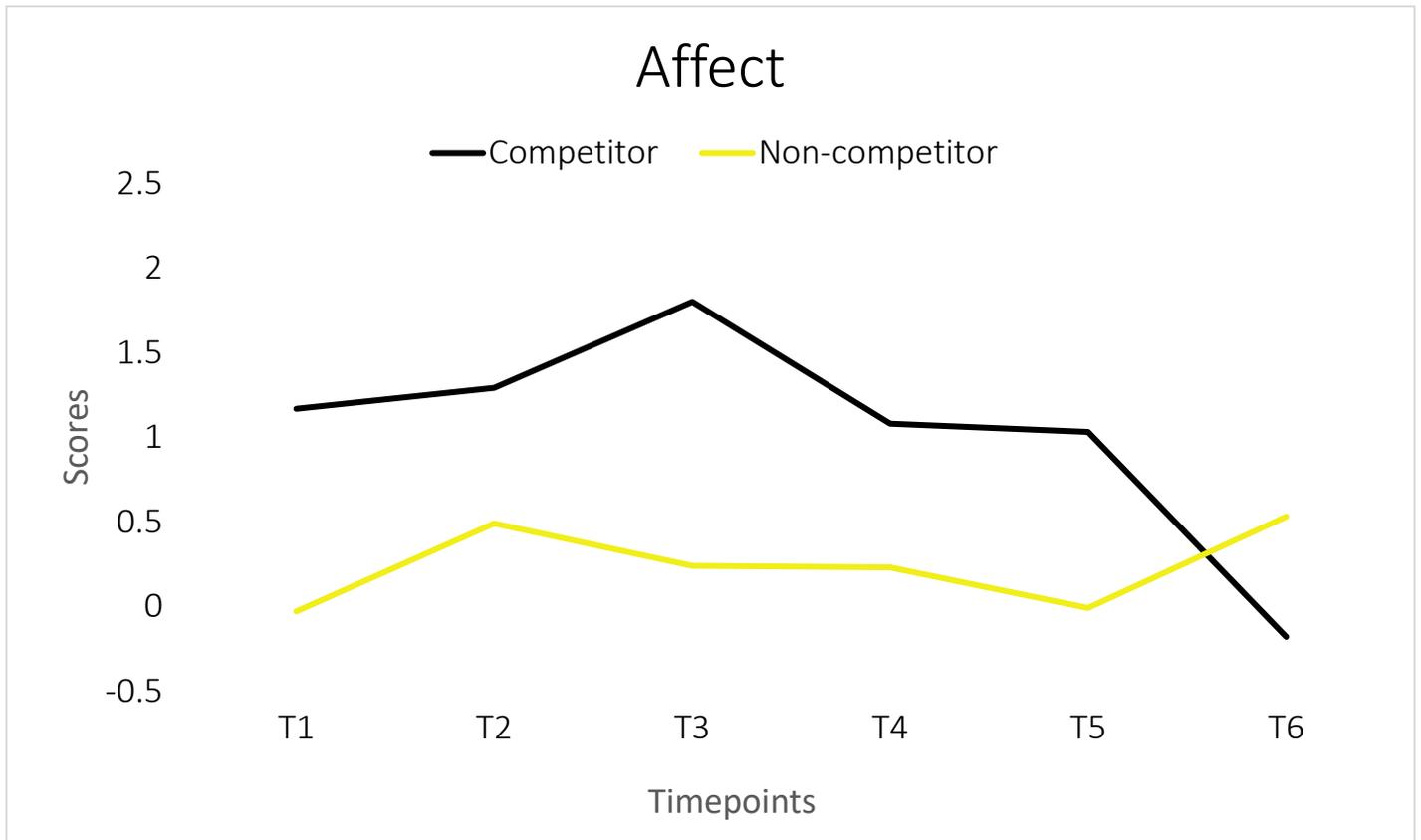


Figure 17. Invictus Games Sydney - Affect by Competitor Status

Competitors demonstrated more positive affect (i.e., positive feelings) than non-competitors (beta = 0.722, $p < 0.001$, CI: 0.304-1.141). However, again the magnitude and significance of this difference decreases over time.

Mood peaks around the Invictus Games and decreases over time. This is reflective of other sport research suggesting a peak in physical and psychological health immediately prior to competition with a potential for downward trends over time once competition is over and the individual must move on towards new goals.^{81,82} One must further note that the timepoint where non-competitors begin to demonstrate increases in affect compared to competitors (T6) relates to notification of team selection for The Hague 2020; thus, many non-competitors were transitioning to the “competitor” identity, while some competitors were receiving news that they would not be competing again. The decrease in affect potentially speaks to the importance of strategies being used to promote continued engagement and physical activity participation after the Games to maintain benefits and the identity of an Invictus Games participant. However, while visually the graph suggests that non-competitors are demonstrating greater affect at 1-year post-Games, this is not significant.

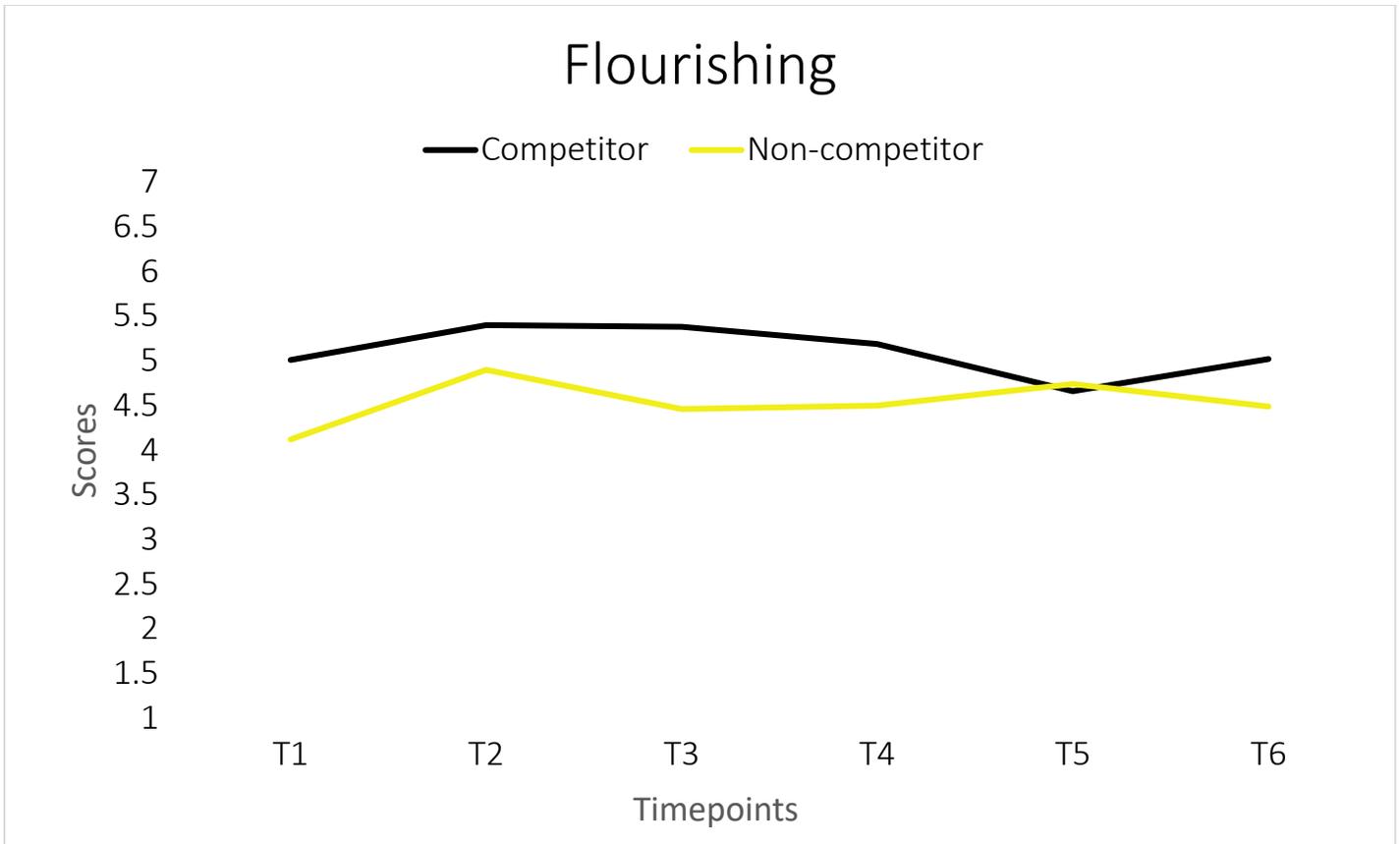


Figure 18. Invictus Games Sydney - Flourishing by Competitor Status

Competitors demonstrate greater flourishing, a measure of psychosocial well-being, compared to non-competitors (beta = 0.46, $p = 0.003$, CI: 0.155-0.762). However, this “competitor effect” decreases over time.

There is a timepoint where non-competitors demonstrate similar flourishing to non-competitors (T5). This relates to selection trials and notification of team selection for The Hague 2020; thus, non-competitors were experiencing the benefits of Invictus Games selection and training.

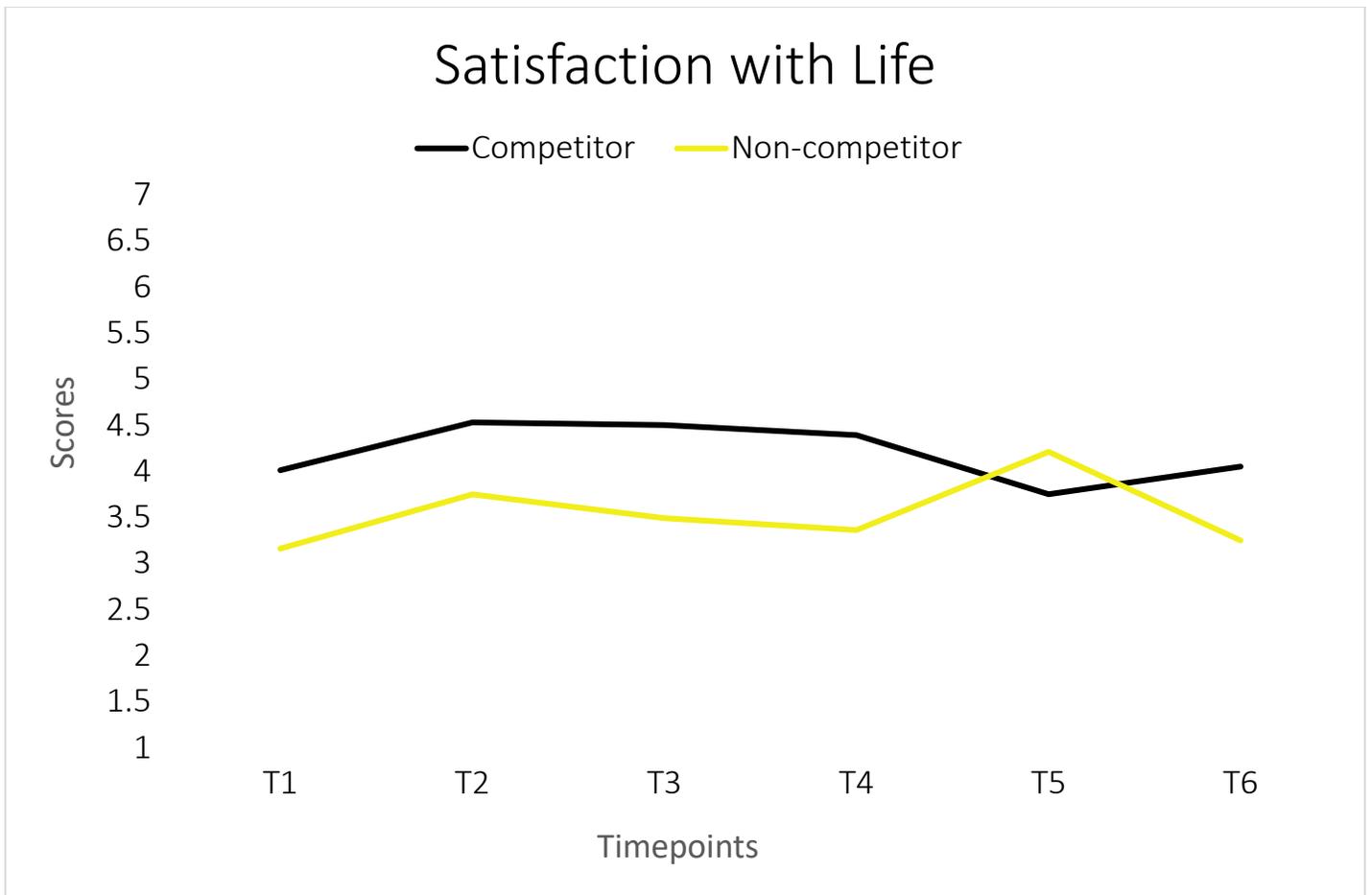


Figure 19. Invictus Games Sydney - Satisfaction with Life by Competitor Status

Overall, competitors demonstrate greater satisfaction with life than non-competitors (beta = 0.49, $p = 0.012$, CI: 0.110-0.865). However, the effect decreases in magnitude and significance over time.

At T5, we do see a visual increase in non-competitors satisfaction with life compared to competitors. This potentially relates to selection trials and notification of team selection for The Hague 2020; thus, non-competitors were experiencing the benefits of Invictus Games selection and training. However, it is important to note that this increase is not statistically significant. Another observation that might be made is that these graphical trends are different from the trends seen for affect. Affect and satisfaction with life capture different facets of well-being. As noted in Chapter 3, affect captures emotional well-being (positive and negative moods and emotions) over the previous four months. However, satisfaction with life captures cognitive well-being: people’s judgment of their lives as a whole (e.g., “So far I have gotten the important things I want in life.”) Trends may differ based on these differences.

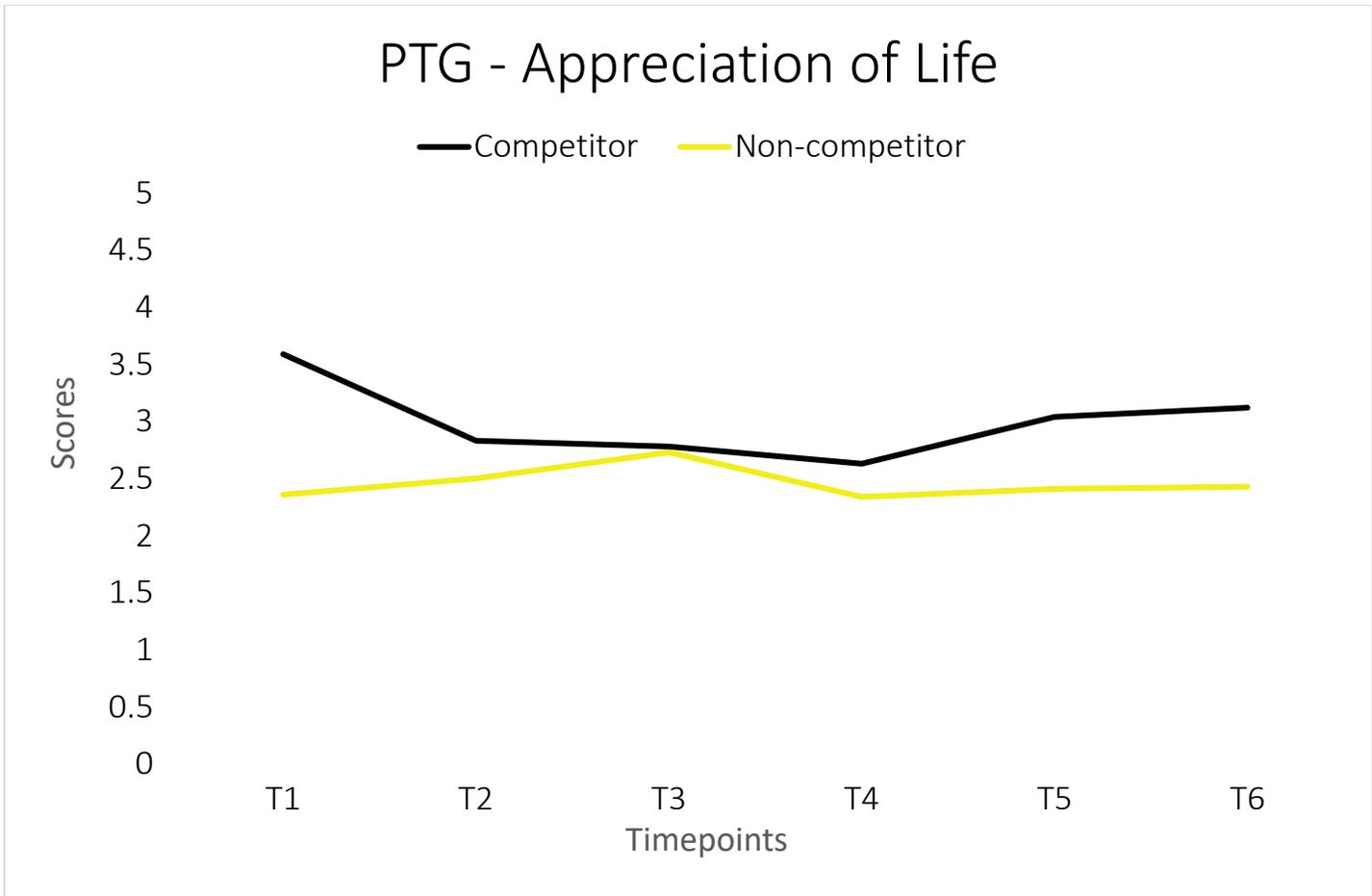


Figure 20. Invictus Games Sydney - Post-Traumatic Growth - Appreciation of Life by Competitor Status

Appreciation of life is the first scale indicative of post-traumatic growth. Overall competitors demonstrate greater appreciation of life than non-competitors (beta = 0.66, $p < 0.001$, CI: 0.319-0.992). While the magnitude of this difference decreases over time and is not statistically significant in the long-term, graphical trends do still suggest greater appreciation of life among competitors.

Reviewing graphical trends, the small increase in non-competitors' appreciation of life at T3 corresponds with the opening of selection processes for the Invictus Games The Hague. Most non-competitor participants indicated being motivated to participate in the Invictus Games The Hague.

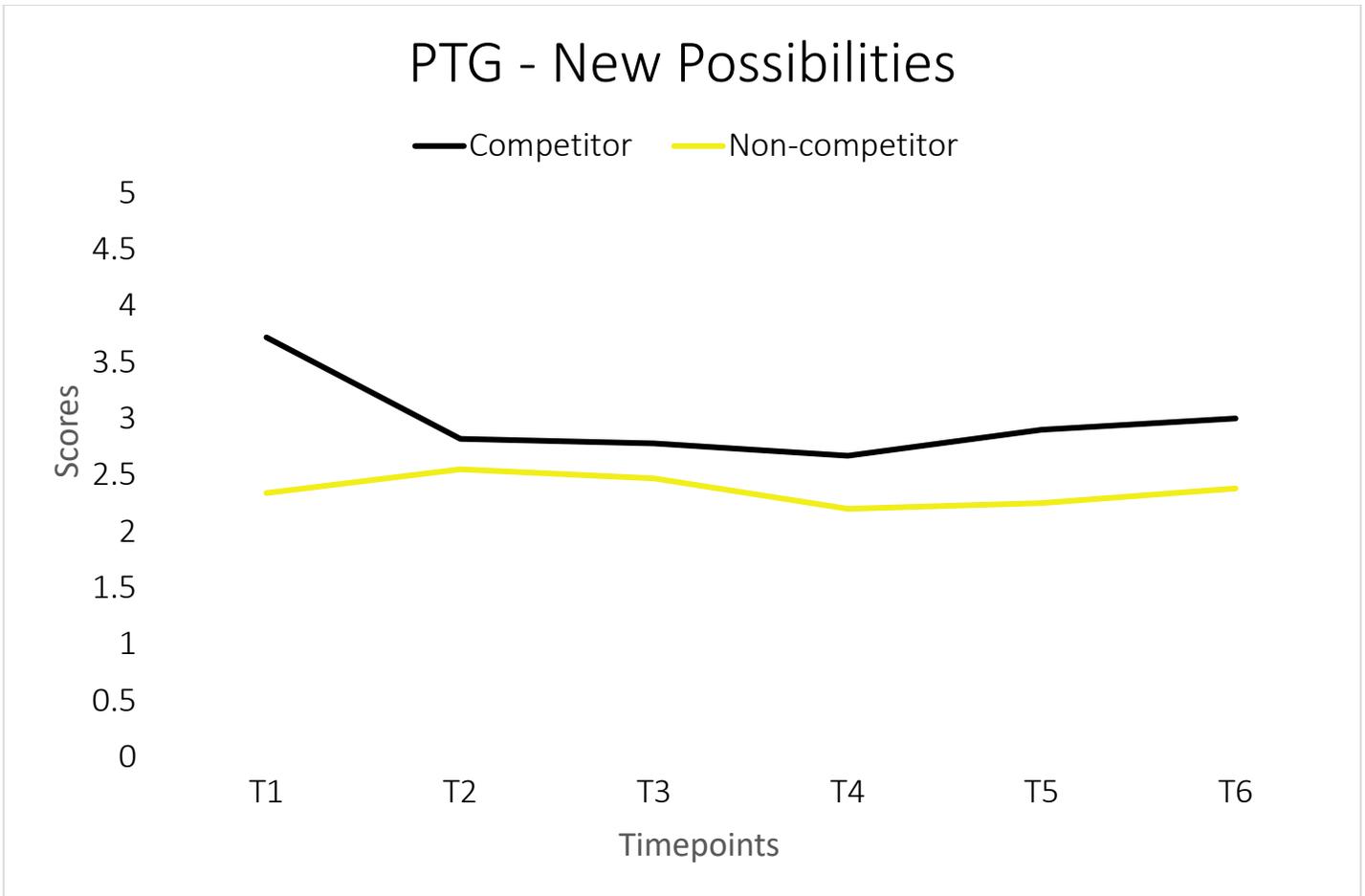


Figure 21. Invictus Games Sydney - Post-Traumatic Growth - New Possibilities by Competitor Status

New possibilities is the second scale indicative of post-traumatic growth. Overall, competitors demonstrate greater perceptions of new possibilities in life compared to non-competitors (beta = 0.77, $p < 0.001$, CI: 0.431-1.117). The difference is not statistically significant in the short- and long-term. However, again, the graphical trends continue to suggest that competitors are demonstrating greater post-traumatic growth for this dimension than non-competitors.

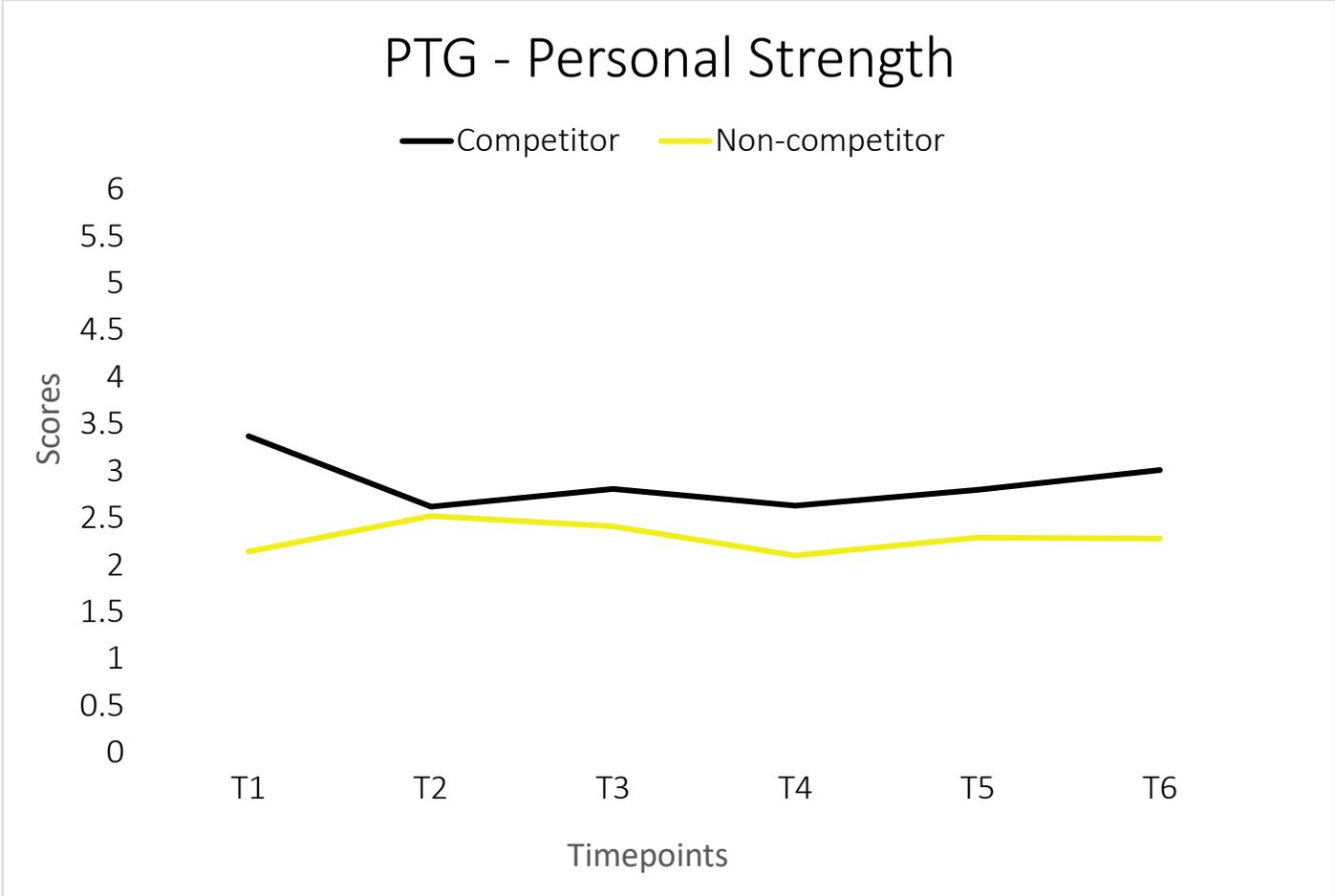


Figure 22. Invictus Games Sydney - Post-Traumatic Growth - Personal Strength by Competitor Status

Personal Strength is the third scale assessed for post-traumatic growth. Overall, competitors demonstrate greater personal strength than non-competitors (beta = 0.68, $p < 0.001$, CI: 0.327-1.028). As with the new possibilities scale, the difference is not statistically significant in the short- and long-term. However, again, the graphical trends continue to suggest that competitors are demonstrating greater post-traumatic growth for this dimension than non-competitors.

4.3 Invictus Games Sydney Research Summary

Findings indicate that, overall, competitors demonstrate greater health and well-being compared to non-competitors across most outcomes. Greater health and well-being were maintained even when any initial differences between competitors and non-competitors was removed. Furthermore, the findings emerge despite the study not including the entirety of the training period, which is when most benefits are experienced. This indicates that there is a “competitor effect” and, thus, great value to participating in the Invictus Games. Despite this competitor effect, there were decreases in the magnitude and statistical significance of findings over time.

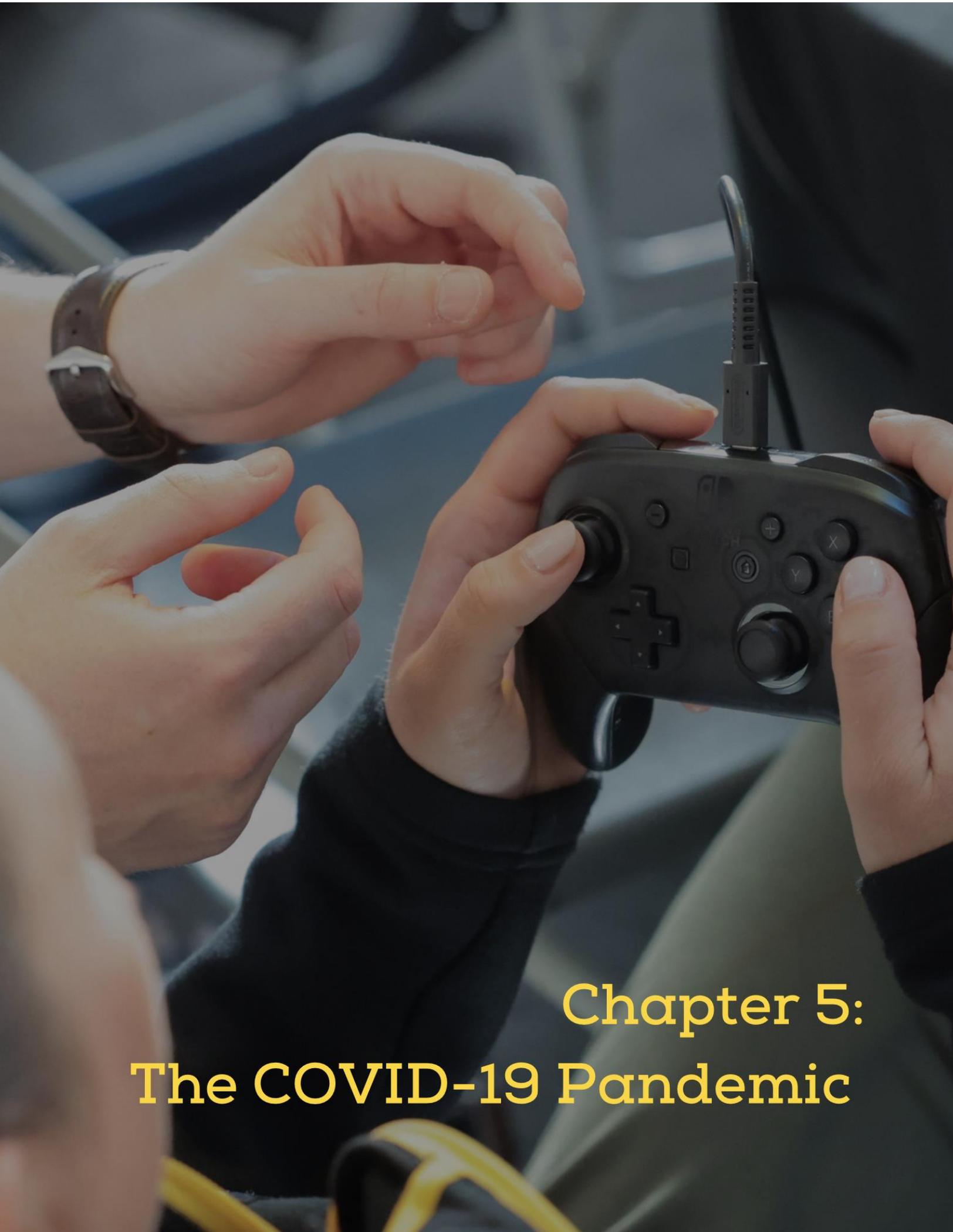
This decrease could be due to several reasons. First, this finding may speak to the importance of programming between the Games either through nations or IGF (see *Chapter 7*). These between-games events can provide competitors with opportunities to connect with their team to reinforce the lessons learned during training and maintain their social connections and personal growth. Meanwhile, non-competitors can benefit from participation in Invictus Games training and programming between Games to build a sense of belonging and work on their goals. A second potential reason for the decrease in competitor effect over time was the natural overlap between the Sydney 2018 data collection and the selection period for the Invictus Games The Hague 2020. Many nations open their selection process soon after the closing ceremonies of the previous Games. Thus, non-competitors have new motivation and excitement surrounding opportunities to participate in the following Invictus Games. Indeed, 54.7% of Sydney 2018 non-competitors indicated that they had applied for selection for the Invictus Games The Hague 2020, compared to only 14.0% of Sydney 2018 competitors. Thus, non-competitors were gaining access to Invictus Games opportunities and gaining an Invictus Games identity through training camps and selection trials (e.g., the Team UK schedule for training camps and selection trials took place during T4, T5, and T6). Meanwhile, due to regulations surrounding the number of Games in which an individual can compete, many competitors were unable to participate in new team events. Once again, this speaks to the importance of the time in between the Games for both non-competitors and competitors.

It is also important to consider that our surveys may not be capturing some of the lasting ways that competitors are changing during the Games, or some of the lasting shifts in competitors’ personal development or social context. During conversations with competitors and their families at training camps and the Games, as well as interviews for The Hague (see *Chapter 6*), many used the words “lifechanging” or “lifesaving” to describe their experiences with the Games. These concepts are deeper and more complex than standard measures of well-being. There may be different ways to account for the enduring benefits of participation in the Games. In our previous research, this was captured through qualitative data, including competitors indicating that they started taking better care of themselves, built stronger relationships with their families, took on leadership positions in their communities, went back to school, or started new businesses.^{17,47,48} This finding highlights the importance of mixed methods approaches in evaluating programming that is perceived by many to be transformational.

Another important outcome that was identified across the physical health measures was the importance of type of illness and injury. Individuals experiencing both physical and psychological illnesses and/or injuries consistently demonstrated poorer health outcomes regardless of whether

they were competitors or non-competitors. This finding has important implications for selection and how sport rehabilitation programming is delivered, particularly regarding the importance of team staff and coaches understanding the scope of illnesses and injuries to determine how to tailor programming to different individuals and their unique health needs (see *Chapter 7*).

Finally, experiences and outcomes are shaped more broadly by each competitor and non-competitor's context leading up to, during, and after the Games – including their sport, type of illness or injury, family, and nation (including size of the military, financial resources devoted to programming, availability of accessible facilities, number of individuals with illnesses or injuries in the nation, type of illness or injury prominent in each nation, or even nation size). We were unable to make comparisons between nations to evaluate differences in short- and long-term outcomes due to differences in team sizes and, thus, study participation across nations. Research being conducted within the different nations can help elucidate some of these differences. Further research can also explore implementation of the best practice strategies across different nations and any resulting differences in the experiences of competitors and non-competitors.



Chapter 5: The COVID-19 Pandemic

Key Points

- COVID-19 resulted in delays to the Invictus Games The Hague 2020, which were first rescheduled for 2021 and then again for 2022.
- National and regional pandemic containment and mitigation strategies resulted in a major shift in how Invictus Games programming was delivered by each nation.
- However, the pandemic also presented opportunities to advance the reach of programming through the development of IGF eSports.
 - Participants were excited about opportunities to connect through eSports.
 - eSports presented additional flexibility, particularly for scheduling training around family commitments.
 - eSports were particularly popular among non-competitors.
- Participant responses reinforced our understanding of the importance of social connection for this population.
 - Individuals who experienced difficulties highlighted the imposed isolation due to distancing and lockdown strategies, while others who adapted and maintained or built social connection demonstrated growth during this period.
 - Most participants reported less in-person contact with family and friends, with some reporting losing contact with all social supports.
- Competitors and non-competitors implemented many coping strategies in the first eight months of the pandemic. The most used strategies were:
 - Engaging in health behaviours (eating healthy, exercising, sufficient sleep, avoiding alcohol and drugs)
 - Taking breaks from watching, reading, or listening to news stories, including social media
- Most study participants did not experience changes in family income and employment or access to food. However, there were some Service Members and Veterans who were unable to meet basic needs and pay bills, and frequently went without enough food.
- Most participants experienced changes in medical health care access.



At the end of the closing ceremonies for the Invictus Games Sydney 2018, all eyes turned towards the Invictus Games The Hague 2020, which were scheduled to take place in May 2020. However, as with most activities scheduled for 2020, the COVID-19 pandemic impacted these plans.

Pandemic containment and mitigation strategies differed for each country included in this research project (and, within some countries, differences also existed at a regional level). However, for most individuals, the impact on activities of daily living was abrupt and all encompassing. The Invictus Games Foundation, nation staff, and Service Members and Veterans sought to respond to these major shifts in programming and rehabilitation opportunities. As with the rest of society, this often meant turning to virtual platforms. Competitors and nation staff created virtual practice times when teammates could jump on Zoom and train together or connect socially. Coaches checked in via WhatsApp, social media, and text to follow competitors' progress. Some competitors and non-competitors living in close proximity connected through social media to train outdoors together and keep each other accountable. However, one of the biggest advancements was the implementation of eSports opportunities.

In 2020, the Invictus Games Foundation implemented eSports in response to lockdowns and social distancing measures across participating nations. From 2020 through 2022, IGF hosted 50 eSport activities. Over 500 individuals participated each year representing all Invictus Games

nations except Afghanistan, Iraq, and Jordan. Types of eSports varied to accommodate different types of illnesses and injuries, sport interests, and equipment access. Among the most prominent activities were virtual bike rides (using the Zwift online platform, virtual running clubs (using the Strava run app), virtual marathons and rowing championships, and newly developed Powered by Invictus sport leagues. Activities involved both individual (e.g., virtual Canada Army Run) and group (e.g., Sydney to The Hague challenge) activities. The goal of the eSports programming was to promote motivation, connection, and sport participation during the pandemic. There was an added benefit of increasing the reach of Invictus Games programming to non-competitors, families, and friends. Indeed, most non-competitors participating in our research indicated that they were participating in IGF eSports, with number of non-competitors in our study participating in eSports outweighing competitors.

Data collection for the Invictus Games The Hague 2020 had already begun in May 2019. Thus, the research team was uniquely positioned to explore the shifts in well-being among Service Members and Veterans experiencing physical and/or psychological illnesses and injuries during the pandemic. An important consideration was how the shutdowns and social isolation would impact Service Members and Veterans. Many individuals participating in the research were at critical stages of recovery: committed to or seeking to be involved in rehabilitation programs. Interruptions at this stage could be detrimental to their motivation, goals, community participation, and long-term health and well-being. As nations began instituting stay at home orders and social distancing regulations, the research team added questions to our existing surveys to explore the psychological and social impact of COVID-19 on study participants. These were followed by interviews in mid- through late-2022 with study participants and their family and friends to retrospectively explore the impact of the COVID-19 pandemic on rehabilitation, as well as perceptions of IGF eSports.

Note. One must review the survey and interview findings understanding a potential limitation in the research process. Individuals with more negative experiences may have dropped out of the research due to the substantial burden and difficulties of the pandemic, they may also have not been willing to revisit their pandemic experiences and not completed these survey questions or volunteered for interviews. Thus, there is the potential for bias in the findings presented below.

5.1 COVID-19 Surveys

Survey data was used to examine the impact of COVID-19 on competitors and non-competitors experiencing physical and/or psychological illnesses and injuries. The COVID-19 data were collected during three Invictus Games The Hague timepoints: May 2020, August 2020, and November 2020. While 184 participants completed surveys across the timepoints, participation varied within timepoints. As such, for results, we present only descriptive information (frequencies, means) and no statistical comparisons between competitors and non-competitors.

5.1.1 Demographic Information

A total of 184 participants (competitors $n = 71$; non-competitors $n = 113$) completed the COVID-19 survey measures.

An overview of key demographics is provided below.

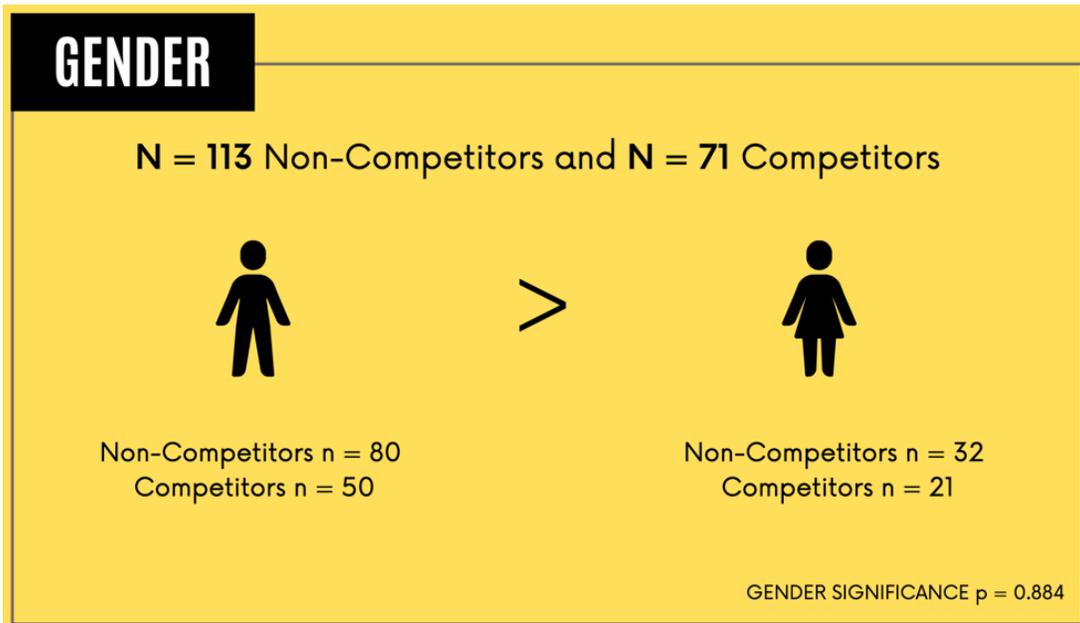


Figure 23. COVID-19 Survey - Gender

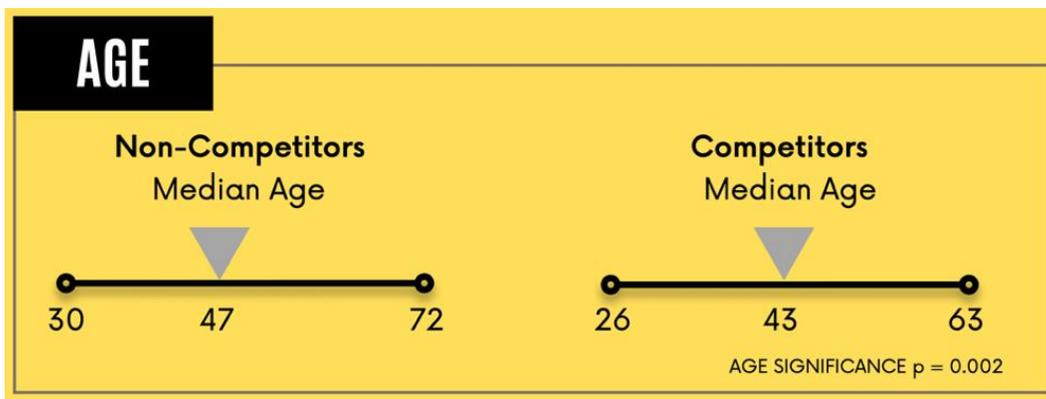


Figure 24. COVID-19 Survey - Age

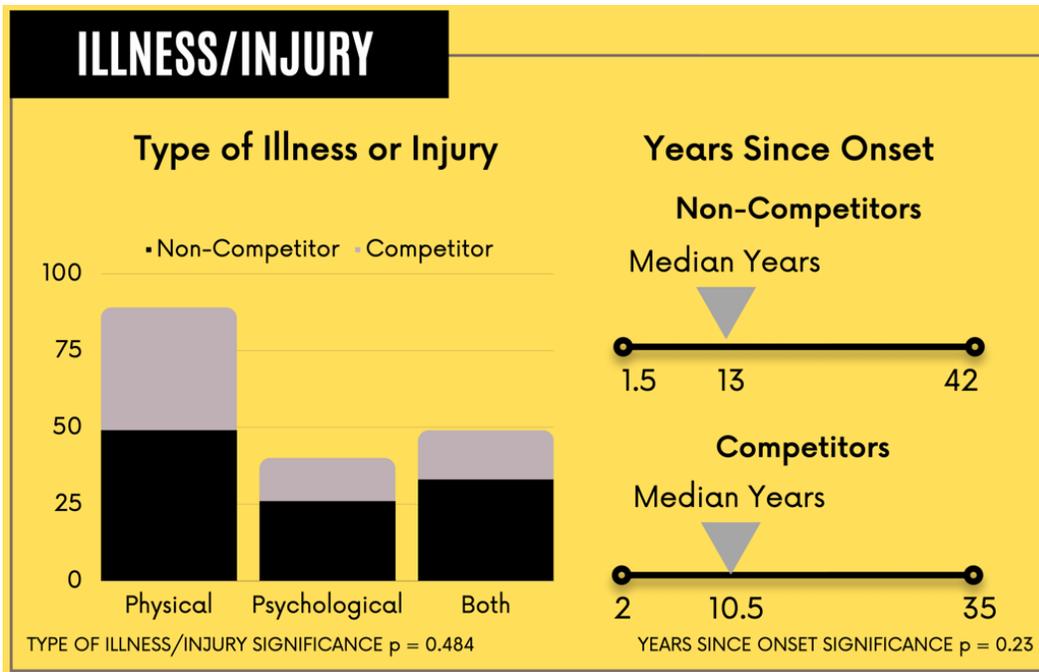


Figure 25. COVID-19 Survey - Illness and Injury

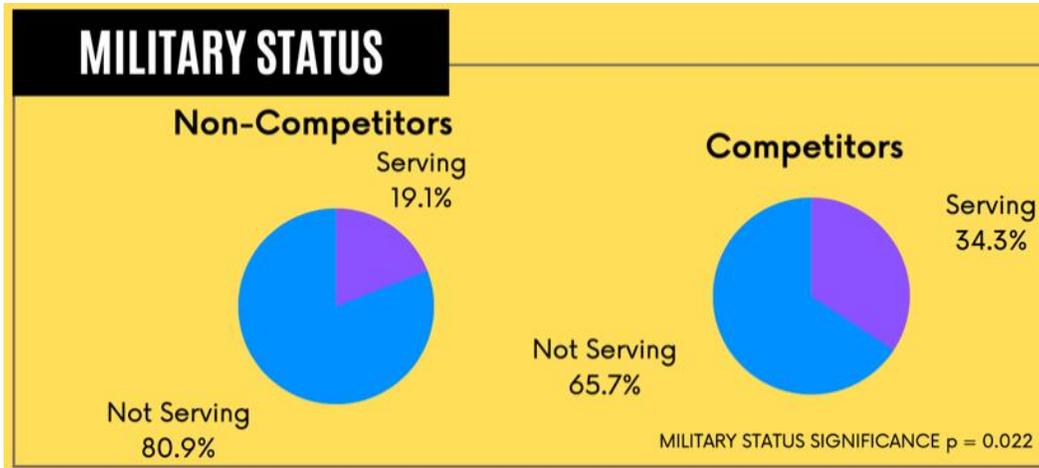


Figure 26. COVID-19 Survey - Military Status

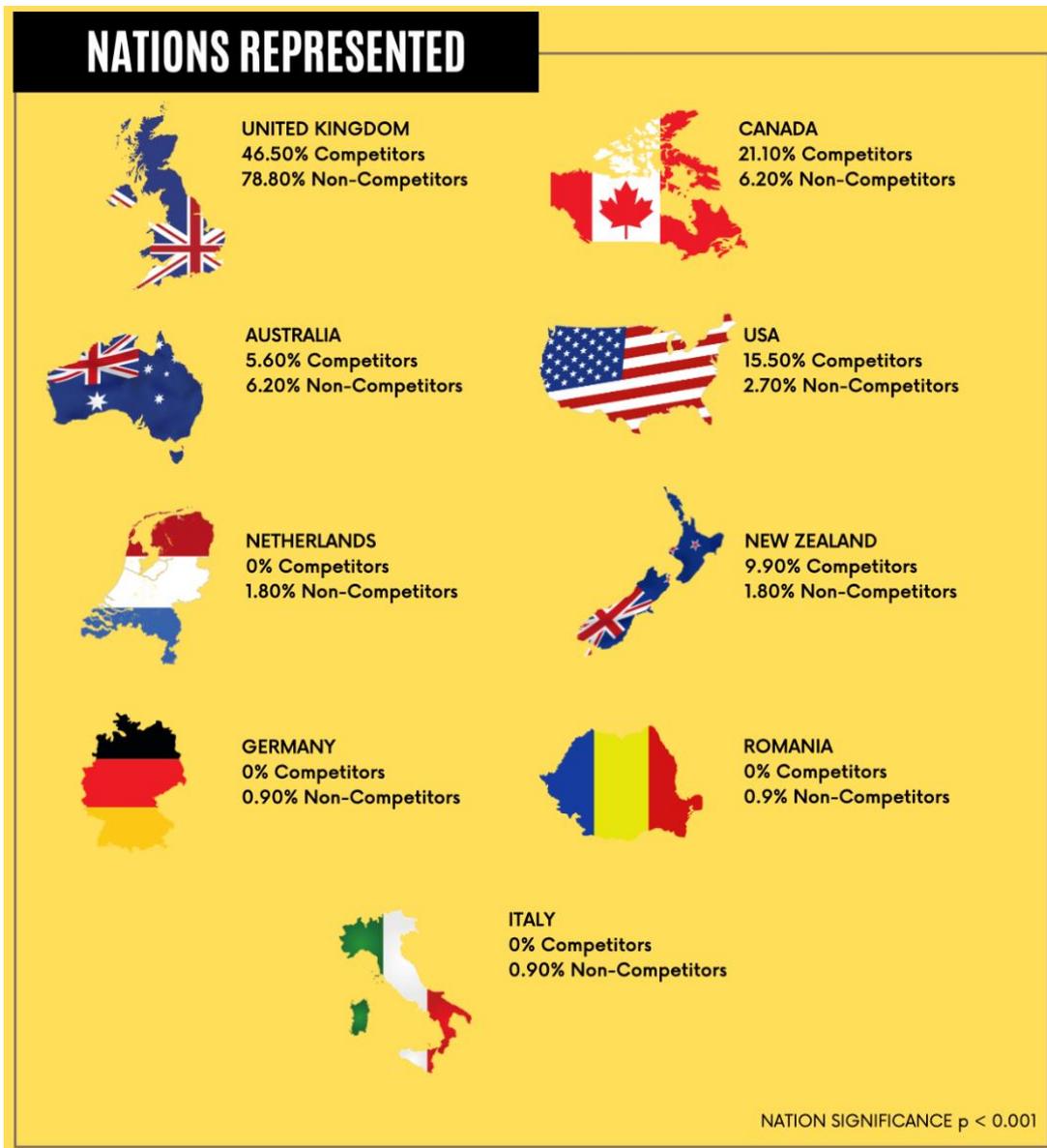


Figure 27. COVID-19 Survey - Nations Represented

5.1.2 Survey Results

We first present coping strategies implemented at each timepoint. We then present findings on changes in daily living and basic needs in the form of infographics.

Below, coping strategies and behaviours applied by competitors and non-competitors during the first eight months of the pandemic are presented according to the frequency in which each strategy was implemented at each timepoint. Positive coping strategies are shaded in green while negative coping strategies are shaded in red. The three most frequently employed strategies were: (1) taking breaks from watching, reading, or listening to news stories, including social media; (2) engaging in health behaviours like trying to eat healthy, well-balanced meals, exercising regularly, getting plenty of sleep, or avoiding alcohol and drugs; and (3) making time to relax.

Table 5. COVID-19 Coping Strategies

Ranking	May 2020		August 2020		November 2020	
	Competitors	Non-Competitors	Competitors	Non-Competitors	Competitors	Non-Competitors
1	Engaging in health behaviours (trying to eat healthy meals, exercising regularly, getting plenty of sleep, avoiding alcohol and drugs) (43.7%)	Taking breaks from watching, reading, or listening to news stories, including social media (52.2%)	Taking breaks from watching, reading, or listening to news stories, including social media (45.1%)	Taking breaks from watching, reading, or listening to news stories, including social media (48.7%)	Taking breaks from watching, reading, or listening to news stories, including social media (33.3%)	Taking breaks from watching, reading, or listening to news stories, including social media (51.4%)
2	Taking breaks from watching, reading, or listening to news stories, including social media (42.3%)	Engaging in health behaviours (trying to eat healthy meals, exercising regularly, getting plenty of sleep, avoiding alcohol and drugs) (44.2%)	Engaging in health behaviours (trying to eat healthy meals, exercising regularly, getting plenty of sleep, avoiding alcohol and drugs) (33.8%)	Engaging in health behaviours (trying to eat healthy meals, exercising regularly, getting plenty of sleep, avoiding alcohol and drugs) (38.1%)	Engaging in health behaviours (trying to eat healthy meals, exercising regularly, getting plenty of sleep, avoiding alcohol and drugs) (26.0%)	Engaging in health behaviours (trying to eat healthy meals, exercising regularly, getting plenty of sleep, avoiding alcohol and drugs) (40.4%)
3	Connecting with others (talking with people you trust about concerns and how you are feeling) (38.0%)	Making time to relax (31.9%)	Making time to relax (32.4%)	Making time to relax (31.9%)	Making time to relax (24.0%)	Making time to relax (33.9%)

Ranking	May 2020		August 2020		November 2020	
	Competitors	Non-Competitors	Competitors	Non-Competitors	Competitors	Non-Competitors
4	Taking care of your body (taking deep breaths, stretching or meditating) (33.8%)	Connecting with others (talking with people you trust about concerns and how you are feeling) (30.1%)	Eating more food than usual (31.0%)	Taking care of your body (taking deep breaths, stretching or meditating) (31.9%)	Eating more food than usual (24.0%)	Eating more food than usual (33.9%)
5	Making time to relax (33.8%)	Taking care of your body (taking deep breaths, stretching or meditating) (29.2%)	Connecting with others (talking with people you trust about concerns and how you are feeling) (29.6%)	Connecting with others (talking with people you trust about concerns and how you are feeling) (29.2%)	Connecting with others (talking with people you trust about concerns and how you are feeling) (21.9%)	Connecting with others (talking with people you trust about concerns and how you are feeling) (31.2%)
6	Eating more food than usual (33.8%)	Eating more food than usual (21.2%)	Taking care of your body (taking deep breaths, stretching or meditating) (23.9%)	Eating more food than usual (27.4%)	Taking care of your body (taking deep breaths, stretching or meditating) (18.8%)	Taking care of your body (taking deep breaths, stretching or meditating) (33.9%)
7	Drinking alcohol (19.7%)	Drinking alcohol (18.6%)	Eating high fat or sugary foods (22.5%)	Drinking alcohol (20.4%)	Eating high fat or sugary foods (17.7%)	Eating high fat or sugary foods (20.2%)
8	Eating high fat or sugary foods (18.3%)	Eating less food than usual (13.3%)	Contacting a healthcare provider (11.3%)	Eating high fat or sugary foods (19.5%)	Drinking alcohol (8.3%)	Drinking alcohol (21.1%)

Ranking	May 2020		August 2020		November 2020	
	Competitors	Non-Competitors	Competitors	Non-Competitors	Competitors	Non-Competitors
9	Contacting a healthcare provider (9.9%)	Using prescription drugs (like valium, etc.) (12.4%)	Drinking alcohol (9.9%)	Using prescription drugs (like valium, etc.) (15.9%)	Contacting a healthcare provider (8.3%)	Contacting a healthcare provider (12.8%)
10	Eating less food than usual (5.6%)	Eating high fat or sugary foods (11.5%)	Smoking cigarettes or vaping more (7.0%)	Eating less food than usual (13.3%)	Smoking cigarettes or vaping more (5.2%)	Smoking cigarettes or vaping more (11.0%)
11	Using prescription drugs (like valium, etc.) (4.2%)	Contacting a healthcare provider (11.5%)	Eating less food than usual (4.2%)	Contacting a healthcare provider (12.4%)	Using prescription drugs (like valium, etc.) (4.2%)	Using prescription drugs (like valium, etc.) (16.5%)
12	Smoking cigarettes or vaping more (2.8%)	Smoking cigarettes or vaping more (8.0%)	Using prescription drugs (like valium, etc.) (2.8%)	Smoking cigarettes or vaping more (10.6%)	Eating less food than usual (3.1%)	Eating less food than usual (13.8%)

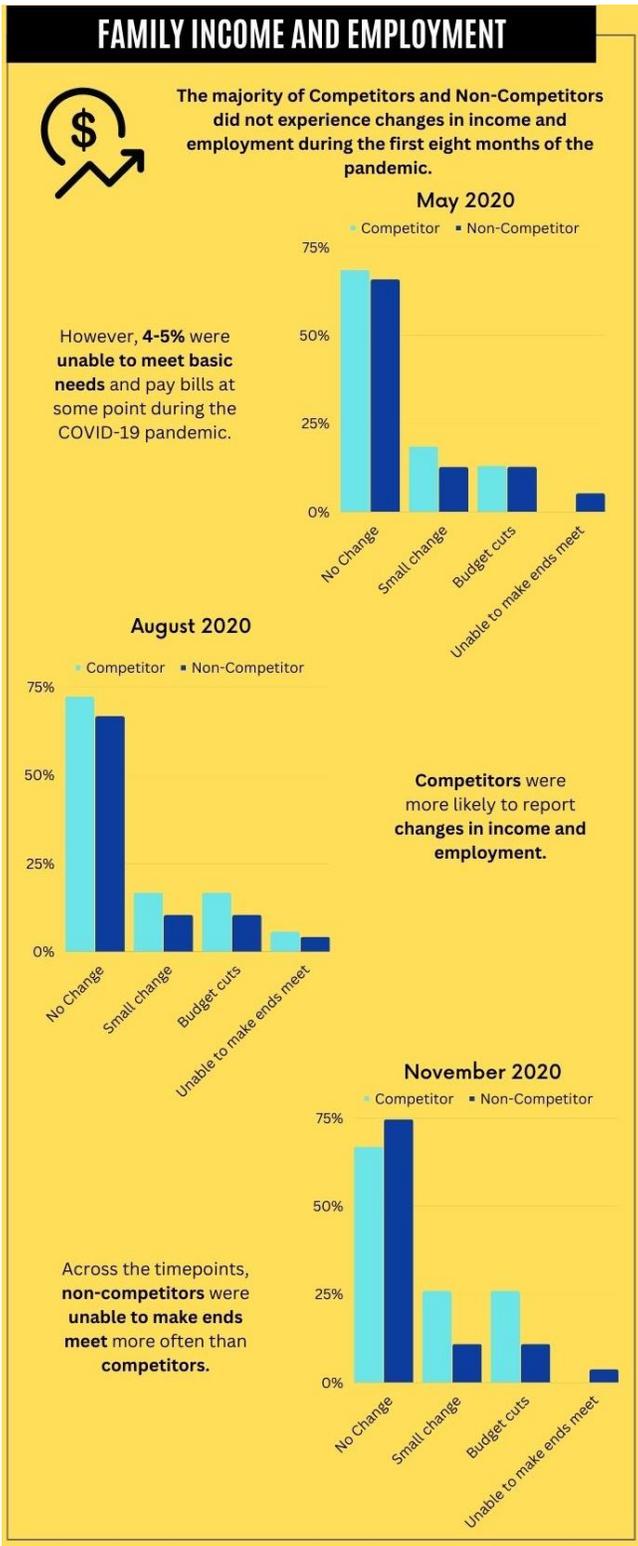


Figure 28. COVID-19 Family Income and Employment

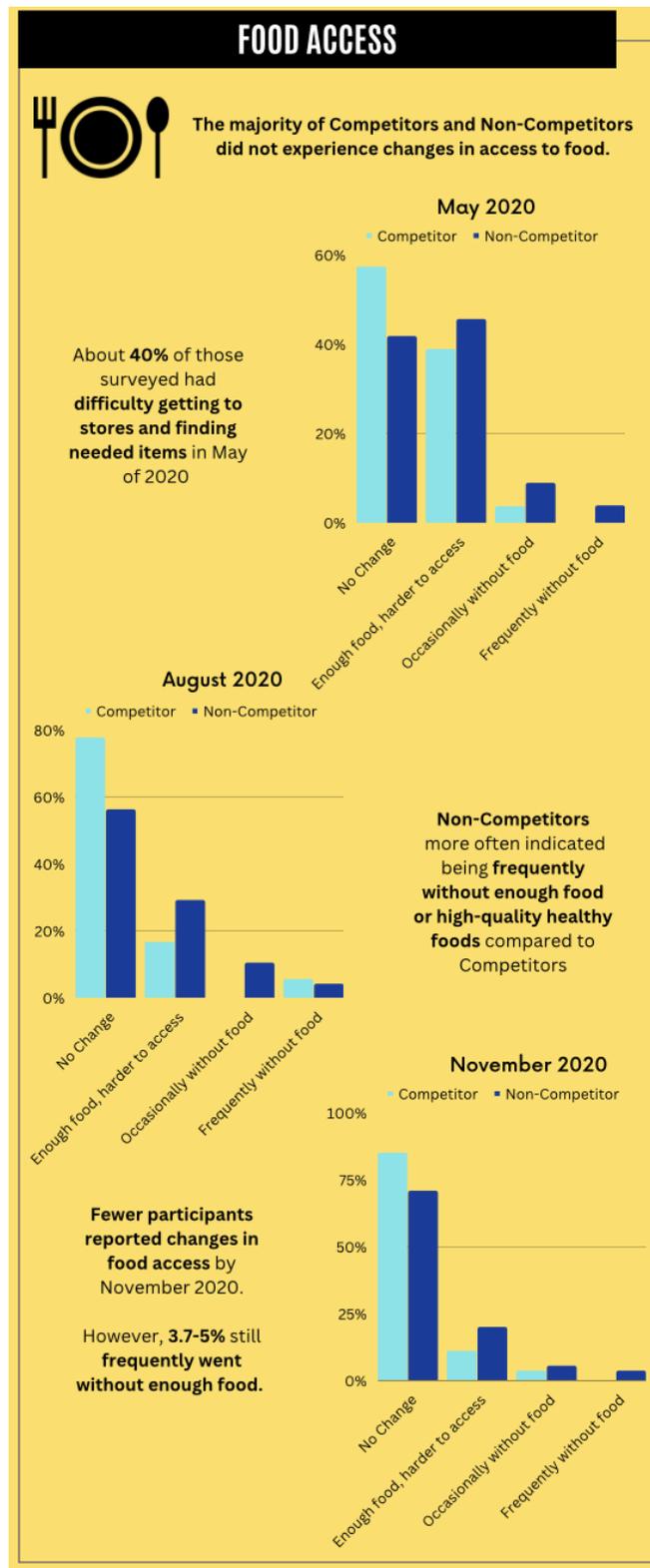


Figure 29. COVID-19 Food Access

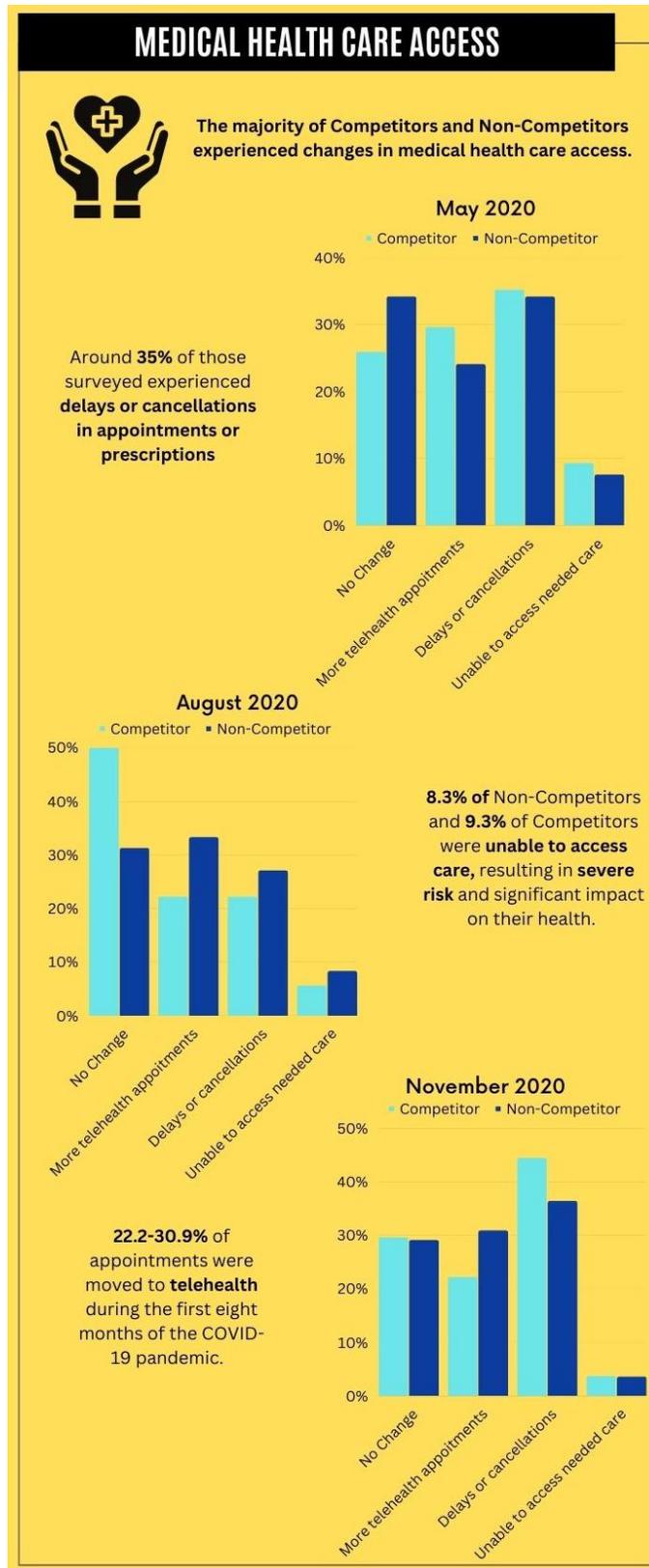


Figure 30. COVID-19 Medical Health Care Access

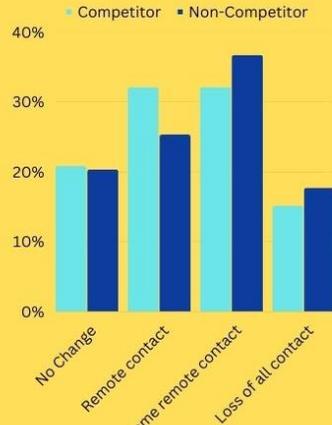
SOCIAL SUPPORT



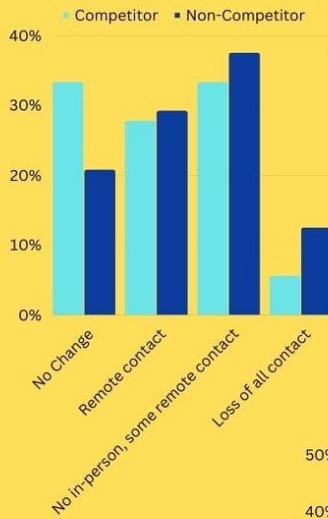
The majority of Competitors and Non-Competitors reported less in-person contact with friends and family during the COVID-19 pandemic.

32.1% to 41.8% of those surveyed report losing in-person contact with friends and family and switching to remote contact.

May 2020

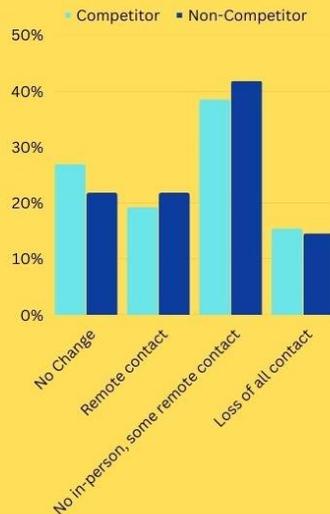


August 2020



Non-Competitors reported losing in person and removing contact with friends and family more frequently than Competitors.

November 2020



12.5-17.7% of those surveyed report losing contact with all social supports, at any given time during the first eight months of the pandemic.

Figure 31. COVID-19 Social Support

5.2 COVID-19 Interviews

5.2.1 Demographic Information

Competitors ($n=6$), non-competitors ($n=10$), and family members ($n=4$) were recruited to participate in semi-structured qualitative interviews about their COVID-19 experiences.

An overview of key demographics is provided below.

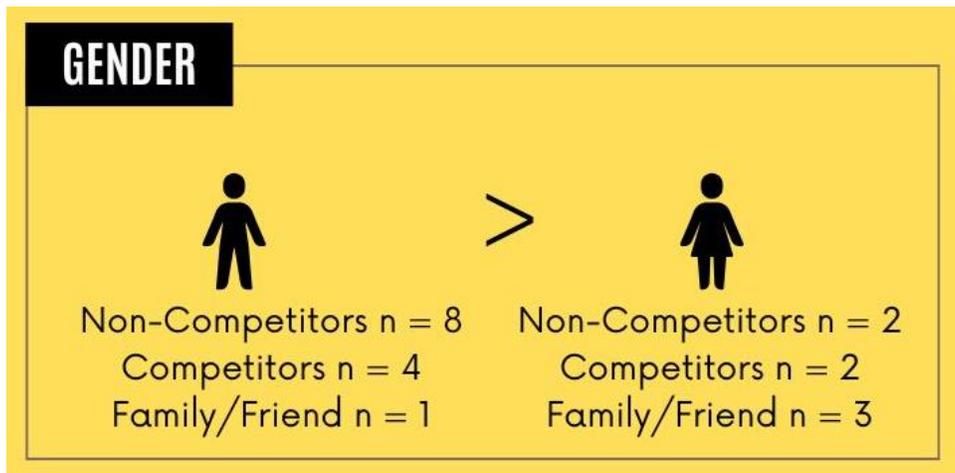


Figure 32. COVID-19 Interview - Gender

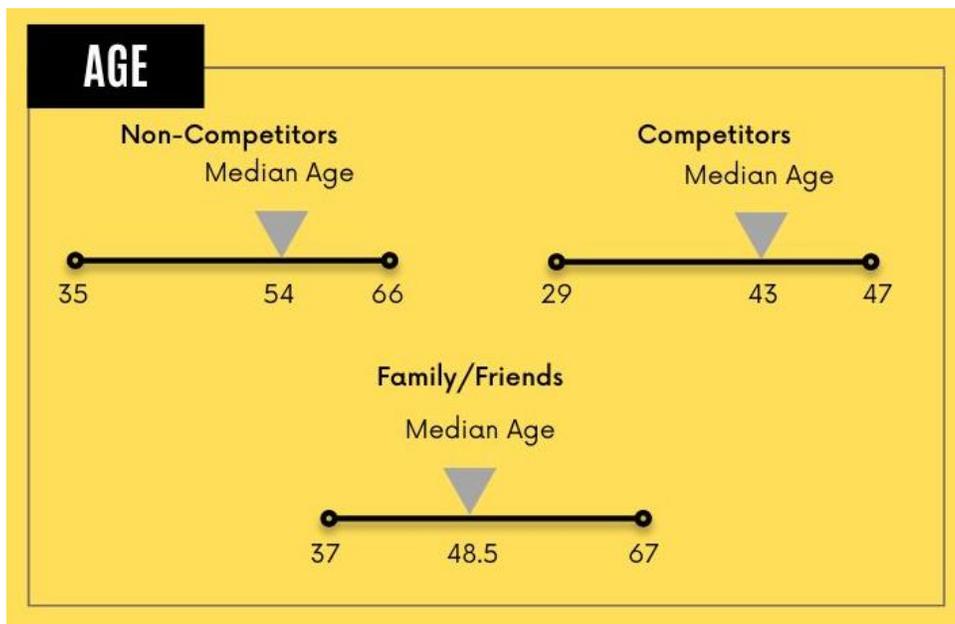


Figure 33. COVID-19 Interview - Age

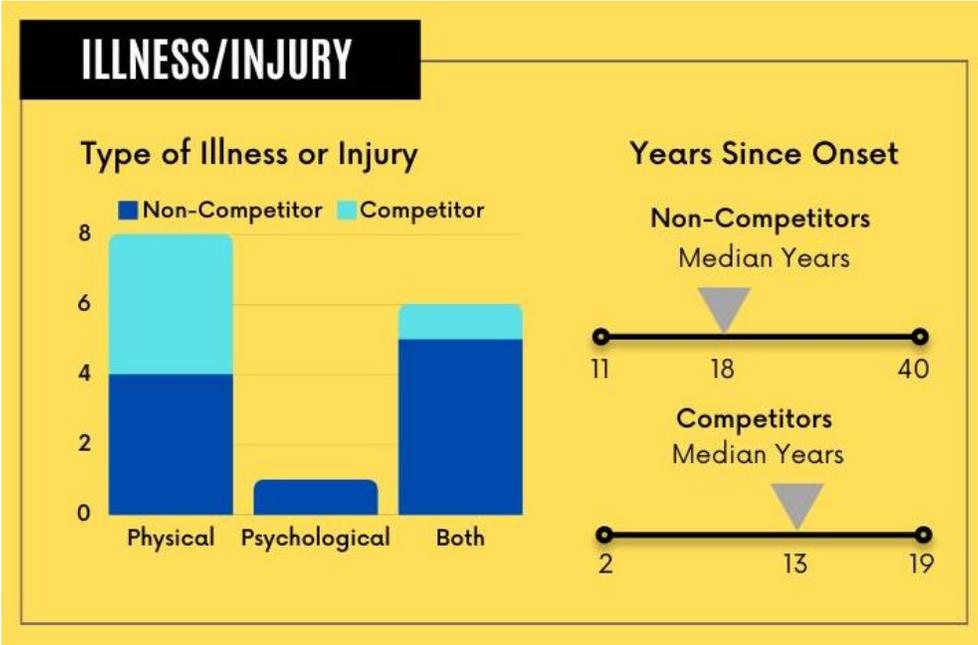


Figure 34. COVID-19 Interview - Illness and Injury

MILITARY STATUS



Figure 35. COVID-19 Interview - Military Status

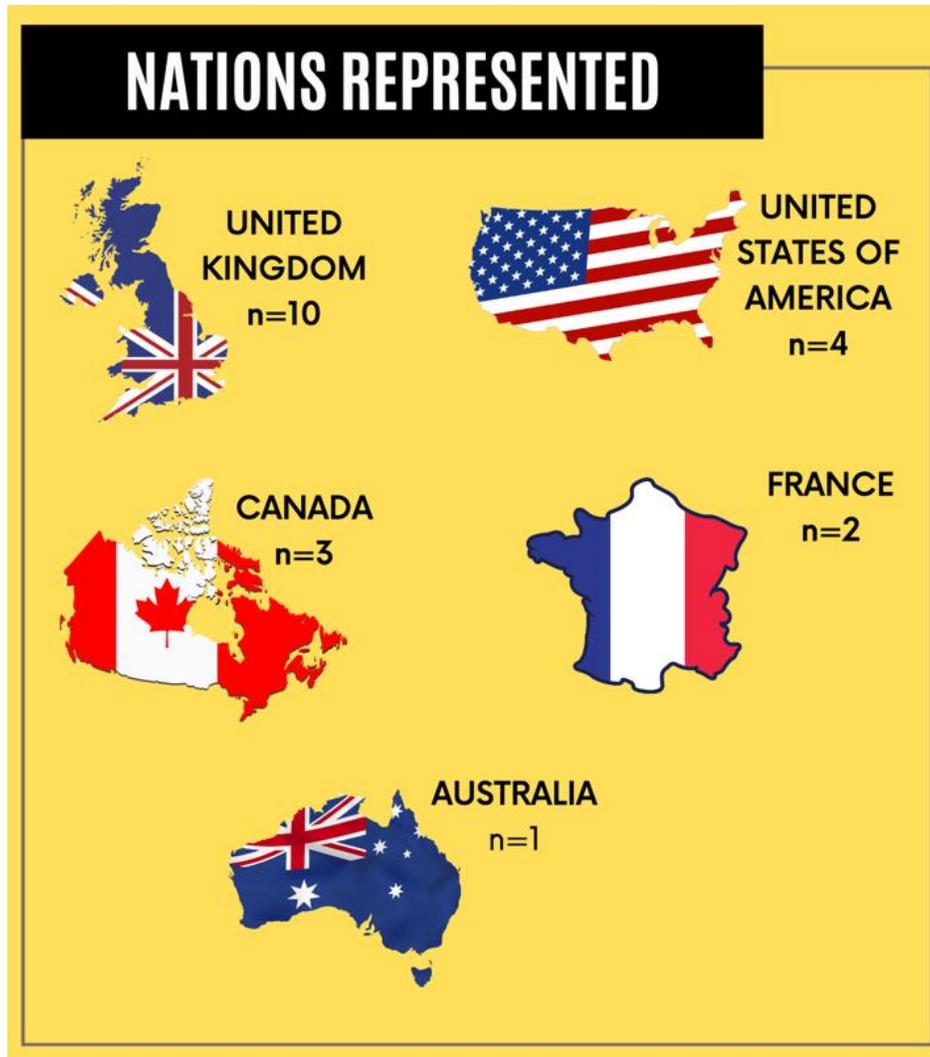


Figure 36. COVID-19 Interview - Nations Represented

5.2.2 Interview Results

The qualitative interviews provided an opportunity to gain a richer understanding of experiences during the pandemic through in-depth discussion with competitors, non-competitors, and their family and friends. The interviews also allowed the research team to explore perspectives on a phenomenon identified through the Invictus Games The Hague surveys: uptake of eSports, particularly among non-competitors.

5.2.2.1 COVID-19 experiences

Individuals did struggle with isolation and changes in medical care access, particularly non-competitors and family members who did not have access to regular training or social opportunities. However, for some competitors and non-competitors, the COVID-19 pandemic was

a time of personal growth. This growth was linked to two mechanisms: an opportunity to pause and simplify; and adapting physical activity participation. These differing responses are explored below.

Isolation. The COVID-19 pandemic and associated public health containment and mitigation protocols presented sudden and drastic changes to social and economic life across the globe. Participants found sheltering at home and social distancing requirements to be difficult. Of note, this response to isolation was most prominent among non-competitors though there is insufficient evidence to suggest a link between this response to isolation and competitor status.

The following participant’s narrative elaborates on the intense feelings of loneliness and isolation experienced during lockdown:

[the pandemic] had a huge impact to be honest. When the UK was in lockdown and I couldn't even go for a walk or a cycle, it was incredible isolating... It's one thing to self-isolate because you don't feel sociable, but it's another thing to be told.

– Jack, Non-competitor, UK

Jack’s response to the isolation of the pandemic highlights the struggle faced by many who lived alone during the pandemic, as well as those experiencing psychological illnesses and injuries either in conjunction with physical illnesses and injuries or on their own. For many, their mental health condition made them more likely to avoid social interactions. However, a motive for participating in rehabilitation programming was to overcome this aspect of their illness or injury. Many had just started overcoming this desire for isolation when shelter at home and social distancing regulations were implemented. This time, isolation was the result of an outside force. Jack’s response to these COVID-19 policies also impacted his motivation. He noted that it took some time for his life to get back in order. Other participants echoed Jack’s feelings of isolation and the return of PTSD symptoms as a result of not being able to work on their rehabilitation and, once again, being socially isolated.

Just gone back to square one. I've just gone back to how I was when I was first ill. The only difference is I don't drink.

– Thomas, Non-competitor, UK

Thomas’ returning symptoms were evidence of a return to pre-rehabilitation state, while his ability to refrain from alcohol use set him apart from trends of increased substance use among Veterans and civilians during the pandemic. His experiences, in conjunction with other participants who noted the trauma of isolation, suggest the potential need to explore how individuals with PTSD were particularly impacted by the pandemic.

Lack of access to health care. Many competitors and non-competitors described attempts to access care as “absolutely horrendous” to the worrisome point that they “had just given up.” (Thomas, Non-competitor, UK). Participants indicated that wait lists to visit primary care doctors and mental health specialists were months or years long. While some found solutions in telehealth

appointments, several participants indicated being unable to keep up with their care. This disruption was also experienced by family members.

Maybe like mid to backend of 2020 I decided to go for some counselling. I've had depression a couple of times in the past. I kind of saw my mental health slipping and I was like, "I don't want to go back on antidepressants or anything." So, I was like, "You know what, I'm gonna try something different." So I decided to go for counselling in order to prevent it getting to that point. (...) I think I made the application in August and it didn't start till like November. It was a bit of a waiting list. I guess I could have tried to find somewhere else but, you know, I couldn't really afford the normal cost ones so I went to the low cost ones. And just waited.

– Jane, Family, UK

While some participants experienced great difficulties, a vast majority found positive aspects in the COVID-19 experience, particularly due to opportunities to pause and simplify, and adapting their physical activity while maintaining social connection.

An opportunity to pause and simplify. The pandemic created an opportunity for introspection for some participants once they had overcome the initial “loss” of socialization and activities that they had enjoyed. Once they passed this phase, they began to realise the mental and physical burden they had been placing on themselves during their rehabilitation. Many had also not had the opportunity to process all the shifts that had happened in their lives because of their illness and injury. One participant, a non-competitor, described this experience:

Once I adjusted to not socializing and kind of the loss of the weight lifting aspect I really enjoyed, it was - mentally and physically – really good to completely step away from something. It was quite a large part of my life. [The pandemic lockdowns] allowed me to really just think about and reflect on how my physical and mental health is and whether those activities were benefitting me or contributing to my fatigue. So in reflection there were times that I was doing activities... I was pushing it too hard. I was doing too much. And it actually had a negative impact on my physical and mental health. I realized there was obviously a fine line when you're participating in organised sports. It's helping your recovery... well, if you do too much for you, personally, then it hinders your recovery. Having it all taken away made me realize that I had been doing too much.

– Aimee, Non-competitor, UK

For another participant with “severe PTSD”, sheltering at home provided an opportunity to re-evaluate which social connections were helping or hindering his recovery.

It allowed me to re-evaluate who I had as friends and who had a negative impact on my mental well-being. So there's a few people who I would have socialized with and seen prior to the pandemic, which I have now just cut out of my life because they were actually detrimental to my well-being and recovery. So the pandemic has benefitted me. There are other people who have lost their jobs, have had stress-related mental issues because of the pandemic... but it's benefitted me. It has allowed me to simplify my life more and also be more open with people to advise them about how uncomfortable I found situations that I was in.

– Philip, Non-competitor, UK

While Philip's experience highlights the introspection that occurred, one must also note that he enjoyed the seclusion during the pandemic as it was a comfortable scenario due to his PTSD. Thus, when meeting with Service Members and Veterans with PTSD, mental health practitioners must evaluate whether the reduction of social network size was beneficial, as in Philip's case, or was accentuating social barriers imposed by their mental health condition.

Adapting physical activity participation. Evidence from the interviews also identified physical activity participation, particularly sport and exercise that promoted interaction, as a potential contributor to growth during the pandemic. Several competitors and non-competitors turned to virtual sport opportunities, including Invictus eSports to be active from home. Based on responses, participating in interactive eSports may have offset negative consequences of isolation and inactivity of the pandemic, providing a social support network through other Service Members and Veterans, teammates, coaches, family, and friends. As the likelihood of shutdowns and the inability to train together became clear, some Invictus Games competitors took on leadership roles, organising group Zoom trainings with their teammates. This effort to maintain their training and harness sport to mitigate social isolation was mentioned by one competitor:

I think the pandemic, obviously, hit a lot of people hard. Everything happened so quickly and everything kind of stopped. Not having access to our training weekends and the camps... It was trying to make ways that we could still stay in touch with our team, continue our training, and continue our fitness. (...) Instead of going into a bit of a downward spiral [and] keep thinking, “Oh, the Games aren't gonna happen,” [virtual training] was a way of keeping everyone's spirit together. So what we did is we set up Zoom meetings. We did training sessions over Zoom, and that was just absolutely fantastic. We were doing strength and conditioning sessions with tin cans and beans and like different things. Using stuff around the house. (...) I think having the meetings... I mean I think we spoke near enough every night. Even if we didn't train there was a group of us that kind of got through the pandemic together just by doing generic Zoom calls keeping in touch with people. I think it made the pandemic go really fast in a way.

– Beatrice, Competitor, UK

It is important to note that some of these Zoom groups were built based on region as opposed to team, sport, or Invictus Games participation. Thus, in some regions, non-competitors started training with Invictus Games competitors, gaining opportunities to connect and build an Invictus Games identity through their training and social relationships.

Beyond Zoom, participants also developed opportunities through their own eSports teams.

We got together with the coaches that we had and said, “Look, you know, we’ve got [an] opportunity here where we can instigate our own training. Clearly we can’t train together – that’s a given because we’re in lockdown. But cycling has a really good setup where you can do a lot of training virtually.” So we used various different mechanisms. Zwift was the main one. We used Zwift a lot to do cycling training. That could take the form of a coached session or just going out on the bikes on Zwift. You’d be in your own setup at home, logged onto a computer and we’d do a group meeting. We got into quite a good routine where we were doing a session twice a week. We’d done that all of our own back. It was good in the fact that it encouraged people. We could also meet up, chat, make sure everybody was okay. It was voluntary. You didn’t have to do it. You didn’t necessarily have to have Zwift in order to do the coach led sessions. That side of things was really good. It was really encouraging.

– Tobias, Competitor, UK

In this example, Tobias had the opportunity to develop as a leader, building a sense of meaning through his role supporting teammates during the pandemic, while also maintaining his belonging and sense of connection during lockdown.

Some participants did not have social groups that stayed connected. In these scenarios, some transitioned to new activities (art, volunteering, etc.). Others started integrating their families into their training so both they and their family members could maintain fitness, as detailed by a family member of a competitor, Grace:

His training facility closed down and the gyms closed down. So he was trying to find ways to stay in shape like I was. So we did those together. There was like some websites that would publish these PDFs with these graphics of different exercises. They would tell you what to do and you would pick whether it was, like what part of the body you wanted to work out. It wasn’t a video you would follow but just kind of like an information sheet that you would follow. So we would do that together. We also took up boxing for a little bit, got like a punching bag (laughs). We did that for a little bit. Kind of trying out different things I guess. But, yeah, for the pandemic we did work out together a lot and I found the videos and I started doing that more. He was doing those Peloton workouts pretty frequently. It wasn’t until October of 2021, so last fall, we actually got a Peloton bike. So we got our own membership and we’ve been using that pretty regularly since.

– Grace, Family, USA

Co-engaging in physical activity with family had an additional benefit of strengthening family relationships. Many individuals were pushing themselves hard in their rehabilitation prior to the pandemic. The down time at home with family was new and physical activity was an opportunity to further connect.

No change. A small number of participants indicated no major change during the pandemic. One of the individuals noted that their state in the USA had few mitigation and containment strategies in place. As such, there was minimal disruption to their social interactions and their ability to continue their Invictus Games training at the gym. The second individual relied upon their military training and isolation they experienced from family while on tour in Afghanistan.

How did I deal with it? I tried not to think about it. I tried to think that I was on tour and when I was in Afghanistan. [I] sort of put those feelings back into it, you know, as in "Okay, well I can't see my family for 6 months." That's how I kind of dealt with it. Then when we could see people, I was out hugging everybody. Then when we went into the second lockdown, I think I was used to it by then. So it wasn't too bad to deal with. I think it's very much a case of I adopted a stance of when I was in the army. (...) You have to find ways of getting on with it and if that is by just talking and virtual hugging then so be it. It wasn't the best, but it did the trick. I think it did the trick.

– Kate, Non-competitor, UK

5.2.2.2 Perceptions of active eSports

The pandemic led to important advancements in technological approaches to sport-based rehabilitation. As noted above, participants were developing their own training and social support groups through Zoom and Zwift. Many coaches were connecting with competitors through Zoom training sessions and WhatsApp messages to keep track of progress. Furthermore, at the organisational level, the Invictus Games Foundation developed its own active eSports programming to promote continued sport participation, maintain motivation, and maintain social support for Service Members and Veterans (both competitors and non-competitors) experiencing diverse physical and/or psychological illnesses. Some events were also open to family and friends.

In our Invictus Games The Hague surveys, competitors and non-competitors indicated participating in IGF active eSports. However, interestingly, in our study, participation was particularly prominent among non-competitors. Some competitors and non-competitors participated in multiple events (one non-competitor from Canada, Stephen, noted in the interviews that he competed in four international indoor rowing events, as well as multiple Powered by Invictus sport leagues). Based on the growth of this programming, the interviews, conducted in mid- to late- 2022, provided an opportunity to explore participant perceptions and experiences regarding IGF active eSports programming as an approach to sport-based rehabilitation.

Many participants indicated being excited about the launch of virtual programming. A key reason for their excitement was the ability for increased access to sport and the Invictus experience.

I thought it was fabulous. You know, I think one thing that we've all learned since the pandemic is, you know, [virtual connection] is a huge asset and [it's a] benefit to be able to get together virtually. We're extremely grateful for a lot of those who participated in them [virtual competitions]. I've had teammates at my Air Force team level and Team USA level that competed in some of those virtual competitions. Some of my friends that I've made from other countries within the Invictus community and family competed in those games. And, you know, for some, that was vital for them. Just to be able to be in that virtual competition arena and being able to have that experience.

– Chris, Competitor, USA

Individuals who participated in the Powered by Invictus eSport leagues noted that there was enjoyable competition.

I think they were great because even though you weren't kind of competing as such, you were still competing against other people. It was great to see results go up, see where you were on the leader board, and be able to change stuff. Ang going, "Oh, they've beat me on that one!" So you'll go back in and you'll do another race or you'll do another thousand meters on the rowing machine to try and beat your previous score or beat the next person. I think it was really kind of nice to have that friendly competitiveness and bring people together without actually realizing it. So I think they were absolutely amazing and it's definitely something that should continue.

– Beatrice, Competitor, UK

Those who participated also noted valuable social interactions that could then build momentum for greater connection during in-person activities like the Invictus Games The Hague.

The technologies have come so far. (...) Particularly mixed sport works really well for the Invictus [Games] Foundation. It brings our community together when we can't meet together always. And then when we actually get somewhere like the Invictus Games or one of the events like mountain biking, which was run by Invictus, we get to meet each other face-to-face. That was actually really good. You know, 'cause you sort of know the guys and girls.... (...) So it's good, a lot of fun, virtual. It's really good.

– Greg, Non-competitor, Australia

Participants additionally noted several benefits to active eSports compared to in-person activity. The most prominent benefit was flexibility. Participants in active eSports could build their activity around their own schedules and did not have to commit to traveling for opportunities, which may

be difficult based on their illnesses or injuries, or family commitments. Indeed, one participant noted that active eSports allowed them to be more present with their family.

For example, if I were to go swimming, I'd have to go to a swimming pool, which is time out of... you know? I think the one thing that I've really struggled with, and one of the reasons I've not gone for the Games again this year is because I'm a single parent. I'm divorced. I only get my kids every sort of two weeks or weekends. And it's important to me that when I do have my kids and I do have time with them that I spend time with them. (...) I am dedicating time with them. So the benefit of doing things virtually was that I could still spend time with them, albeit, you know, for that hour period where I'm doing my workout. It's, "Right, this is my time. I'm gonna do my workout. But the rest of the day is yours." You know, the rest of the day I can spend with them. So there's a lot of benefits that I took from it. That's from a personal perspective. (...)

– Tobias, Non-competitor, UK

Those that did not participate in active eSports had concerns regarding the level of competition, lack of social interaction, and inability to participate due to a lack of equipment, space, or facilities. Given the responses of the individuals who did participate which contradict these perspectives, two key takeaway points for future program dissemination need to be highlighted:

- 1) Service Members and Veterans should receive some education and/or further information on the diverse opportunities available through eSport. While some IGF eSport activities required specific equipment, others required no equipment and had limited spatial requirements. While some activities were individual, others were group-based.
- 2) As with in-person sport rehabilitation programming, it is important that different types of activities are available so individuals can choose active eSports tailored to their interests, illness or injury, and equipment access.

5.3 COVID-19 Research Summary

The COVID-19 data presents an important lens for understanding the impact of the pandemic on military personnel in critical stages of rehabilitation, and reinforces the importance of social connection for this population. The sample size for the quantitative survey fluctuated over time (see *Chapter 3*). However, the findings are telling: while most individuals experienced minimal changes, some did experience disruption to their daily life. Furthermore, while many implemented positive coping strategies, negative behavioral strategies were still used. The interviews provided depth to understand these experiences and support these diverse responses, from mental health concerns linked to isolation or lack of medical care access through to personal growth as a result of time to focus and finding ways to adapt. The pandemic also resulted in the launch of active eSport programs to promote rehabilitation and maintain belonging. The data on eSport participation, particularly from non-competitors, is promising. These initial findings highlight the potential value provided by active eSports to expand the reach and benefits of the Invictus Games, and military sport-based rehabilitation more largely.



**Chapter 6:
The Invictus Games
The Hague 2020
[conducted in 2022]**

Key Points

- COVID-19 had a substantial impact on the Invictus Games and data collection.
- Unlike Sydney 2018, the quantitative surveys did not demonstrate a “competitor effect”. This is likely reflective of four factors:
 - The pervasiveness of the shared experience of COVID-19 across both groups.
 - The development of IGF eSports which were popular among non-competitors. (see *Chapter 5*)
 - Competitors did not receive traditional training due to the pandemic and had different training timelines compared to other Games. Differences included limited or no in-person interactions for some nations, changes in teammates, changes in coaches, and continuous uncertainty regarding both the pandemic and the Games.
 - Most importantly, this is likely a result of statistical limitations. There were significant decreases in study participation as the burden of the pandemic increased, and thus, potentially insufficient participants to demonstrate an effect. Second, due to the changes in study participants and starts and stops in training for the Games, we could only examine post-COVID differences as opposed to differences compared to pre-selection in 2019.
- Due to the statistical limitations, we turn to examining graphical trends. These do suggest a “competitor effect” and, for many outcomes, there are improvements over time. This finding is further reinforced by qualitative data. During interviews, many competitors and their families labelled the Games as “lifechanging” and important for well-being and family connection.
- As with the Sydney 2018 data, it is worth noting the important impact of type of illness and injury for outcomes.
 - Findings suggest that particular attention in post-COVID-19 rehabilitation should be paid to those with psychological illnesses and injuries, who demonstrated poorer well-being outcomes for The Hague but not for Sydney.
 - As with Sydney 2018, attention should be paid to findings indicating poorer physical health among individuals experiencing both physical and psychological illnesses and injuries.
- A further limitation of the data, which must be considered, is each nation had a different selection timeline. As such, the preselection timepoint was based on Team UK and nations were added at different times based on the timeline of their selection and training processes.

This chapter presents longitudinal findings on the impact of the Invictus Games the Hague on physical health and psychosocial well-being. The Invictus Games The Hague were substantially impacted by COVID-19. The original dates for the Games were May 9 - 16, 2020. Due to the original COVID-19 variant, the Games were rescheduled to May 29 - June 5, 2021. The Games were then rescheduled a second time due to the Delta variant, finally occurring April 16 - 22, 2022. When the Games took place in 2022, a total of 395 competitors participated in the Games. They represented 18 nations (some nations were unable to attend due to reasons which included the COVID-19 pandemic). Competitors had the option to compete in 10 sports: archery, athletics, cycling, indoor rowing, the Land Rover Driving Challenge, powerlifting, sitting volleyball, swimming, wheelchair basketball, and wheelchair rugby.

When the Games took place in 2022, they occurred in a different context compared to the original planning of the event. Factors that influenced the Games as well as research outcomes included:

- The experience of COVID-19 (see *Chapter 5*), which includes:
 - the impact of the continuous starting and stopping of rehabilitation programs;
 - impact on access to medical support;
 - changes in access to coaches and nation staff;
 - changes to programming (virtual vs in person) which influenced the type of training experience, as well as provided non-competitors with the opportunity to engage in Invictus Games programming;
 - uncertainty as to whether national regulations would allow their nation to compete (e.g., New Zealand did not compete in The Hague due to COVID-19 travel restrictions. Their data had to be removed from the analysis).
- A change of government in Afghanistan where many of the Service Members and Veterans had served;
- The war in the Ukraine.

These must all be considered when seeking to understand the experience of the Invictus Games The Hague training period and competition. In addition to impacting the experience of competitors, these factors also influenced the study design, with additional timepoints added for the rescheduling of the Games, as well as substantial attrition due to the burden of the pandemic, withdrawal of the substantial number of Ukrainian study participants due to conflict, and withdrawal of participants due to changes in their ability to be a part of the team and attend the Games as a result of changes in scheduling and work and life commitments.

Data collection with competitors and non-competitors for The Hague began based on the original schedule for the Games for 2020. Thus, data collection began with a 1-year pre-Games timepoint in July 2019 to capture pre-selection. An important limitation for the study was variability in nation selection and training schedules. Choosing a definitive pre-selection date across all nations that also included information as to who may be participating in selection trials was not possible. Thus, pre-selection was based on Team UK, which held its Invictus Games Trials in Sheffield in July 2019. Data collection continued through 6 months post-Games (October/November 2022). There was a break in data collection from November 2020 - January 2021 in response to participant burden concerns and uncertainty due to the pandemic.



Figure 37. Data Collection Part One: 2020 & 2021 dates

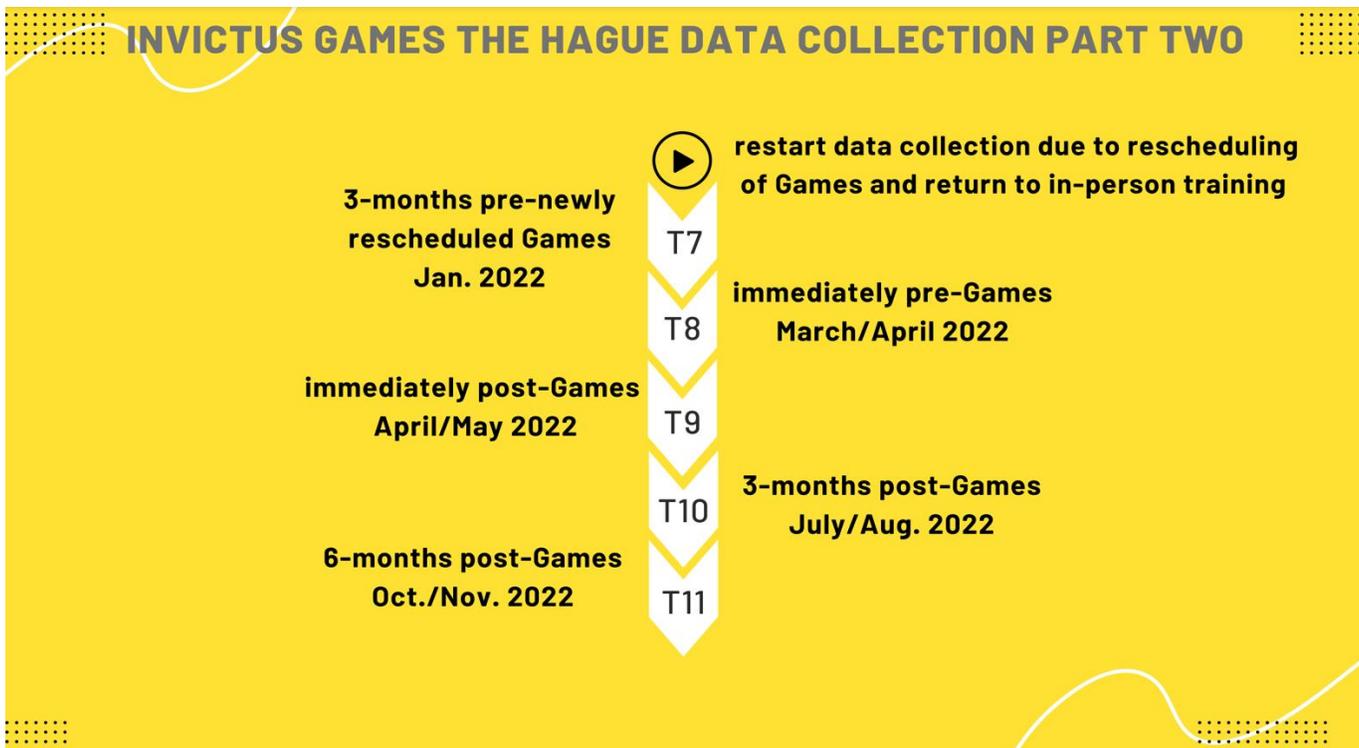


Figure 38. Data Collection Part Two: Rescheduled 2022 date

6.1. Demographic Information

A total of 370 Service Members and Veterans experiencing physical and/or psychological illnesses and injuries participated in the Invictus Games The Hague research surveys, including 174 competitors (44.30% of all competitors) and 196 non-competitors.

An overview of key demographics is provided below.

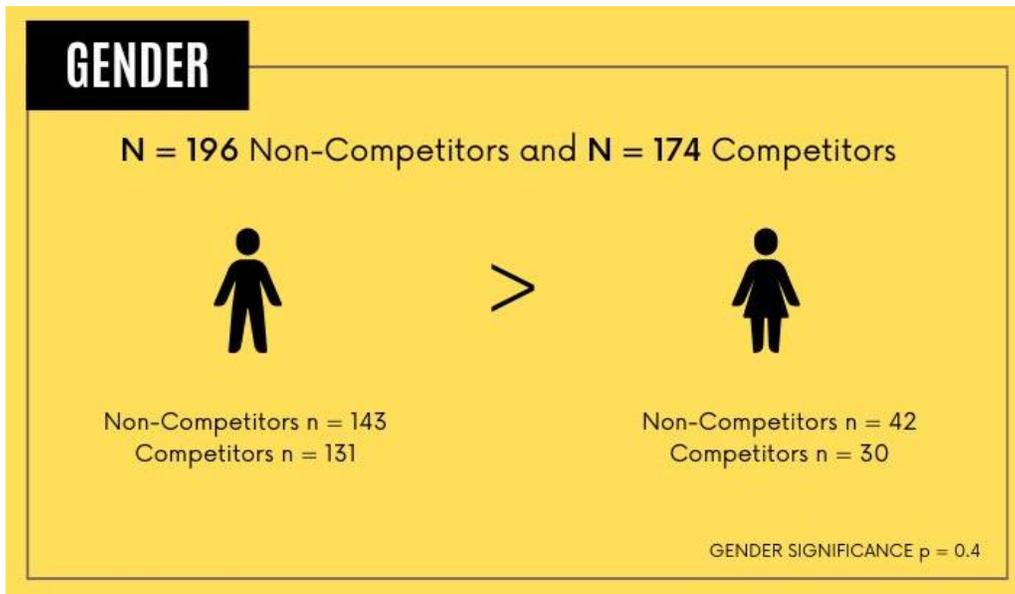


Figure 39. Invictus Games The Hague – Gender

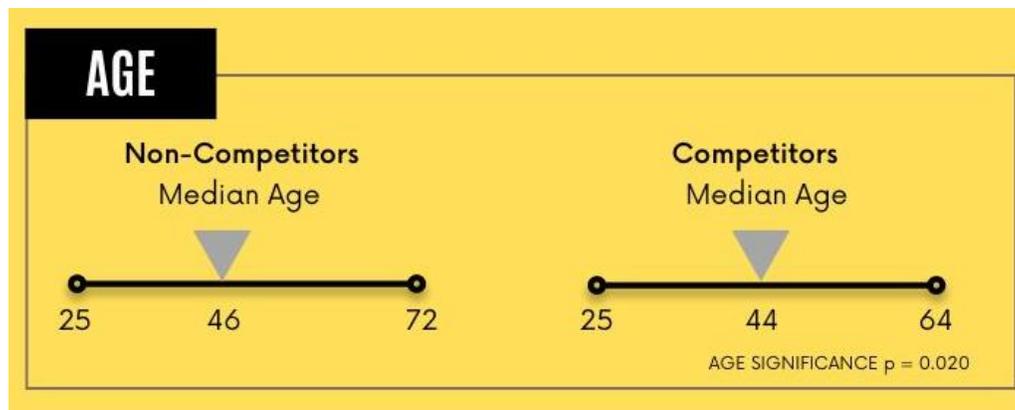


Figure 40. Invictus Games The Hague - Age

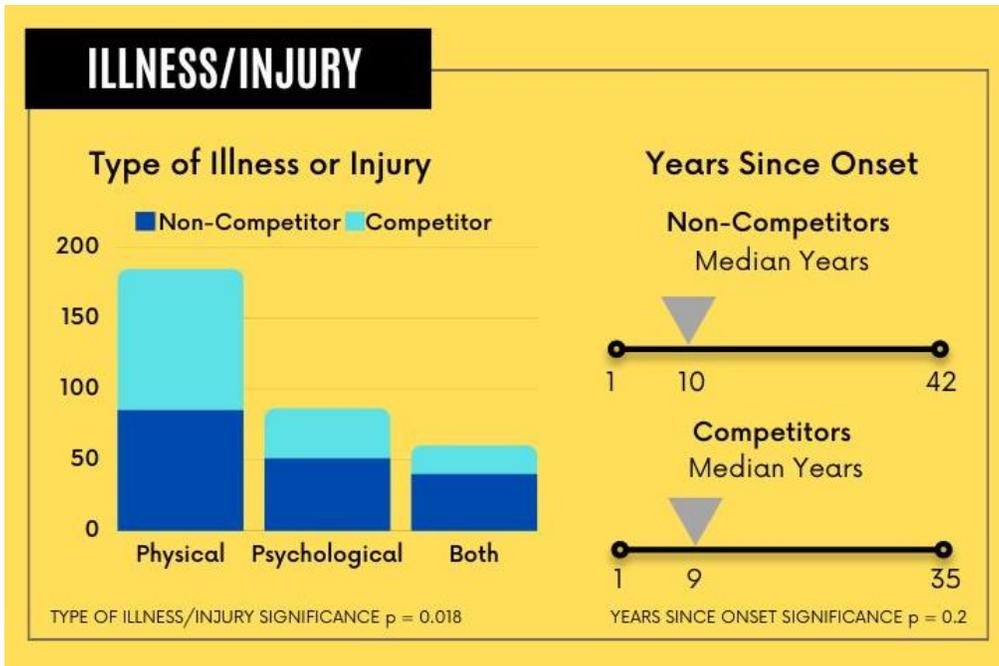


Figure 41. Invictus Games The Hague - Illness and Injury

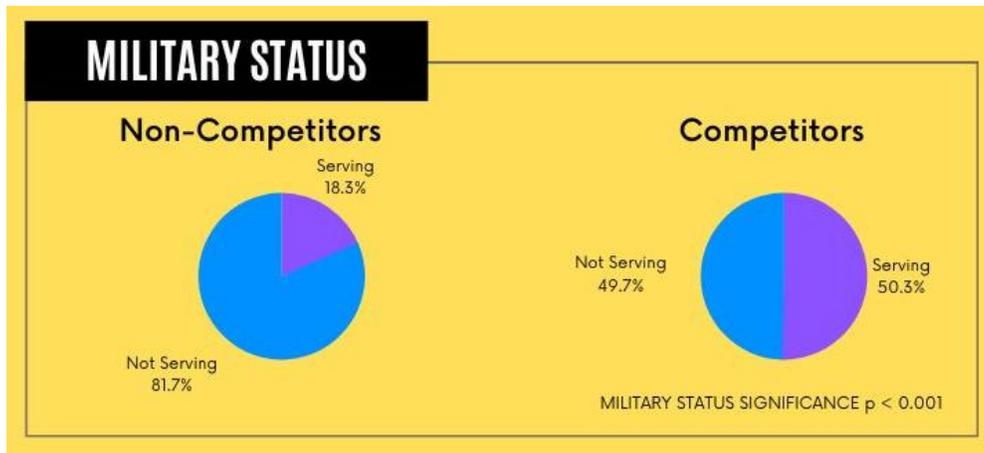


Figure 42. Invictus Games The Hague - Military Status

NATIONS REPRESENTED



Figure 43. Invictus Games The Hague - Nations Represented

6.2. Survey Results

In the graphs below, we present data across all timepoints for readers to gain an understanding of the trends over time in the data, including the impact of COVID-19. However, to determine short- and long-term outcomes, particularly based on the rescheduling of the Games and decreased survey participation, we were unable to run rigorous analysis with pre-COVID-19 data. Analysis was thus conducted comparing T7 (3 months pre-rescheduled Games, January 2022), T8 (immediately pre-rescheduled Games, March/April 2022), T9 (immediately post-rescheduled Games, April/May 2022), T10 (3 months post-rescheduled Games, July/August 2022), and T11 (6 months post-Games, October/November 2022). As can be seen across the different graphs, competitors' baseline was often greater than that of non-competitors. This likely reflects a team selection bias for participant readiness (see *Chapter 7*). Thus, when conducting the main analysis, any baseline difference in outcomes were controlled (i.e., analysis was conducted such that this initial difference was removed). This allows the analysis to solely account for differences based on training and Games participation. Given the impact of the pandemic on data collection and participant experiences, in this chapter we describe the trends in the graph in addition to the significant findings.

6.2.1. Physical Health

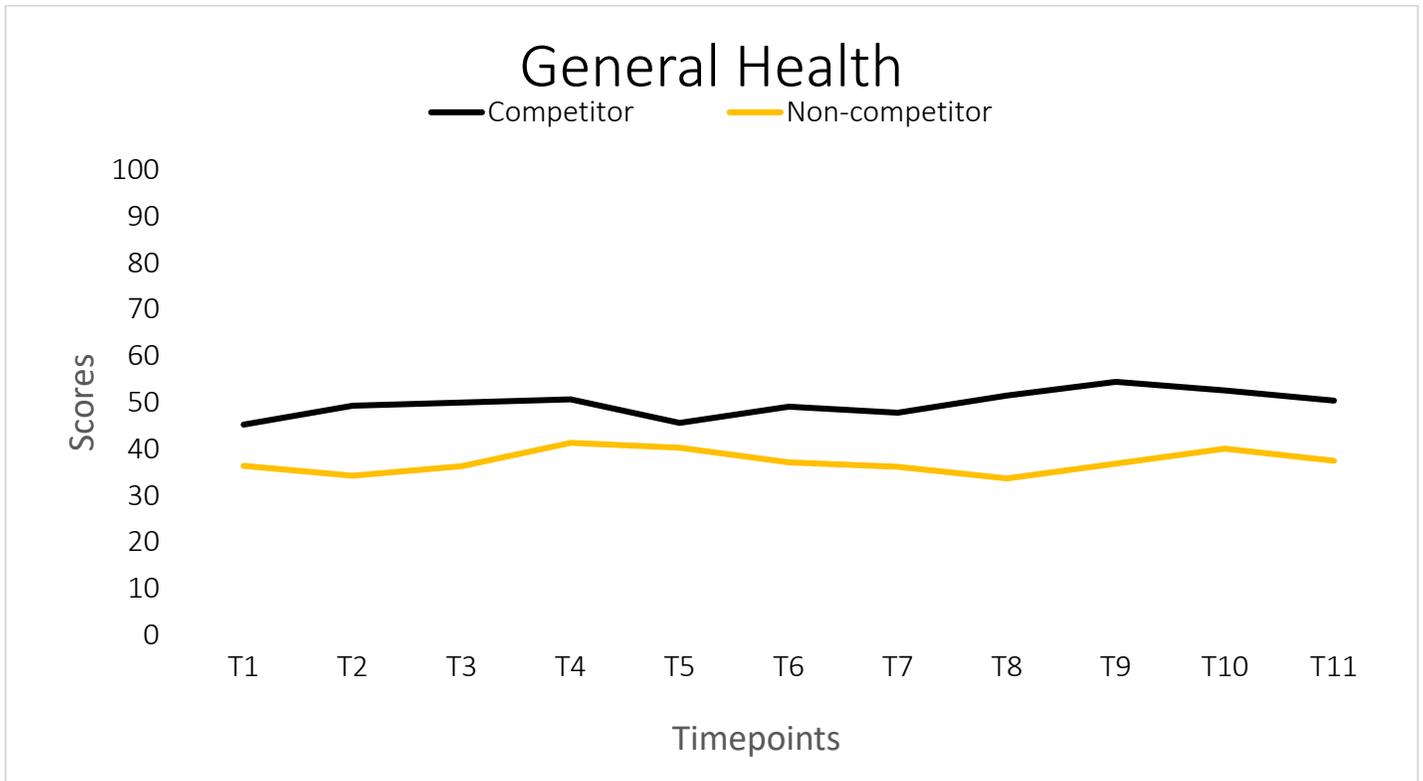


Figure 44. Invictus Games The Hague - General Health by Competitor Status

The trends in *Figure 44* demonstrate greater general health for competitors, with increases over time. Analyzing based on the post-COVID data, however, there was no significant difference for competitors' general health compared to non-competitors (OR 1.66, 95% CI 0.66-4.56, $p = 0.33$).

Reminder:

T1: 1-year pre-Games

T2: 6-months pre-Games

T3: 3-months pre-Games

Onset of COVID-19 pandemic

T4: original date of Games

T5: 6-months after original date

T6: 6-months pre-first rescheduling of Games

Pause in data collection, Games rescheduled again due to pandemic

T7: 3-months pre-newly rescheduled Games

T8: immediately pre-Games

T9: immediately post-Games

T10: 3-months post-Games

T11: 6-months post-Games

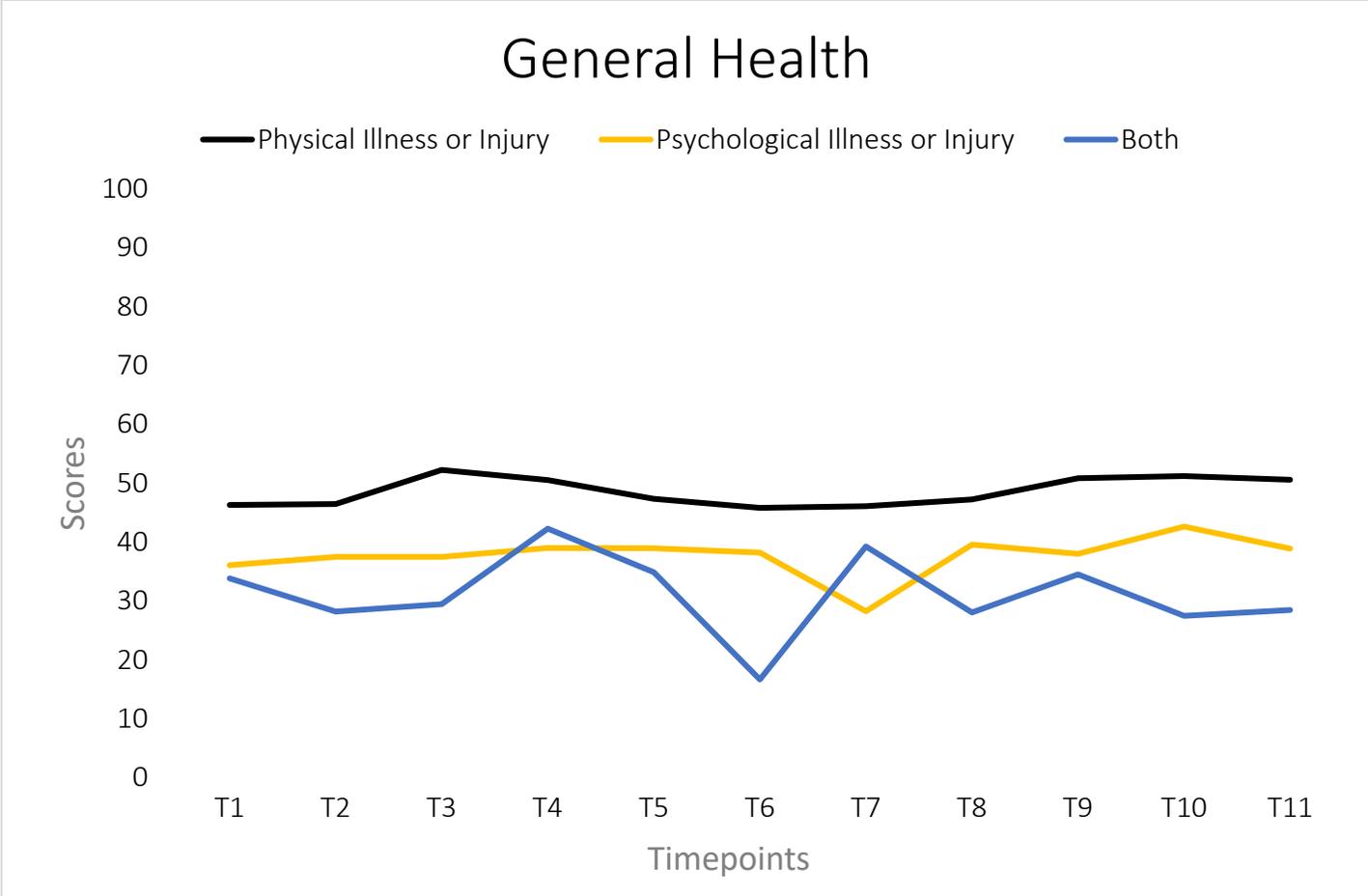


Figure 45. Invictus Games The Hague - Health Compared to Previous Year by Type of Illness or Injury

Mirroring the Sydney 2018 data, competitors and non-competitors experiencing both physical and psychological illnesses and injuries were 76.0% more likely to have poorer general health compared to those with physical illness or injury or psychological illness or injury (OR 0.24, 95% CI 0.09-0.67, $p = 0.007$). Viewing *Figure 45*, it is important to interpret keeping in mind that due to pandemic interruptions analysis was only conducted from T7 through T11. Looking at the earlier timepoints, this difference is present in T2 and T3 but then we do not see the same difference during the pandemic timepoints. During the pandemic, in fact, see potential similarity in outcomes between individuals experiencing psychological illness or injury and individuals experiencing both physical and psychological illness or injury. The pandemic trends for all types of illness and injury may potentially speak to the impact of COVID-19 on individuals experiencing psychological illness or injury, as well as the potential impact of COVID-19 infections on perceptions of health.

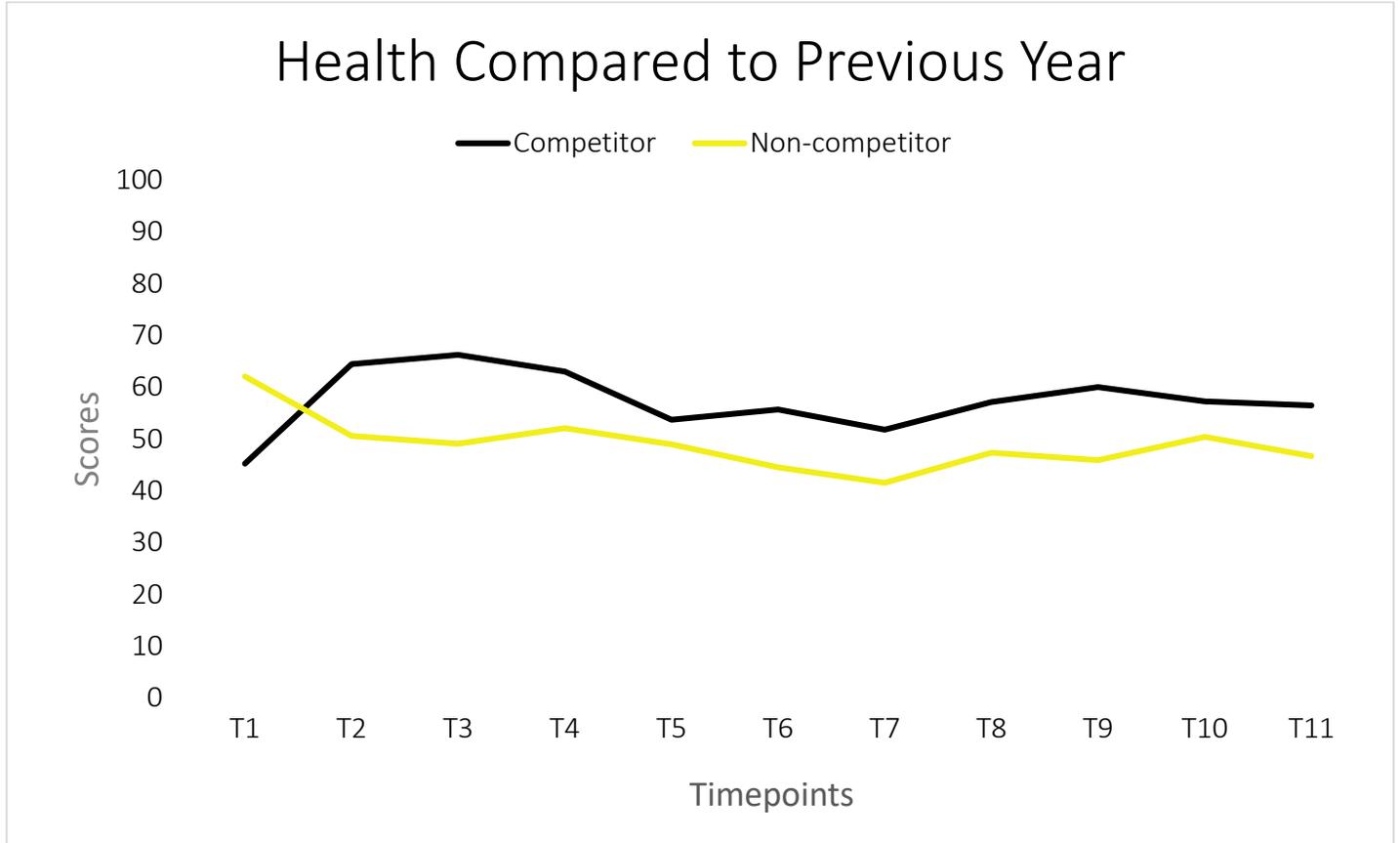


Figure 46. Invictus Games The Hague - Health Compared to Previous Year by Competitor Status

Except for baseline, *Figure 46* indicates that competitors continuously demonstrated greater health compared to the previous year across all timepoints. However, analyzing based on the post-COVID data, there was no significant difference between competitors and non-competitors (OR 1.32, 95% CI 0.58-3.02, $p = 0.50$).

Health Compared to Previous Year

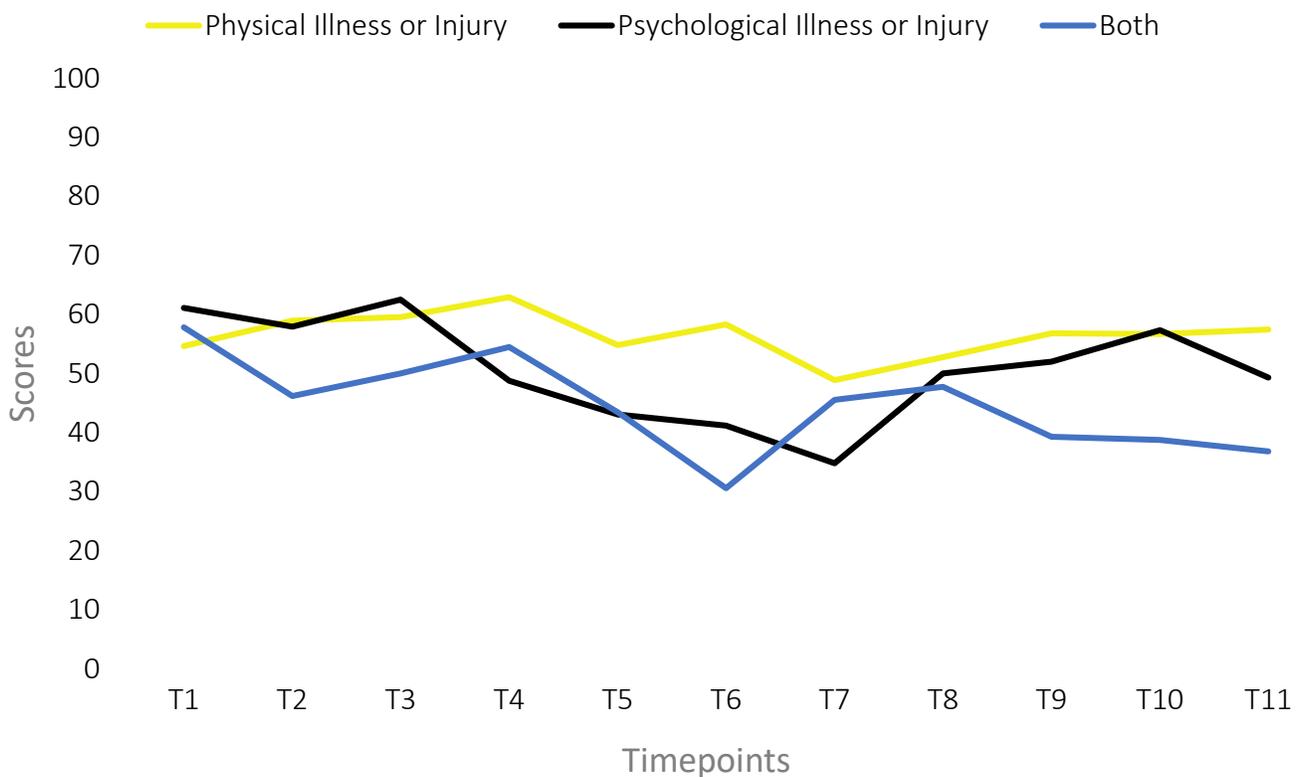


Figure 47. Invictus Games The Hague - Health Compared to Previous Year by Type of Illness or Injury

While the competitor finding differed from the Sydney 2018 data, *Figure 47* did once again demonstrate that individuals (competitors and non-competitors) experiencing both physical and psychological illnesses and injuries were 60.7% more likely to have poorer health compared to the previous year (OR 0.39, 95% CI 0.19-0.81, $p = 0.01$). As when viewing *Figure 45*, it is important to interpret keeping in mind that due to pandemic interruptions analysis was only conducted from T7 through T11. In this instance we see similar findings as *Figure 45*, with individuals experiencing both types of illness or injury demonstrating poorer trends pre-pandemic and after the end of most national COVID-19 mitigation measures (T7-T10). During the height of the pandemic, however, we again see similarity in perceptions of health compared to the previous year between individuals experiencing psychological illness or injury and individuals experiencing both physical and psychological illness or injury. The pandemic trends for all types of illness and injury may potentially speak to the impact and/or threat of COVID-19 infections on perceptions of health.

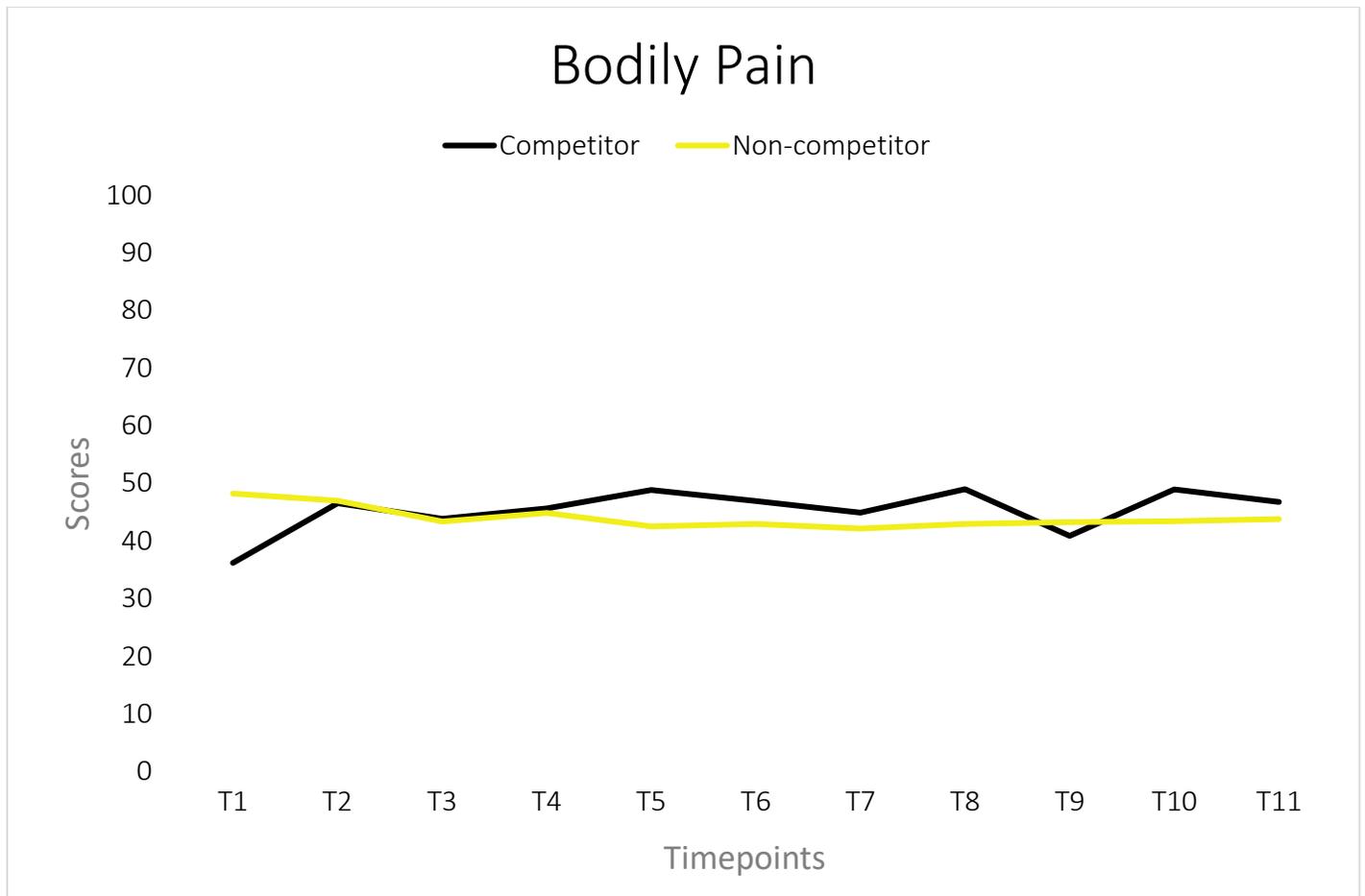


Figure 48. Invictus Games The Hague - Bodily Pain

Mirroring the Sydney 2018 findings, *Figure 48* indicates generally similar bodily pain for competitors and non-competitors. Furthermore, there was no significant difference for competitors' bodily pain compared to non-competitors (OR 0.96, 95% CI 0.43-2.13, $p = 0.92$). As noted in Chapter 4, this finding likely reflects the complexity of injuries and illnesses among both competitors and non-competitors. Research suggests that whether physical activity decreases or increases pain relates to an interaction between fitness levels, physical activity levels, and the state of the injury or illness.⁷⁹ The finding may also reflect the complexity of the concept of pain, which may have physical, psychological, social, and spiritual components.⁸⁰

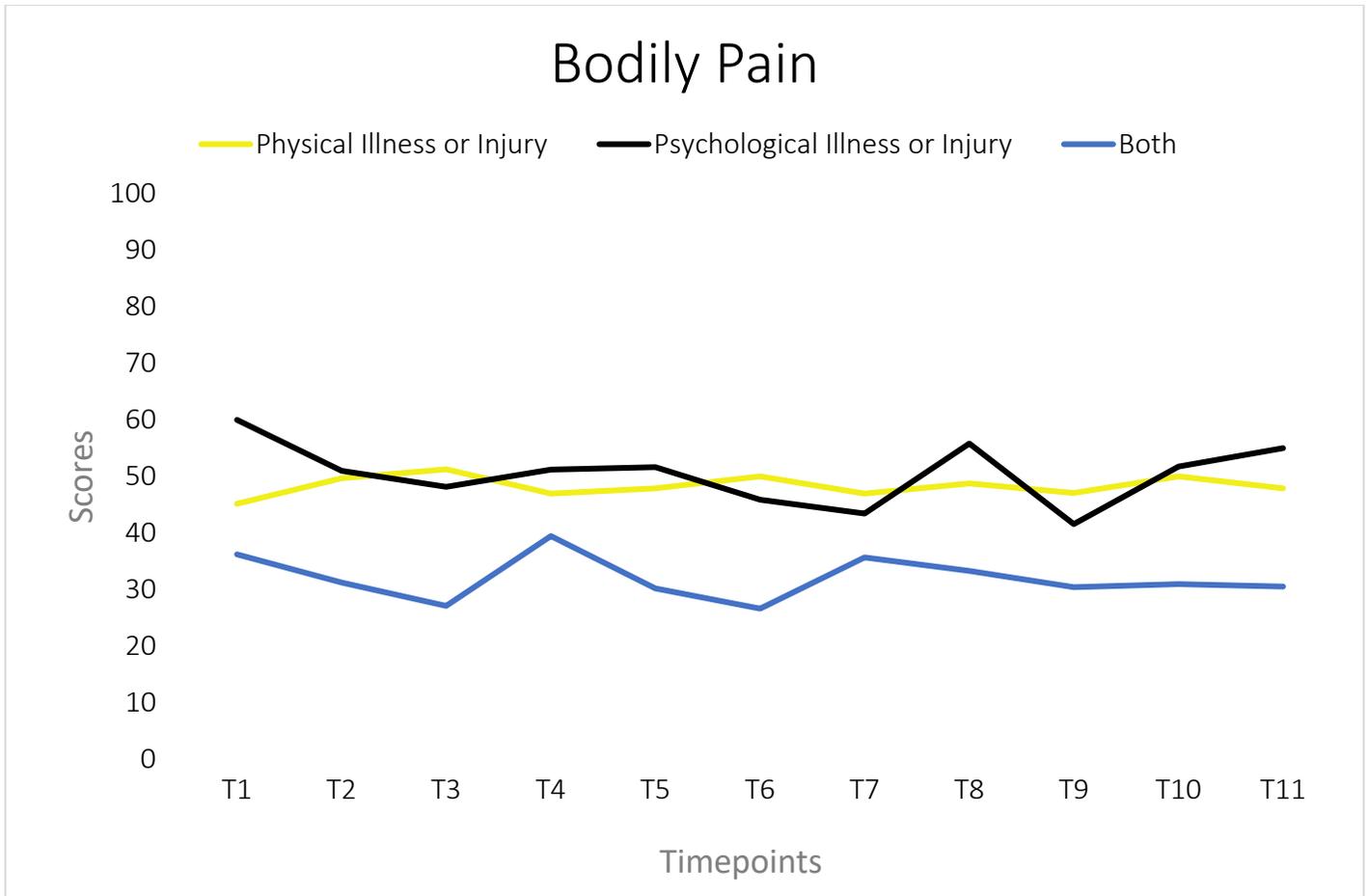


Figure 49. Invictus Games The Hague - Bodily Pain by Type of Illness or Injury

As can be seen in *Figure 49*, the data once again demonstrate that competitors and non-competitors experiencing both physical and psychological illnesses and injuries were 80.7% more likely to have bodily pain (OR 0.51, 95% CI 0.22-1.20, $p = 0.12$).

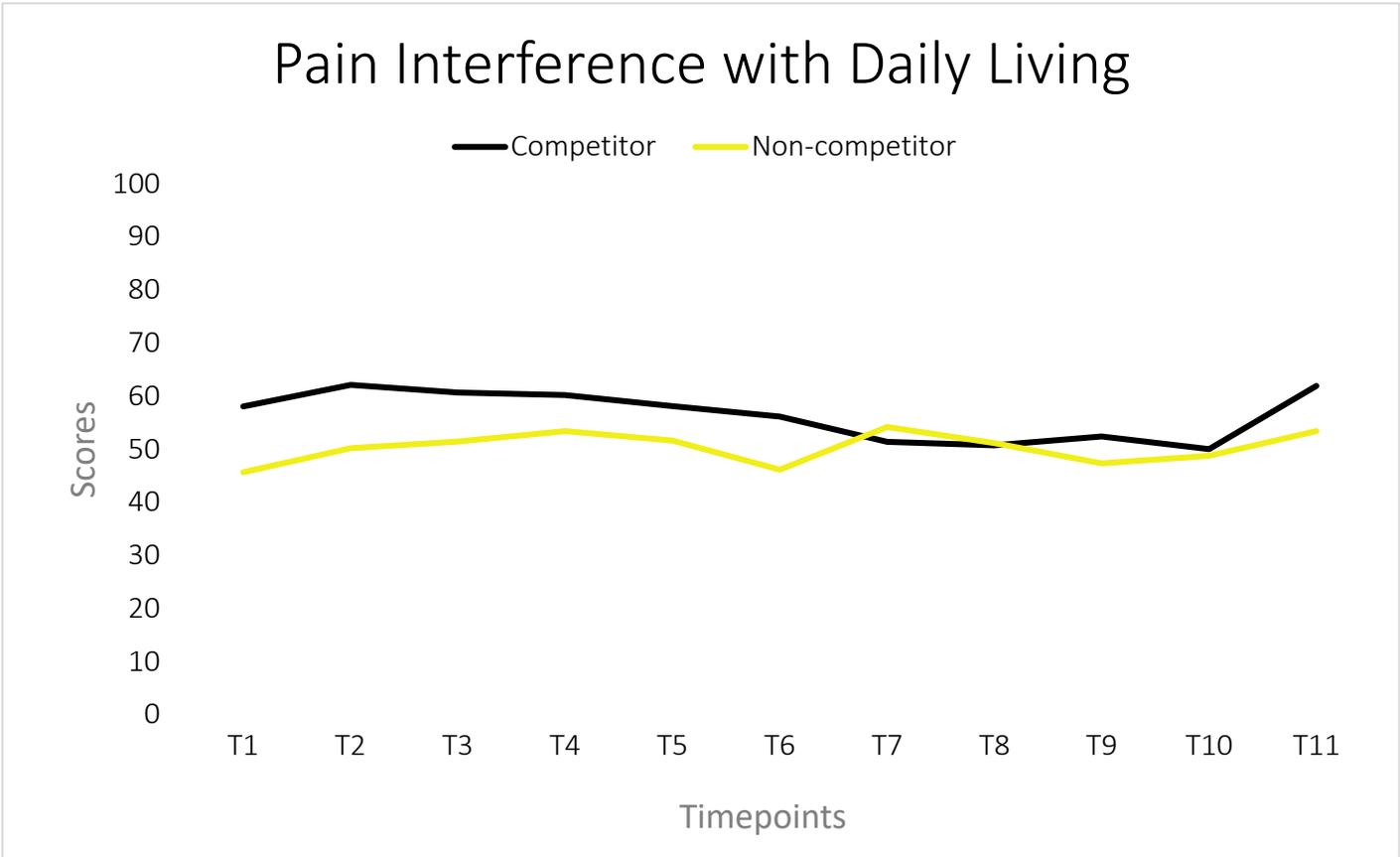


Figure 50. Invictus Games The Hague - Pain Interference with Daily Living

The trends in *Figure 50* suggest greater pain interference with daily living for competitors until 3-months after the Games when competitors and non-competitors have similar pain interference. Analyzing based on the post-COVID data, there was no significant difference for competitors' pain interference compared to non-competitors (OR 0.89, 95% CI 0.37-2.15, $p = 0.79$).

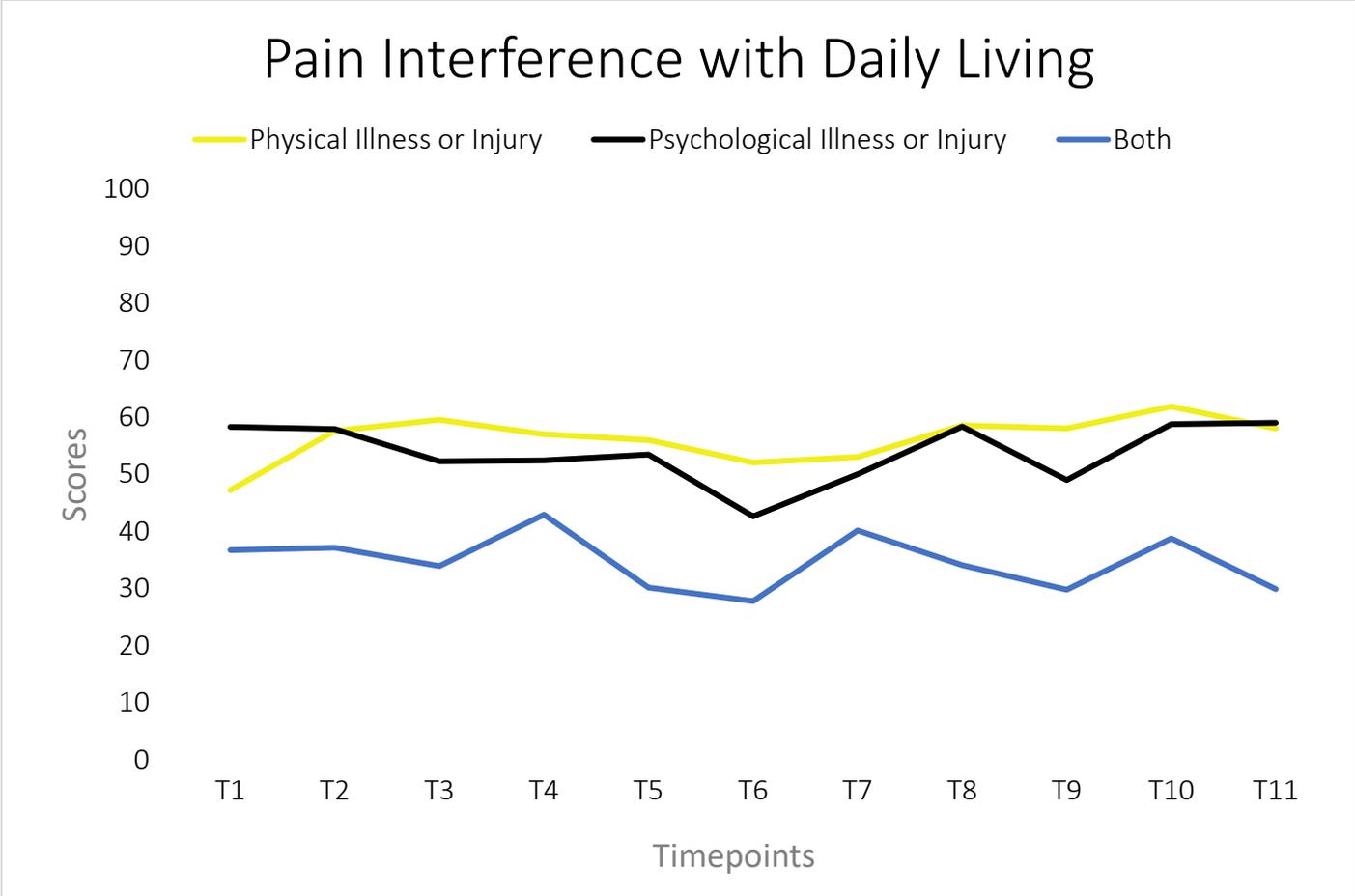


Figure 51. Invictus Games The Hague - Pain Interference with Daily Living by Type of Illness or Injury

Figure 51 once again demonstrates that competitors and non-competitors experiencing both physical and psychological illnesses and injuries were 82.6% more likely to have more pain interference with daily living (OR 0.174, 95% CI 0.07-0.43, $p < 0.001$).

6.2.2. Psychosocial Well-being

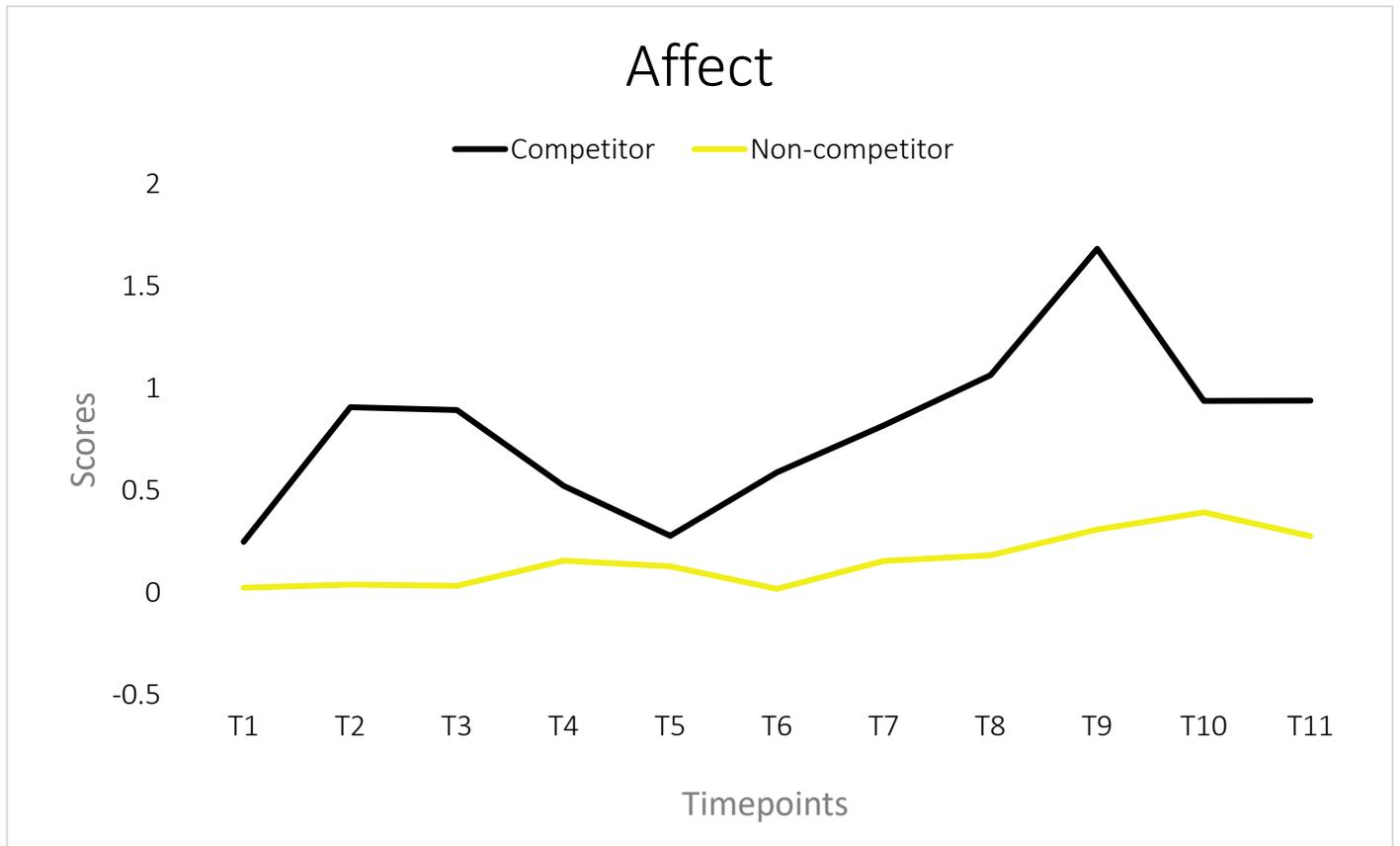


Figure 52. Invictus Games The Hague – Affect by Competitor Status

The trends in the graph suggest greater positive affect among competitors which, contrary to the Sydney 2018 data, peaked in the timepoints after the Games. Indeed, affect for both competitors and non-competitors seems to be higher post-pandemic than before the pandemic or the first months of the pandemic. The peak in competitor affect reflects the pre- and post-Games timepoints, potentially highlighting positivity at being able to gather and compete at the Games. Analyzing based on the post-COVID data, however, there was no significant difference for competitors' affect compared to non-competitors (OR 0.06, 95% CI -0.37 -0.48, $p = 0.791$).

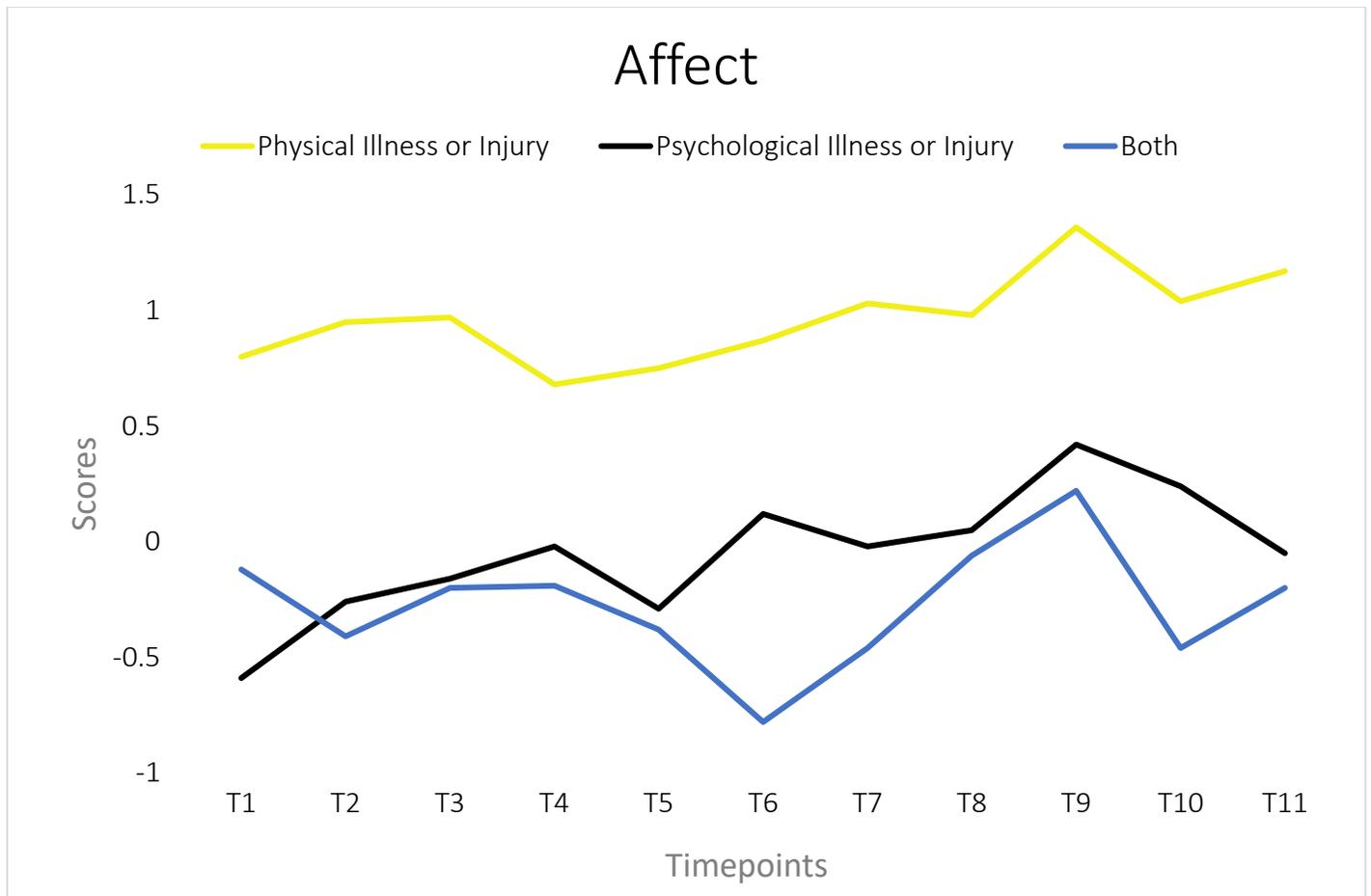


Figure 53. Invictus Games The Hague - Affect by Type of Illness or Injury

While the Sydney 2018 data only demonstrated difference in type of illness or injury for physical health measures, the Invictus Games Hague data suggests differences for psychosocial measures. Competitors and non-competitors experiencing psychological illnesses and injuries had more negative affect than those experiencing physical illnesses and injuries (beta = -0.52, 95% CI -0.37 – 0.48, $p = 0.79$).^{vi}

^{vi} Across all psychosocial outcomes for the Invictus Games The Hague, the statistical analysis only demonstrated a significant difference between those experiencing physical illnesses and injuries and those experiencing psychological illnesses and injuries. However, visually, the graphical trends for these figures would make us expect there to also be a difference between individuals experiencing physical illnesses and injuries and those experiencing both types of illnesses and injuries. Reviewing the data, we believe the reason this difference is not statistically significant is due to a lack of participants resulting from a decrease in study participation over time (see *Chapter 3*) among individuals experiencing both types of illnesses and injuries. Had there been more participants, this difference would likely have been significant.

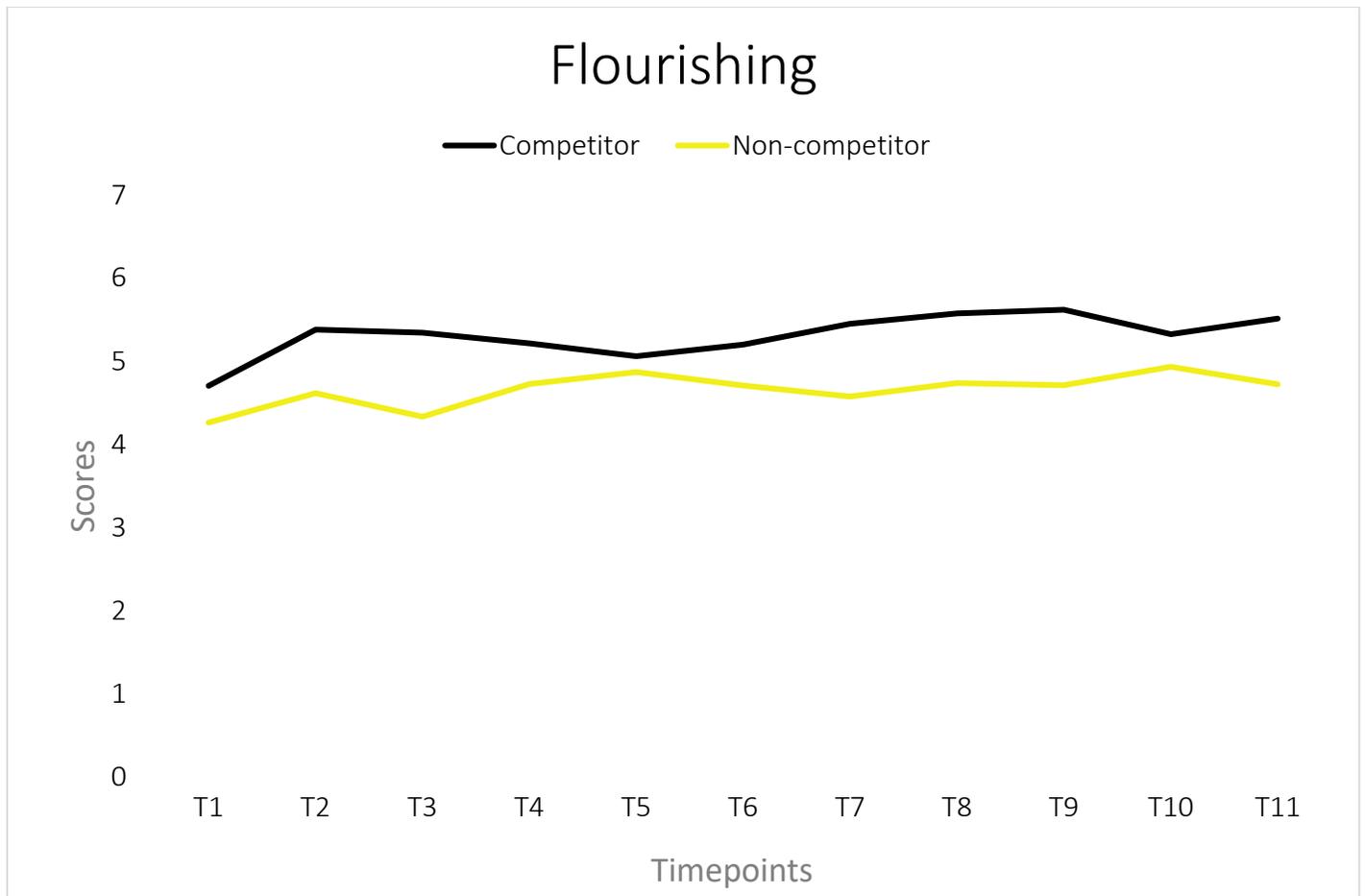


Figure 54. Invictus Games The Hague – Flourishing by Competitor Status

The trends in *Figure 54* suggest greater flourishing among competitors, as well as an increase in flourishing in the long-term despite the pandemic. Analyzing based on the post-COVID data, however, there was no significant difference for competitors’ flourishing compared to non-competitors (beta= 0.27, 95% CI -0.03 – 0.57, $p = 0.082$).

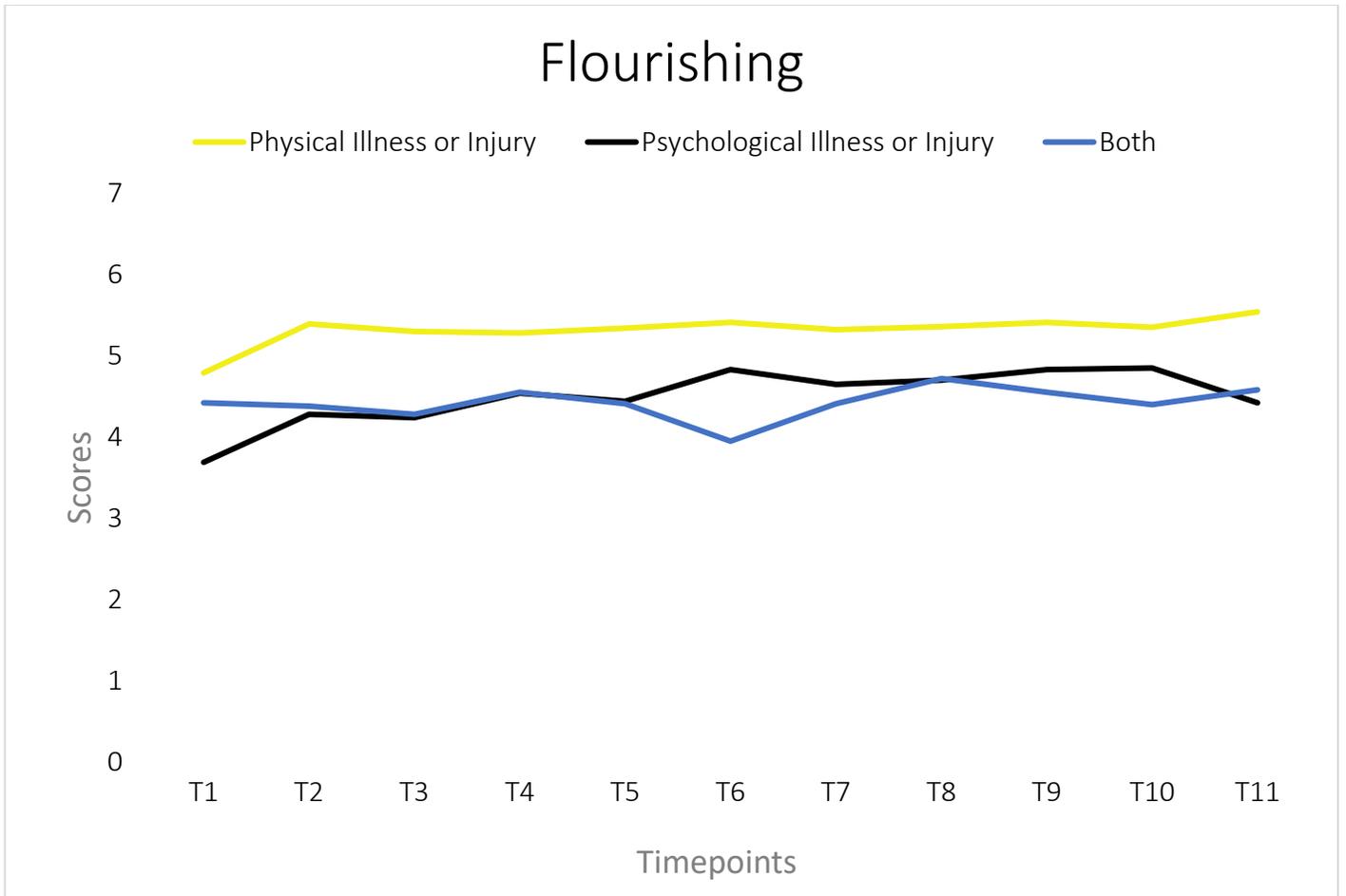


Figure 55. Invictus Games The Hague - Flourishing by Type of Illness or Injury

Interestingly, again contrary to the Sydney 2018 data, the data again demonstrated that competitors and non-competitors experiencing psychological illnesses and injuries had decreased flourishing compared to those with physical illnesses and injuries (beta = -0.49, 95% CI -0.80 – -0.17, $p = 0.003$).

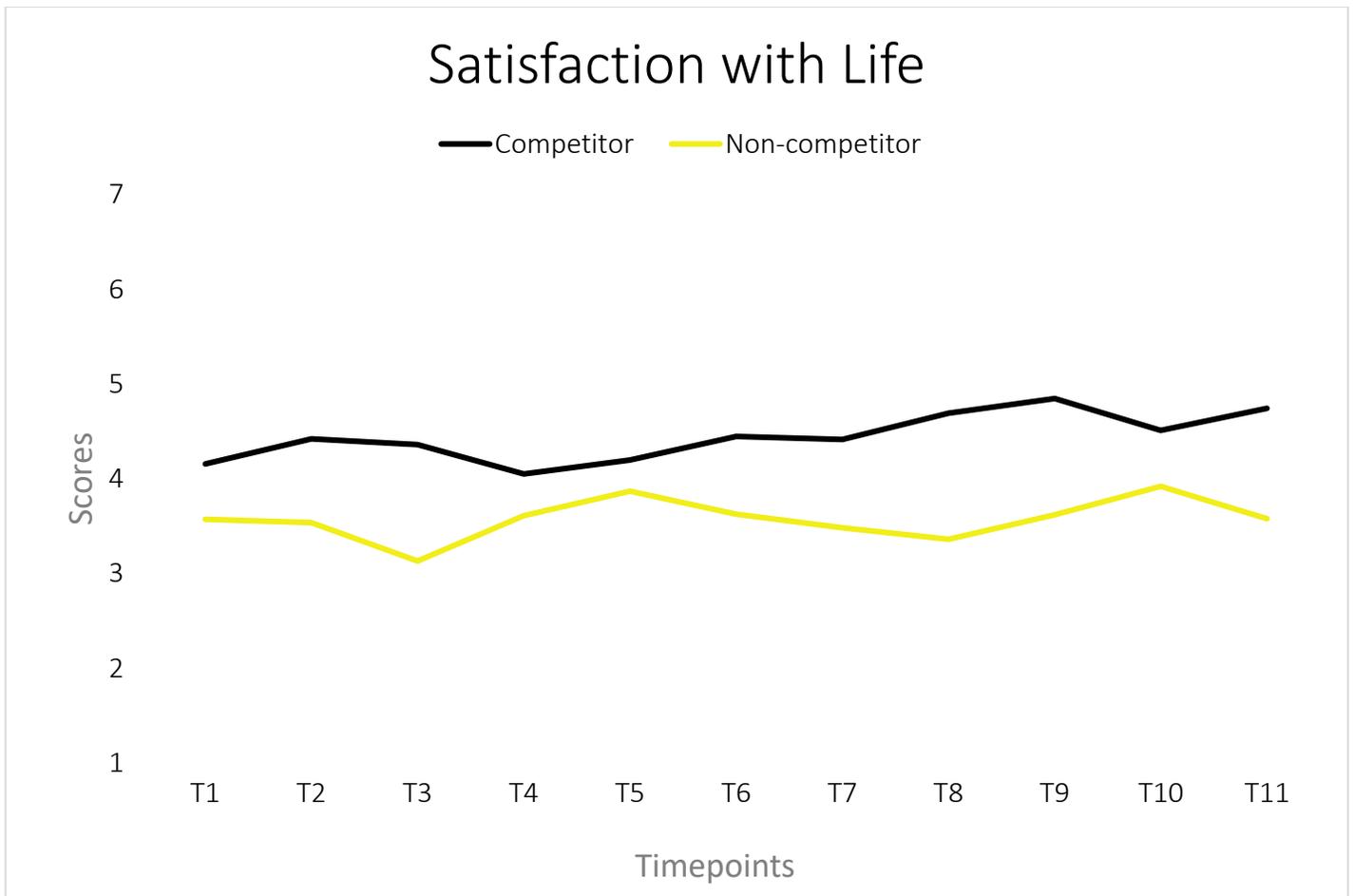


Figure 56. Invictus Games The Hague - Satisfaction with Life by Competitor Status

The trends in *Figure 56* suggest greater satisfaction with life among competitors compared to non-competitors, with a trend towards improvement in the long-term. Analyzing based on the post-COVID data, however, there was no significant difference for competitors' satisfaction with life compared to non-competitors (beta= 0.31, 95% CI -0.08 – 0.69, $p = 0.123$).

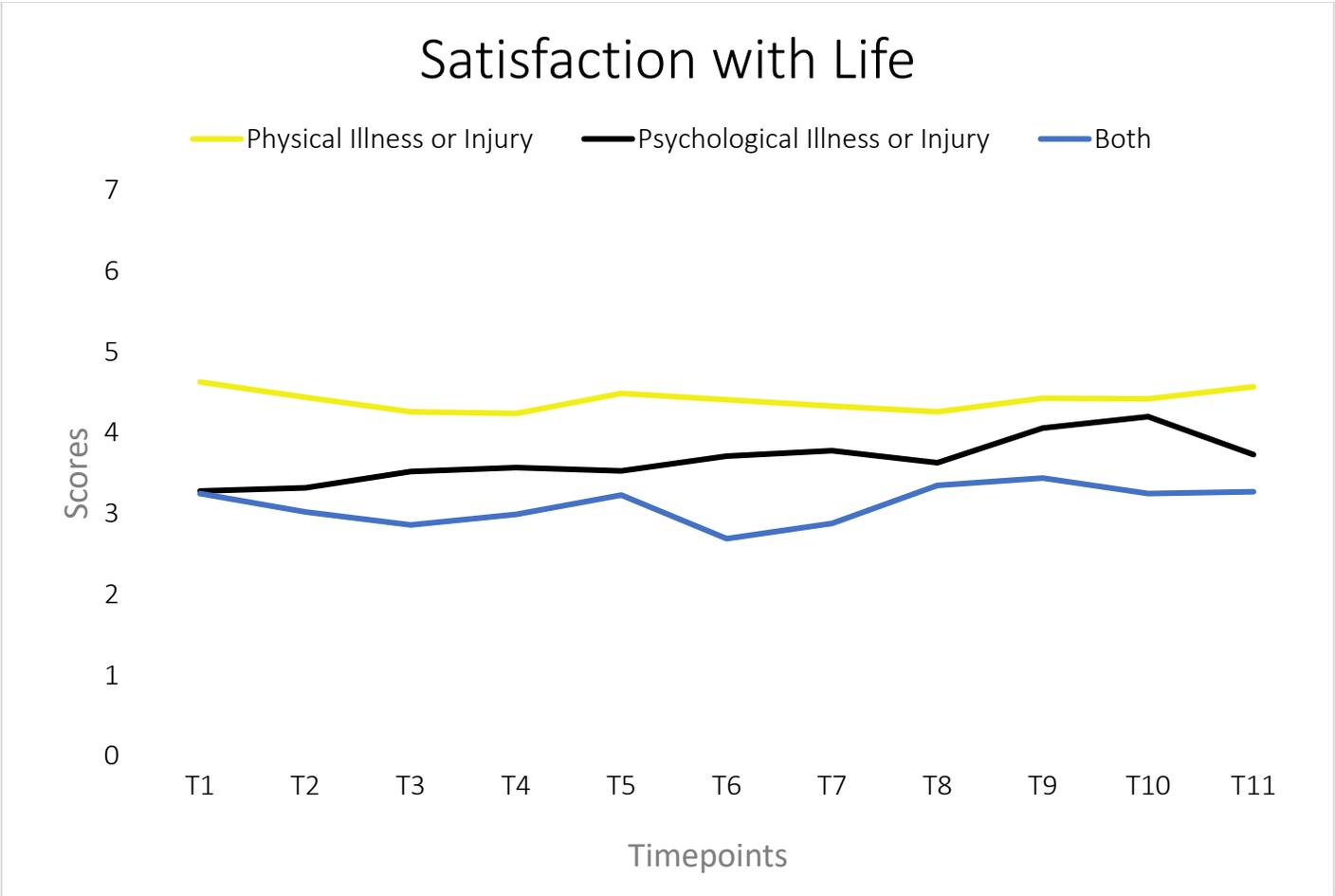


Figure 57. Invictus Games The Hague - Satisfaction with Life by Type of Illness or Injury

As with other well-being measures, the data indicated that competitors and non-competitors experiencing psychological illnesses and injuries had less satisfaction with life than those experiencing physical illnesses or injuries (beta = -0.56, 95% CI -0.98 – -0.15, $p = 0.009$).

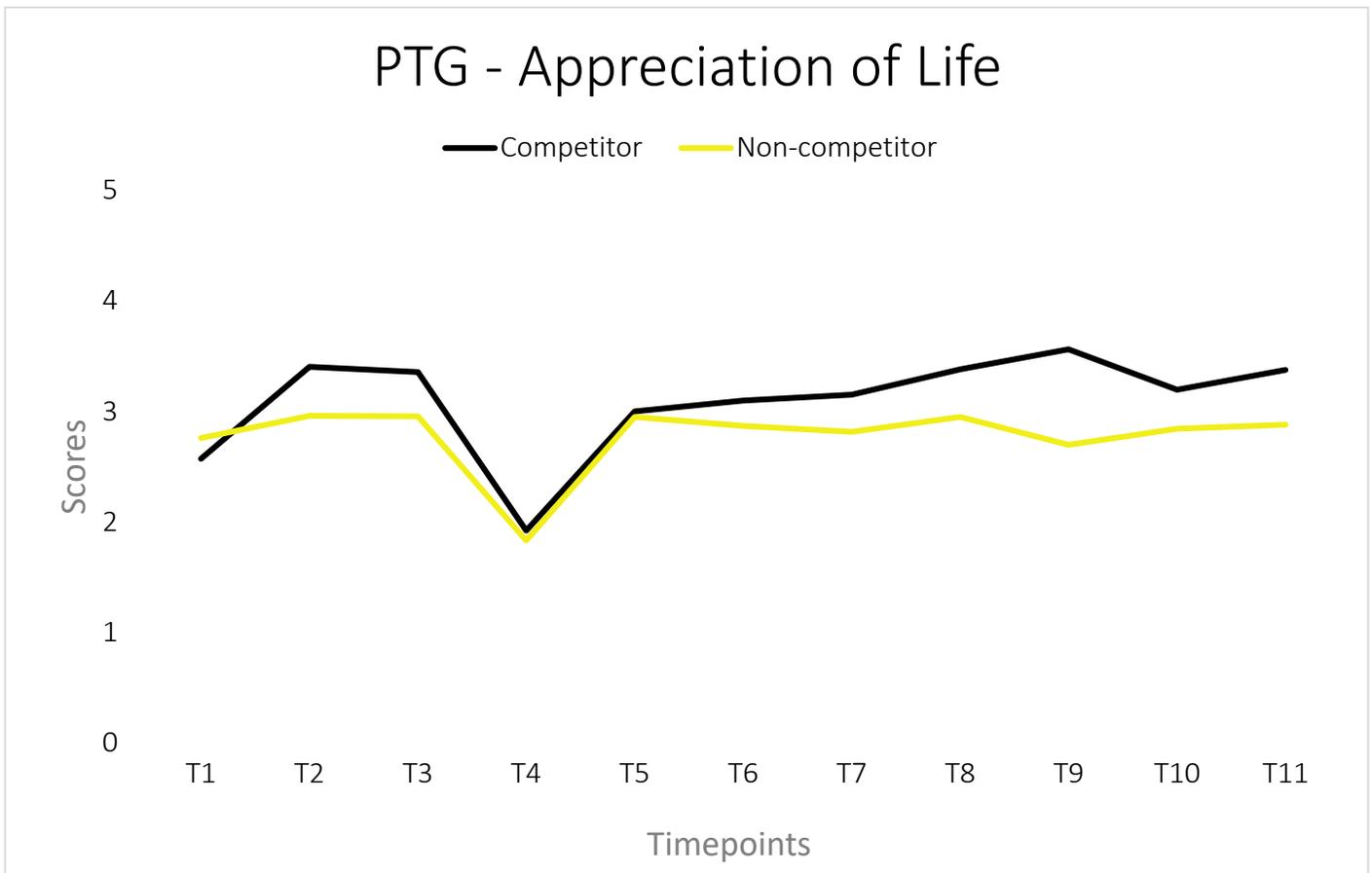


Figure 58. Invictus Games The Hague - Post-Traumatic Growth - Appreciation of Life by Competitors Status

The trends in *Figure 58* suggest greater appreciation of life among competitors compared to non-competitors, with a trend towards improvement in the long-term for competitors, which peaks post-Games. However, the decrease in appreciation of life at the first COVID-19 timepoint in May 2020 is stark. Analyzing based on the post-COVID data there was no significant difference for competitors' appreciation of life compared to non-competitors (beta= 0.05, 95% CI -0.30 – 0.39, $p = 0.785$).

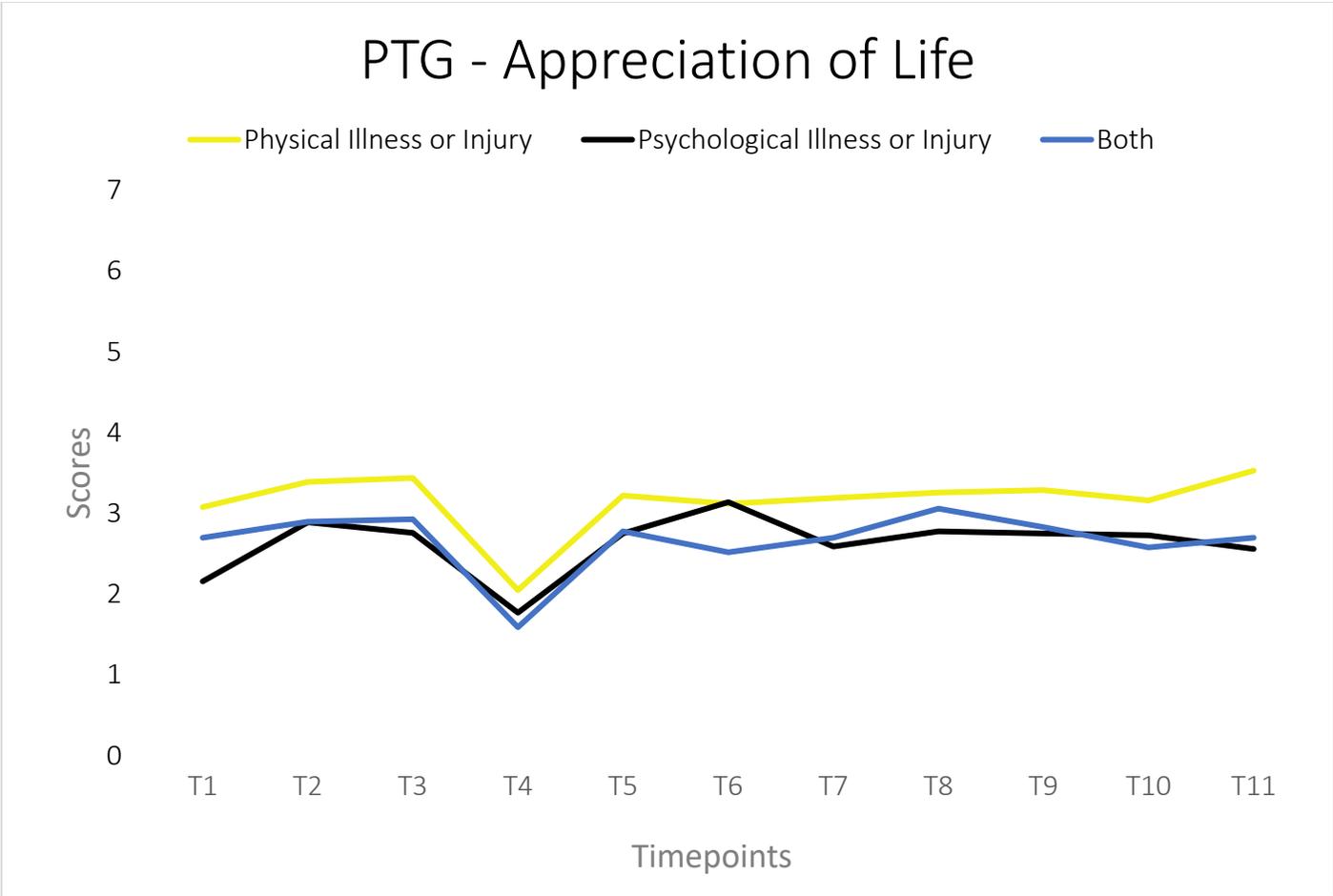


Figure 59. Invictus Games The Hague - Post-Traumatic Growth - Appreciation of Life by Type of Illness or Injury

As with other Invictus Games The Hague well-being measures, the data indicate that competitors and non-competitors with psychological illnesses and injuries had decreased appreciation of life than those experiencing physical illnesses and injuries alone (beta= -0.41, 95% CI -0.75 - -0.06, $p = 0.023$).

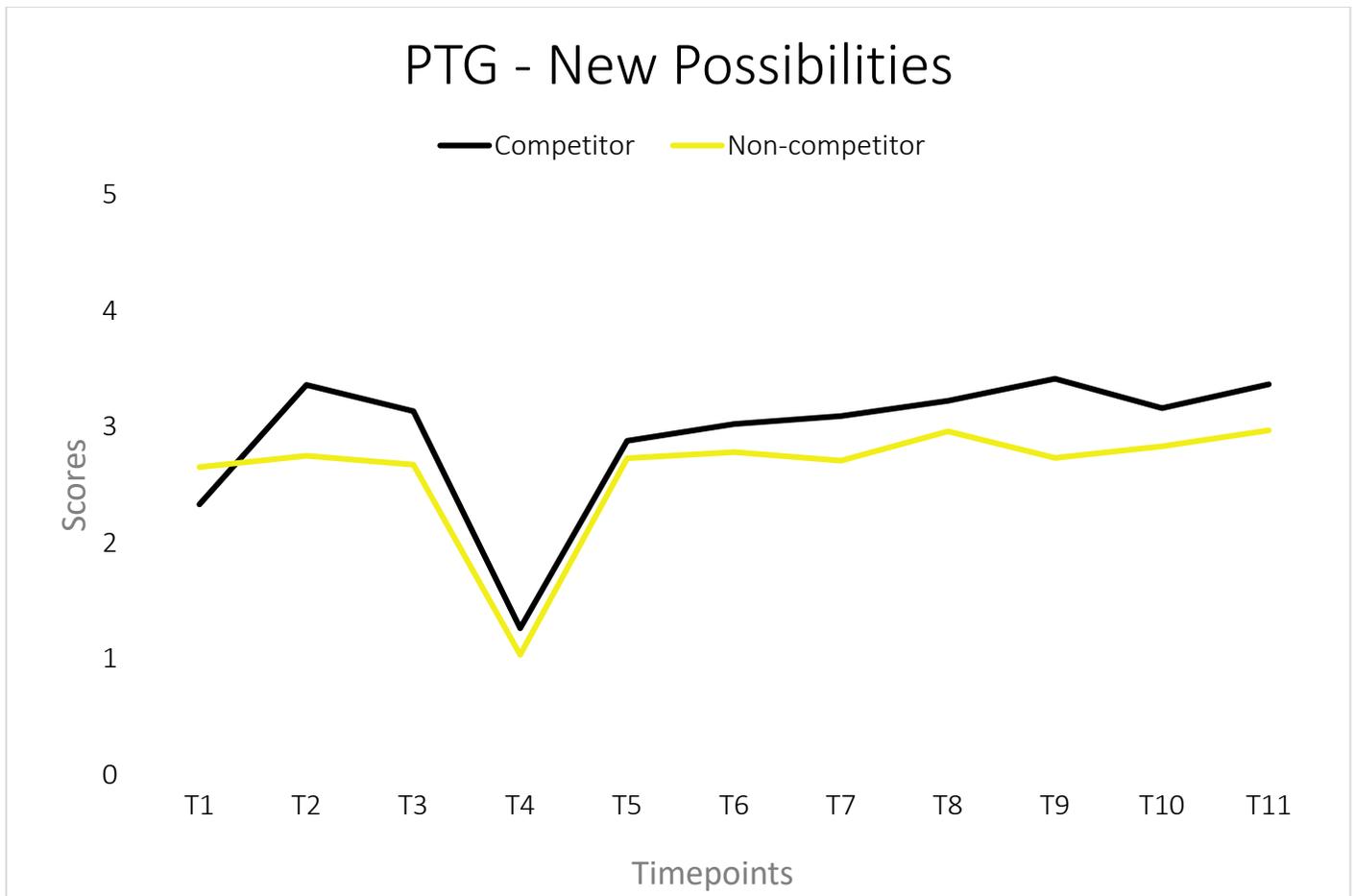


Figure 60. Invictus Games The Hague - Post-Traumatic Growth – New Possibilities by Competitor Status

The trends in *Figure 58* suggest greater perspective of new possibilities among competitors compared to non-competitors, with a trend towards improvement in the long-term. However, as with the other post-traumatic growth subscale, appreciation of life, the decrease in new possibilities at the first COVID-19 timepoint in May 2020 is noteworthy. Analyzing based on the post-COVID data there was no significant difference for competitors’ new possibilities compared to non-competitors (beta= 0.10, 95% CI -0.26 – 0.46, $p = 0.577$).

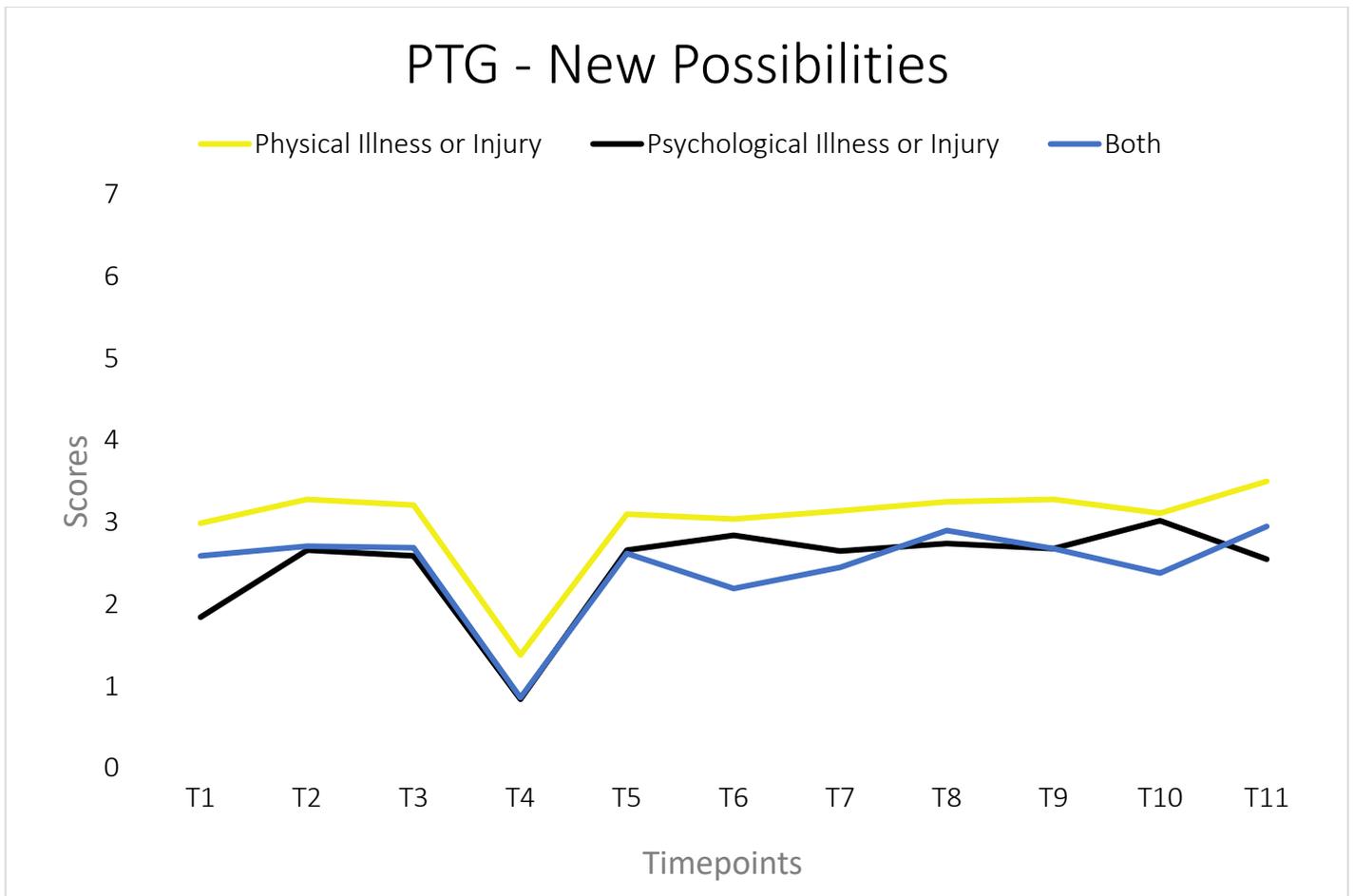


Figure 61. Invictus Games The Hague - Post-Traumatic Growth - New Possibilities by Type of Illness or Injury

As with other psychosocial measures, the data indicate that competitors and non-competitors experiencing psychological illnesses and injuries had decreased perceptions of new possibilities compared to those experiencing physical illnesses and injuries (beta= -0.41, 95%CI -0.71 - -0.11, $p = 0.008$).

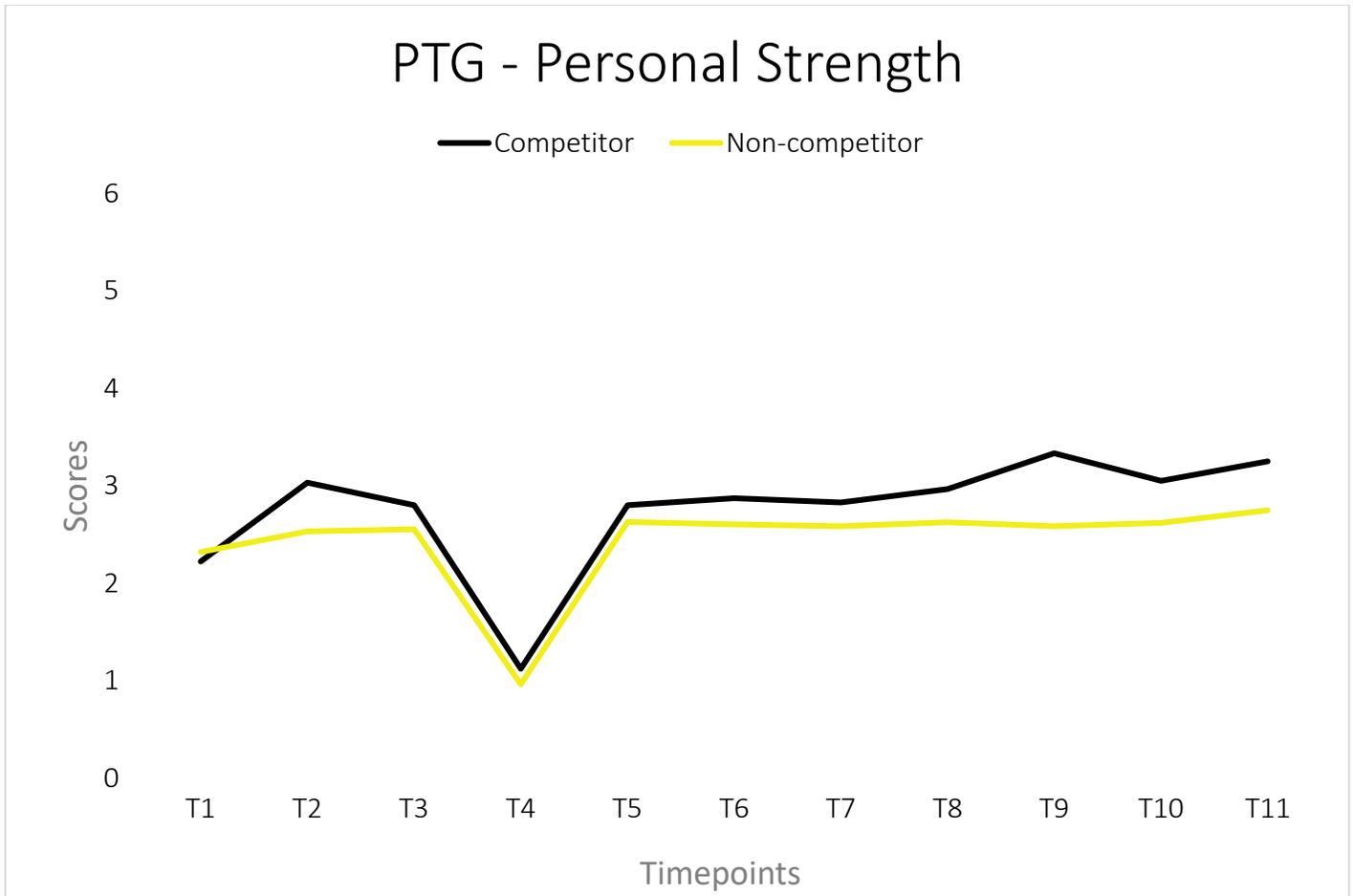


Figure 62. Invictus Games The Hague - Post-Traumatic Growth - Personal Strength by Competitor Status

The trends in *Figure 62* suggest greater personal strength among competitors compared to non-competitors, with a trend towards improvement in the long-term. Competitors’ personal strength peaks post-Games. However, as with the other post-traumatic growth subscales, the decrease in new possibilities at the first COVID-19 timepoint in May 2020 is remarkable. Analyzing based on the post-COVID data there was no significant difference for competitors’ personal strength compared to non-competitors (beta= -0.09, 95% CI -0.47 – 0.29, $p = 0.643$).

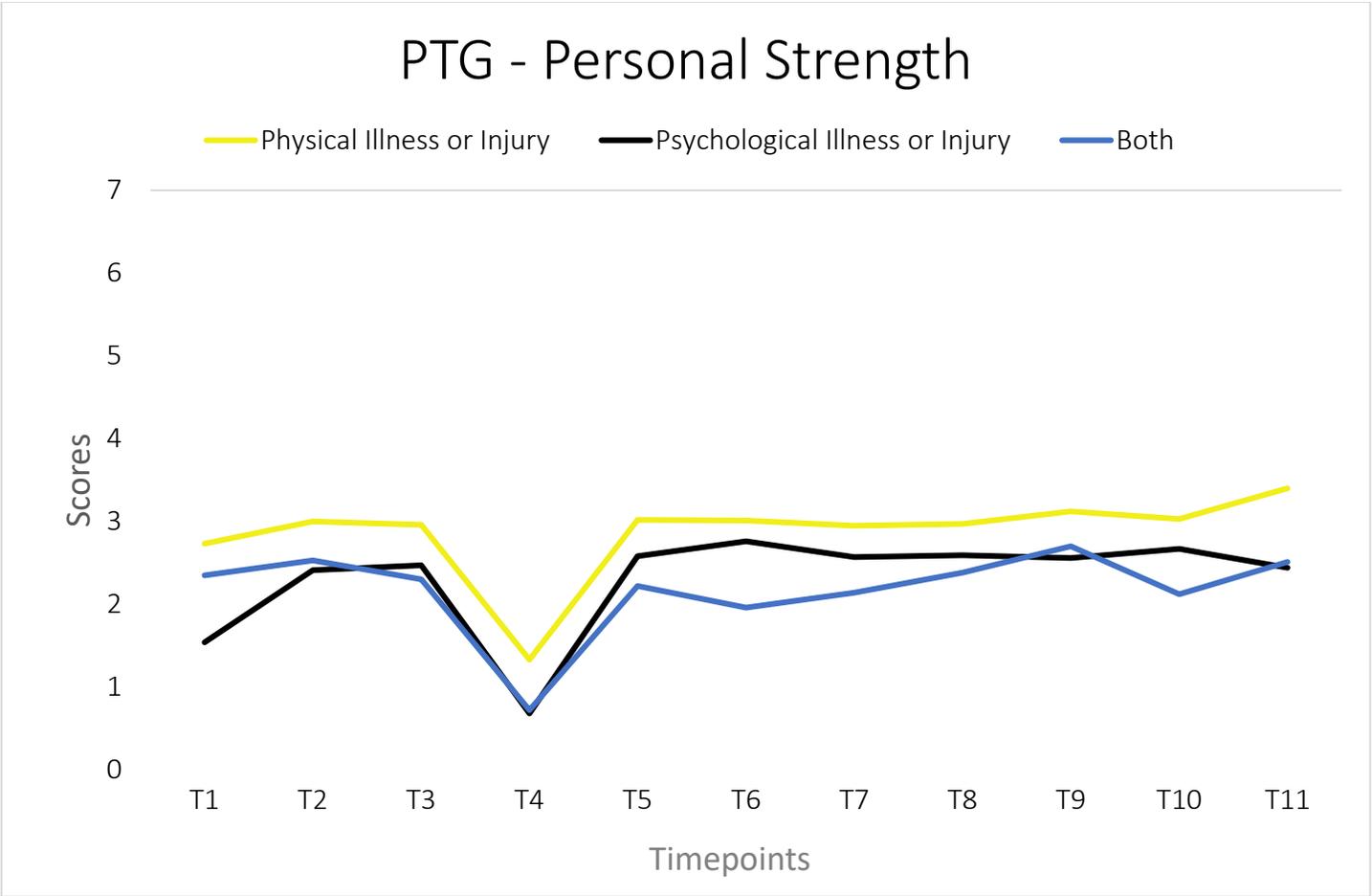


Figure 63. Invictus Games The Hague - Post-Traumatic Growth - Personal Strength by Type of Illness or Injury

As with the other Invictus Games The Hague psychosocial measures, the data indicate that competitors and non-competitors experiencing psychological illnesses and injuries had decreased personal strength compared to those experiencing physical illnesses or injuries (beta= -0.43, 95% CI -0.76 - -0.09, $p = 0.012$).

6.3. Interview Results

Understanding the impact that participant dropout would have on our ability to demonstrate significant findings from the Invictus Games The Hague surveys, questions about Invictus Games The Hague experiences were integrated into the COVID-19 qualitative interviews (see *Chapter 5*). These findings do reflect a “competitor effect”.

Both competitors and non-competitors highlighted the importance of sport for their mental health.

The only reason why I never actually went through with killing myself – but I was self-harming, cutting myself, and basically hurting myself on purpose – was because of the sport. If I didn't have the sport, if I didn't have the exercise, then I wouldn't be alive now. It's as simple as that. We would not be having this conversation.

– Philip, Non-competitor (previous competitor at Sydney), UK

Competitors and their families also described this life-saving benefit of sport in relation to the Invictus Games The Hague.

I would even be willing to say that I'm sure these types of Games have saved the lives of many because I know it's not easy to have your life flipped upside down. To have something there to help redirect it or to get it back – back in the way that it's supposed to be – is a big thing. So, absolutely. I think it's therapeutic. Absolutely. I think it's saved lives. Absolutely. I think not only that but it's also brought joy and happiness to the family members. They may not be suffering from the same injuries as these athletes are but they're suffering alongside them. They're there to support them. I'm sure they've seen the worst of days. But to be there in those moments of those best of days as athlete's compete, as they've had their personal best experiences or setting personal records or whatever might be happening.... I mean, shoot! They win a gold medal and the joy and happiness not just only on the face of the athlete but also the face of the family members is priceless.

– George, Family, USA

While George highlighted the example of winning a gold medal in this quote. He also noted that for some “their victory wasn't finishing first in the race. But their victory was finishing the race.”

The importance of considering the Invictus Games The Hague experience in relation to family was particularly prominent. Many study participants had spouses, partners, or children. These family members motivated them to train and compete. Furthermore, competitors felt it was important for family members, particularly children, to see them accomplish their goals.

I absolutely loved my time out in the Invictus Games in the Hague. I was a little bit taken back at first just because I think how overwhelming it all was. But I think after a couple of days, and settling into it, you kind of get used to everything. It was just an absolutely fantastic experience. Having my husband and my son there with me to kind of experience that with them. And just, kind of, obviously show to them that I am still fun, and I can still do sports, and go out and do different things. And, kind of, put myself back out there into situations that I wouldn't of done [before]. And just kind of highlight to the world and to people and be like, "I am still that woman. I am still able to do sports, different ways, and I'm still able to compete at such a high, kind, of, level." So, yeah, I definitely achieved [those goals].

– Beatrice, Competitor, UK

Another important benefit identified that can be linked to psychosocial well-being was feeling accepted by one's community and, as a result, feeling more comfortable and self-confident.

It's nice because I have this group of friends no matter where I go now. I can have coffee or hang out or go for a workout and they all understand if I'm having a bad pain day I can do this but I can't do that. And there's no judgment. There's not judgment. I was talking to someone in a chronic pain group I was part of yesterday and he was talking about the shame of using mobility devices because he was getting a scooter but he was afraid to use it. And I said, "You know, if it gives you quality of life and makes your life better and you can do stuff you want without pain then there's no shame. Who cares what people think?" And that was what the Games is like. You used the mobility aids that you needed. When I was at the Games, because the Zuiderpark was so big, I used my cane. Nobody batted an eye. It was just, "Okay, you need that, carry on." Even my own teammates who had seen me when I don't need it. It was really liberating that way. You know another teammate's going to be doing the Canadian Army run and she has MS. She said, you know, "I'm having problems bearing weight on my left leg. Do I shuffle along with my cane or do I use my wheelchair." I said, "Use your wheelchair. Enjoy the experience and not worry about having to stay upright." It's been really liberating to me because in society we're so pushed to walk at all costs and using a mobility aid is giving up and stuff. And it's like, "No. it's not." It's your quality of life and expanding what you can do and the experiences you can do. And that acceptance of who we are, where we are in life, was a big thing at the Games, which I really liked.

– Sheila, Competitor, Canada

These findings highlight benefits experienced during the Invictus Games The Hague by competitors and families. They reinforce the graphical trends. They also provide support for the discussion in *Chapter 4* that some impactful personal and social benefits may be difficult to capture through standard surveys.

6.4. Invictus Games The Hague Research Summary

Unlike the Invictus Games Sydney results, we do not see a statistically significant “competitor effect”. This can likely be explained by a number of reasons. Most important, was the impact of the COVID-19 pandemic, a profound shared experience between competitors and non-competitors (see *Chapter 5*). The most notable indication of this burden is the significant drop in post-traumatic growth early in the pandemic. Additional factors include changes to traditional delivery of the Invictus Games and Invictus Games national training programs. These changes included rescheduling of the Games, starts and stops in training due to lack of access to gyms and equipment or uncertainty surrounding the Games, changes as to how training was delivered (virtual communication and participation), and fluctuations in access to coaches and teammates. Finally, and most likely based on graphical trends and qualitative findings, there may also be statistical limitations. The burden from the pandemic resulted in significant drops in study participation. This had two major limitations for the analysis. First, there may have been an insufficient number of participants in the study to demonstrate an effect. Second, we could only examine post-COVID differences as opposed to changes between pre-selection which occurred in 2019 prior to the pandemic and post-Games.

Due to these limitations, and particularly the statistical limitations, there is value in examining the graphical trends across all the timepoints. These trends do support a “competitor effect”, specifically that competitors demonstrated greater health and well-being across most timepoints compared to non-competitors, with differences maintained in the long-term. These findings are reinforced by the qualitative data. The interviews with competitors and family provide compelling examples of the importance of the Games experience for mental health, as well as well-being (family relationships, a sense of accomplishment, and acceptance). As with observational data from Sydney, participants described their experiences as having changed and/or saved lives. Based on the magnitude of these statements, the role of statistical considerations in limiting demonstration of a “competitor effect” is most likely.

As with the data from Invictus Games Sydney, the findings also highlight important implications regarding health and well-being outcomes and type of illness and injury. Once again, individuals experiencing both physical and psychological illnesses and injuries demonstrated poorer health outcomes. As evidence continues to grow regarding the co-occurrence of these injuries and poorer outcomes among individuals experiencing both types of illness and injury, program organisers must respond.^{14,83-87} The findings suggest the need to tailor programming to the unique and complex needs of this population. Unlike the Sydney data, however, the findings also demonstrate poorer outcomes for individuals experiencing psychological illness and injury compared to individuals with physical illness and injury or individuals with both physical and psychological illnesses and injuries for measures of well-being. These results likely reflect the impact of the pandemic and speak to the importance of mental health practitioners screening for the impact of COVID-19 experiences during treatment.



**Chapter 7:
Best Practice Strategies**

Key Points

- All nations face similar questions:
 - Who is ready for participation?
 - How do we optimize rehabilitation through training?
 - How do we support well-being after program completion?
 - How do we support individuals not selected for the Games?
- In response to these questions:
 - Nations choose different combinations of sport and mental skills training.
 - Some nations focus specifically on the Games themselves, while others developed year-round national Invictus programming.
- Through observations, interviews, and surveys with nation staff we identified 71 best practice strategies across the six Quality Elements of the Quality Paraspport Participation Framework. These strategies can serve as guidelines for new nations, onboarding training for nation staff, as well as resources for community programs seeking to promote quality participation and well-being among military personnel with physical and/or psychological illnesses and injuries.
- Analysis from competitor surveys on mechanisms that promote greater outcomes support these best practice strategies. Mental preparation (during training), goal setting (during training), competition strategies (during the Games), and less negative rapport with the head coach (during training) were identified as statistically significant strategies for promoting psychosocial well-being.

This chapter presents findings on best practice strategies that support improvements in psychosocial well-being and health for competitors. These findings are presented in two parts: (1) nation staff perspectives; (2) competitor findings.

7.1 Nation Staff Perspectives

This first phase of the best practice research focused on understanding each nation's approach to the Invictus Games and military sport recovery programming more broadly. Data collection consisted of an iterative process of observations, interviews, as well as a survey.

7.1.1 Phase One: Qualitative Observations and Interviews

From March 2018 through to November 2023,^{vii} an iterative approach was taken to collecting multiple types of data to identify best practice strategies. These included:

- Over 40 interviews with nation staff (team managers, coaches, etc.) representing 22 of the 23 nations participating in the Invictus Games at the time of the study.^{viii}
- Observations of nation training and competition delivery strategies for the Invictus Games Sydney and The Hague.
- Observations at two Team UK selection trials (2018, 2019), a Team France training camp (February 2020), and a Team USA training camp (April 2022).
- Review of documentation provided by nations.
- Online search for publicly available information on national rehabilitation programming.

Based on this data collection and analysis, we identified four critical areas of decision-making for each nation:

- Who is ready for participation?
- How do we optimize rehabilitation through training?
- How do we support well-being after program completion?
- How do we support individuals not selected for the Games?

In this section, we review each of these questions and highlight strategies being used to address each area of decision-making.

^{vii} While all data was collected in relation to the Invictus Games Sydney and the Invictus Games The Hague, the principal investigator used the opportunity presented by the Invictus Games Düsseldorf 2023 to meet with additional nation staff from existing Invictus nations to reflect on findings, and see if there were changes in perspectives or practices after The Hague. These Games also presented the opportunity to collect data and integrate findings from three new Invictus Games nations (Colombia, Israel, Nigeria).

^{viii} Georgia did not participate in interviews due to language limitations and scheduling availability. However, information about Georgia's programming was provided by IGF. In addition, Georgia had participated in interviews for our previous research so we had an understanding of their programming. Georgia was also still included in observations.

Who is ready for participation?

For international competition like the Invictus Games, nation staff must consider how to build their team. Nations are guided by a number of factors, for example the prominence of different types of illnesses or injuries in their military or goals set internally for diversity in gender or race and ethnicity. For example, some countries have Service Members or Veterans with more psychological than physical illnesses or injuries. Meanwhile, other countries, like the Republic of Korea, have been driven over time to consider diversity in gender for team composition, with the goal of equity of opportunity and access for women. Across all countries, however, one key question is considered beyond these demographic factors: who is ready for participation or who can become ready by the time training is completed and the Games take place? For most nations, this is determined by the following factors: (1) psychological, physical, and social readiness; as well as (2) an understanding of how the Games can benefit the individual.

While sport in the context of the Invictus Games is a platform to promote rehabilitation and a transition to physical and psychosocial well-being post-illness and injury, it is not necessarily viewed as appropriate for all individuals and all stages of rehabilitation. Nation staff discussed how not all individuals who wish to participate in the Games are healthy enough post-rehabilitation to commit to training requirements and participate in vigorous activity. More importantly, Service Members and Veterans early in the rehabilitation process may be too vulnerable and not prepared for the crowds, noise, and other demands of the Games. Nations vary in their response to determining readiness during team selection based on the size of the country, the structure of military rehabilitation programming, and the number of Service Members and Veterans in the country. As such, the application and selection process ranges across nations from virtual applications to in-person trials through to select invitations to potential participants. Each approach is detailed below. It is important to note that some nations use a combination of these approaches such as a written process to disclose interest followed by assessments during a multi-sport camp or trial.

Virtual applications: Virtual applications were considered particularly valuable when there is the potential of high interest with a limited number of spots on the team and no ability to develop trials and camps to engage with applicants before selection (either due to nation size or finances). In this case, individuals provide information on their illness and/or injury and how they believe they can benefit from the Invictus Games experience. This information is then reviewed by a committee of stakeholders.

National in-person trials and camps: Individuals can register to attend or are invited to attend pre-selection camps or a national trial competition. This concept stems in many ways from the original inspiration for the Invictus Games: the United States of America's Department of Defense Warrior Games. The Warrior Games culminates an individual's adaptive sport recovery experience through a week of sport competition between the different military service branches. Nation staff noted that these national trials or camps provide a number of benefits. First, they provide the opportunity for individuals (and their families if the nation integrates family into the event) to experience sport recovery competition even if they aren't selected for the Invictus Games, with many integrating a number of elements from the Games including opening ceremonies, attendance of political leaders, distribution of tickets to schools and civilian organisations, medals, and event activations. They can also serve to publicize the experiences of military personnel and

their families to the broader military community or the civilian population. Here, we see the example of Poland that includes fun civilian games and school competition with prizes at a one-day national veterans sports event. However, from a selection standpoint, these events also provide nation staff with an opportunity to watch how an individual approaches sport, deals with competition, and interacts with others. In addition, these events also provide an opportunity for in-person interviews or assessments by psychologists and other medical personnel.

An example of the in-person trial approach is the three-phase selection process practiced by Team Ukraine and shared by the Team Manager in an interview during the Invictus Games The Hague.^{ix} The Ukrainian team typically begins the selection process 9 months to a year prior to the Games, with one year considered preferable. Phase one consists of promoting knowledge about the Games. A mass media information campaign is disseminated across the Ukraine for two months to spread the word about team trials, with a focus on getting the message to non-governmental organisations, local Veteran centers, local authorities, hospitals, and local media. The Team Manager, a trained coach, a medical professional, and a psychologist then go on a road show for 1-day events in three parts of Ukraine: a Western city, a Southern city, and Kyiv. This is not a trial but a way to test the water to determine readiness of potential applicants. These one day events also allow individuals to try different sports under the supervision of medical professionals to increase a sense of safety. No previous training is necessary. From there, individuals can decide if they want to register for the trials.

Phase two consists of National Trials. At time of interview, Ukraine held one trial, or as was the case during COVID-19, two trials in different regions of the country. To register for the trials, applicants must send medical information, including a certificate of combat participation,^x medical information with a diagnosis, and information on their sports of interest. This information is reviewed and one week prior to the trials applicants are sent classification information, with the opportunity to be re-assessed during the trials. The country then hosts a two-day trials event, with a parade, family recognition and attendance, and appearances from top governmental leaders including the President of the Ukraine. The Team Manager highlighted that ideally it would be longer than two days. However, the team believes a two day minimum is essential to provide the required experience with one day focused primarily on building a sense of community. The inclusion of an opening ceremony, media coverage, governmental and military recognition, and family inclusion are important experiences for the applicants. The Team Manager noted that while nothing can replicate the Invictus Games experience, it is still important to provide a similarly meaningful national experience to support the rehabilitation of those who won't be selected.

During the two days of the national trial, individuals compete in different sports. At the same time as the competition, individuals undergo psychological assessments. These assessments must be passed to have the opportunity to be selected. Ten psychologists are on site from one day before the trials through the end of the trials to be able to complete the assessments in the available time. However, this process sometimes continues post-trials. These assessments were described as important for 3 reasons: (1) to know if an individual is ready for sport-based rehabilitation and

^{ix} Please note that there is the potential that nations have changed practice between data collection, time of publication, and in particular, time of reading. National changes to programming may be particularly true for nations engaged in military conflict at time of writing like Team Ukraine or Team Israel.

^x It is important to note that not all nations require these documents. Furthermore, not all nations require that competitors have combat experience.

what resources may be needed to support them (e.g., Do they have an alcohol or drug abuse disorder? Or any undiagnosed or unknown mental health conditions?); (2) to understand their motivation for participating in the Games, and determine if they have the motivation and discipline to following a training schedule; and (3) understand an individual's social skills and what their role might be on the team (e.g., Could they be a mentor? Can they help and support others?).

After the trials, the selection process moves into phase three. This phase consists of determining who will make the team. In making the decision, psychological assessments, as well as sporting results and reviewed. Individuals are assigned points with sport performance only 10% of the final point total. A committee then meets to discuss team selection. To try to support objectivity in the selection process, no team managers or coaches are on the committee. The committee consists of military representatives, representatives from the Veteran community, a medical professional, a psychologist, and the Minister of Veterans Affairs (or a representative from this office). The committee are given recommendations from the psychologists. However, also important to the recommendations are an individual's story, whether they can benefit from the Games, and their medical documentation. The committee then discusses the recommendation over the course of 2-3 meetings. Once a decision is finalized, a public announcement is made. Those who are not selected are added to a database for future opportunities, included in other sporting events, and provided with opportunities to connect with other organisations or Service Members and Veterans with illnesses and injuries in their city.

Invitations to select individuals: Nations with extensive existing adapted sport infrastructure may choose to identify individuals based on previous program participation. This approach is also practiced in some nations with a smaller number of Service Members and Veterans with illnesses and injuries. In these cases, there may be a focus on identifying individuals who have not had access to previous rehabilitation programming and have demonstrated need for support.

Integrated with these approaches are also different models for situating the Games within rehabilitation programming. Some nations have multiple programming options with individuals choosing their own pathway. Other nations have pathways that situate competition including the Invictus Games as a final step in rehabilitation to fully ensure that participants are ready for competition and large-scale sporting events. One example of this model is France. Upon completion of any acute medical- or hospital-based rehabilitation, French Service Members and Veterans with illnesses and injuries are provided with the opportunity to participate in a multisport camp and/or a week of equine therapy. From there, individuals have the option to sign up for the "AD VICTORIAM" program. AD VICTORIAM is Latin for "To Victory." The program consists of a series of sport camp challenges that take place each month for a year. Each camp takes place in a different city, is two days long, and consists of a different type of sporting activity or challenge. The goal is not to win the challenges or to demonstrate sporting success for each activity but rather to participate regularly. Participants receive points for every camp attended. A yearly AD VICTORIAM ceremony is then held during which those who attended regularly are recognized and the individuals with the most points (indicating greatest attendance) win an award. It is after completing AD VICTORIAM that Service Members and Veterans then have the option to participate in high-level competitive adapted sport such as the Invictus Games or other international military sport competitions. At the same time, Service Members and Veterans also have the option to engage in family programming that focuses on more recreational sport activities

for Service Members and Veterans and their families. Practiced by several nations, the advantage of this model for situating competition in rehabilitation is a greater understanding of participant readiness for high-level competition and any supportive care that an individual might need, particularly for their mental health, when competing.

How do we optimize rehabilitation through training?

When determining how to optimize rehabilitation through sport, an initial question that all nations consider is whether to situate sport programming within the military or with a Veteran or civilian organisation. Often, there is a hybrid model which emulates the reality that many participants are transitioning from military to civilian life. As such, there may be a partnership between the Department of Defence and a Veteran organisation or a national parasport organisation. In conversation with nation staff from Estonia and Italy, collaboration with civilian organisations - in their cases, national parasport organisations - is valuable for promoting quality participation through access to accessible facilities and, for some sports, highly-trained coaches. This can be especially valuable if the nation has a smaller national military sport rehabilitation program and low number of Service Members and Veterans with illnesses and injuries, which limits the building of military specific facilities and hiring of coaches. Team Estonia representatives further noted the value of collaborating with a civilian organisation as a means to promote civilian awareness of Service Members and Veterans with illnesses and injuries. Furthermore, it can benefit recovery by exposing military personnel to life outside the military, improving understanding for the transition to civilian life. It is important to note that based on changes in nation staff leadership, national perspectives, and funding availability, whether the programming follows a military-led approach, a civilian-led approach, or a hybrid model can be fluid.

Even if programs did not involve collaboration between military and civilian organisations, many nation staff highlighted that sport-based rehabilitation for Service Members and Veterans experiencing physical and/or psychological illnesses and injuries requires a balance between military structure and autonomy-supportive behaviors reflecting civilian style programming. This perspective was based on the belief that because individuals had a background in the military, they were likely used to and found comfort in some structure. However, as noted above, because they were in rehabilitation and were likely in the process of having to transition to civilian life, nations also wanted to support independence and autonomous decision-making. For some nations, this balance was practiced by providing detailed and structured schedules with dedicated blocks of free time that would allow individuals choice for how to spend parts of the day. One example is from Invictus Games Team Germany. Team Germany prepares printed booklets during the Games for each competitor. These booklets have schedules with each event, notes which events are sport or social, and which are mandatory or optional. Participants are also given space to create their own itinerary with additional Games events or family and friend commitments. This booklet is given alongside a second booklet, a journal, for competitors to document thoughts and feelings about their experiences.

Dienstag 19.04.2022

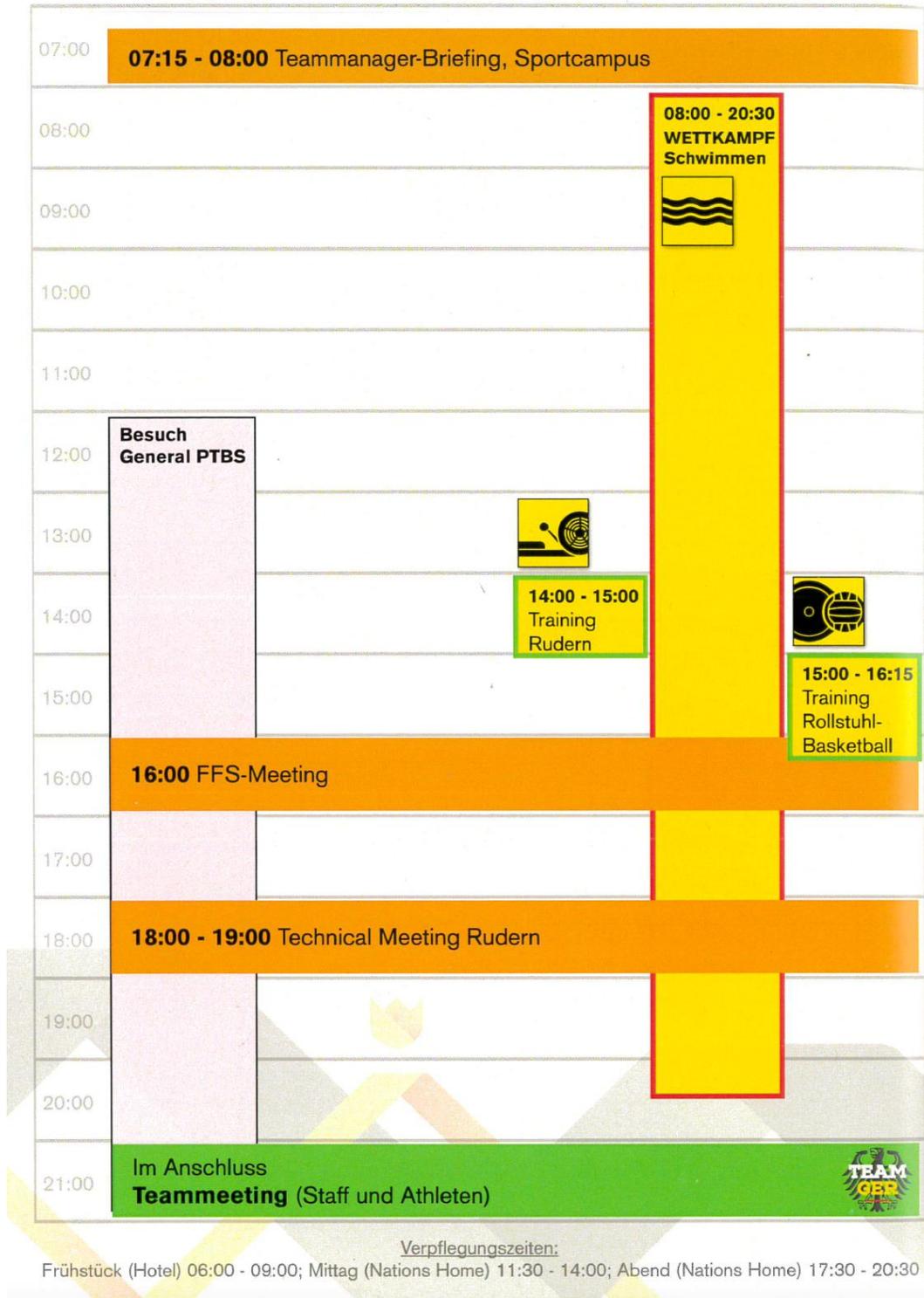


Image 1. Team Germany Schedule for the Invictus Games The Hague (April 19, 2022)

Dienstag 19.04.2022

Training / Eigene Notizen:
07:00
08:00
09:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
20:00
21:00

Verpflegungszeiten:
Frühstück (Hotel) 06:00 - 09:00; Mittag (Nations Home) 11:30 - 14:00; Abend (Nations Home) 17:30 - 20:30

Image 2. Blank itinerary for the same day, allowing competitors to add additional events

To optimize the potential for rehabilitation during what often averages to a year of formal training for the Invictus Games, several nations have also implemented ongoing classroom-based resilience training focused on mental fitness (e.g., goal setting, behavior contracts, implementation intentions, mindfulness training, etc.). Of note, in many ways this training parallels or is adapted from the resilience training implemented by many nations to prepare service members for combat. One example of this approach is Team Denmark. Every Team Denmark competitor works with the Team Manager and social workers to develop a Personal Development Program. When building the individualized program, competitors have to reflect early on how they will transfer the skills and rehabilitation achieved during the Games to their personal life. Central to this approach is goal setting and determining how psychological, social, and physical/sport skills developed during training will be implemented outside of the military and the Games after the competition has ended. Competitors also have the option for interdisciplinary discussions, with staff embedded in the national training program who can support competitors in employment, education, housing, and pensions. This early planning, monitored throughout training, the Games, and post-Games, and multi-faceted support has demonstrated impressive results in promoting successful long-term physical and psychological rehabilitation and a transition to civilian life. An important aspect of being able to deliver this type of quality resilience training to Danish competitors is staff training. To support staff in their work assisting competitors in developing the programs and helping competitors successfully follow the plans, staff receive training and in-depth briefings on post-traumatic stress prior to the selection process. Other nations have developed their own versions of this approach and also integrated other tools to support mindfulness and well-being, such as Team Germany's use of journaling (noted above) and Team Colombia provides access to programs that help Service Members and Veterans write their stories and experiences to develop them into books.

Indeed, while approaches differ, all agreed that mental fitness, and particularly goal setting, was important. Furthermore, discussions centered on encouraging goal setting that is not solely framed in terms of training and sport goal but centered on what happens starting the day after the Games, in-relation to key life domains like personal well-being, family, education, and employment. Focusing on planning and goal setting for post-Games creates an essential narrative of the recovery experience as a journey with the Games as one marker on the path of rehabilitation. The Games as a springboard but not the be-all and end-all of recovery was considered an important component for maintaining mental health outcomes post-Games. Alternate approaches that avoid these considerations were seen as likely to result in concerns about competitors only working towards the event itself and then experiencing a decrease in well-being post-Games with competitors having no other goals or plans for the end of the Invictus Games journey and the return to daily life.

A final approach to optimizing recovery experiences during the Invictus Games was implementing guidelines for choosing a sport. After multiple Games, some nations believe there is value in participating in one individual and one team sport. This approach would allow competitors to develop mental strength and commitment to training on their own. However, they would also be able to build social connection and tackle any concerns related to social interactions (e.g., a preference for isolation due to anxiety or depression) by having to be part of a team and work with others to achieve a goal. Other nation staff also discussed that they may potentially implement future guidelines around the number of sports in which individuals can compete. Some competitors view engaging in as many sports as possible as a challenge and a way of fully

experiencing the Games. However, as the Games have continued, there is also a belief that the benefits of the Games occur not only through sport but through fully experiencing the Games, specifically by finding a balance between sport competition and down-time during which competitors can spend time with their families and friends, connect with their teammates, or connect with competitors from other nations. This free time also allows competitors to experience other events and celebrations affiliated with the Games (e.g., Invictus Games village musical performances, employment or research exhibits and conferences, and company activations) without concern about how it may impact their performance. Finally, those who compete in too many events may sometimes leave training and the Games fatigued and/or with sport-based injuries. This outcome contradicts the goal of experiencing physical and mental benefits.

How do we support well-being after program completion?

Supporting well-being post-competition involves maintaining a sense of belonging with the team and continuing to foster autonomy and mastery. While some nations maintained social media groups, there were other more personalized strategies identified by nation staff as important. First, and most often discussed, was the value of in-person meet-ups post-Games, particularly 1-3 months post-Games. This opportunity may be limited based on competitor commitments, financial resources, and nation size, in which case some suggested virtual meetings as a second option. However, several nations consider these in-person meetings essential for avoiding any post-Games dip in social connection, psychological well-being, and sport motivation. It is an opportunity, as noted by Team Netherlands, to get together again, post-discuss lessons learned from the Games, what can be improved, and reinforce post-Games plans and next steps for competitors and their families.

An additional strategy was post-Games phone calls and texts from coaches to check-in personally around two weeks after the Games. These calls provide an opportunity to touch base with competitors to ensure that they are continuing to set goals, implement their plans, and be active as they return back to daily life post-Games. This personal touch was viewed as important in demonstrating that there remained active interest in the individual as a person and not just as a competitor.

A final strategy was the development of national “Invictus” organisations. An example of this final approach was the development of “Invictus Australia” after the Sydney 2018 Invictus Games. Invictus Australia allows competitors to maintain their link to the Games and have access to programming after competition, while also providing non-competitors with opportunities to engage in national Invictus programming. Invictus Australia partners with national sport organisations and major sport groups to provide local sport opportunities for Service Members, Veterans, and their families. Multiple sport opportunities are available at both recreational and competitive levels. A key aspect of the approach is to include both military specific physical activity programming as well as programming that integrates military personnel with civilians. This focus allows those that wish to maintain a military identity to remain connected with military adapted sport programming. However, by integrating military personnel with illness and injuries with civilian sport programming support is also provided for the transition to civilian life. Those who may wish to integrate more with civilians but maintain aspects of their military identity are able to do so wearing jerseys as part of a “Team Veteran”, a running club for Invictus Australia participants participating in parkrun. In addition to supporting the transition to civilian life, this

approach can also help increase societal understanding of the experiences of military Service Members and Veterans with illnesses and injuries and potentially mitigate stigma towards disability, additional important goals of the Invictus Games organisation.

How do we support individuals not selected for the Games?

Selecting some individuals for the team means saying no to others. How to support this group of non-competitors is an ongoing consideration, particularly so as not to harm their well-being. Some nations have to say no to hundreds of applicants and some to only a few; however, regardless there will be non-competitors who feel upset. This feeling of anger can be intensified among those already experiencing mental health concerns. To address these potential issues, nations seek to focus on transparency during the selection process and approaches for integrating individuals into the Games, training, or other programming.

One interesting approach is Team Romania. Romania has a number of sport events that take place as part of Team Invictus throughout the year so individuals have the opportunity to build a sense of belonging, be active, and build an Invictus identity regardless of whether they compete in the Games. When it came time for Sydney 2018, family and friend spots (every competitor at the Invictus Games gets the option to bring 2 family and friends to experience the Games with them with all costs covered) were given to non-competitors. This provided the non-competitor with the option to still experience the Games themselves and the possibility to gain an understanding of the context should they wish to participate in a future Games. Other countries also provide those who aren't selected with the opportunity to still participate in training camps. Meanwhile, in discussion with the Team Manager from Denmark, thought is being given to methods for expanding the Personalized Development Program to non-competitors through support from team social workers.

While the approaches above highlight steps taken after selection, nation staff also discussed the value of taking steps for transparency in the selection process during initial touch points with applicants. A member of the research team had the opportunity to attend the Team UK selection trials for Sydney 2018. During these Games a briefing was held for all applicants. The briefing was led by a team leader, sport psychologist, and team mentors (competitors from previous Games). The briefing started with a video about the Invictus Games. There was then a presentation from a team leader about how to make the most of the training journey regardless of selection. Following this discussion, the selection timeline was discussed as well as factors that influenced selection decisions. This was accomplished through a true/false game where statements were shared and the audience had to decide whether that common statement about selection was true or not (e.g., "If I was a reservist last year, I will be top of the list this year" OR "If I am not fastest or strongest, I will not be selected."). The briefing was then handed over to the sport psychologist and the three team mentors to discuss the team mentors' Invictus Games journeys. The section on selection ended with smaller breakout group discussions led by the team mentors on topics including "Why the Invictus Games?", "What changes have you already noticed in yourself?", and "What do you think you will be proud about from your trials experiences?" Notably, in a bid to celebrate the journey to the trials and the benefits of the journey that can occur without participating in the Games, presenters identified individuals in the audience who had attended trials the previous year and asked them to share how they benefitted from the trials experience. The session ended with a presentation from the Endeavour Fund, with the speaker highlighting

opportunities available “beyond the Invictus Games.” While individuals may still get caught up in their performance during a trial and be upset that they weren’t selected, ultimately this session likely helped many to understand the process, reframe their experience, and consider other opportunities.

In addition to transparency, providing additional support and tailored opportunities (such as the option discussed about regarding the Endeavour Fund) were also deemed important. A focus on connecting those that aren’t selected with opportunities is prominent across all nations, with other opportunities including international and national sporting events (CISM, Warrior Games, etc.). For example, Team Poland and Team Netherlands connect individuals with local Veterans centers, while Team Ukraine seeks to connect individuals and adds them to databases so they can be contacted for participation in other sporting events.

7.1.2 Phase Two: Quantitative Surveys with Nation Staff

Which delivery strategies were determined by nation staff to be important for promoting the best long-term outcomes for program participants? To answer this question, the research team conducted a content analysis of interviews, observations, and any documentation provided by the nations to identify a list of strategies. This list of strategies was integrated with existing quality participation strategies identified by the Canadian Disability Participation Project. These latter strategies were adapted to the context of the Invictus Games. Strategies were organised according to quality element of participation (it is important to note that some strategies foster multiple elements of participation and were thus duplicated across elements). Nation staff were then asked to rate the importance of the strategies (final list included 165 strategies) across the 6 experiential elements of participation. *For further details on research methods, see Chapter 3.*

7.1.2.1 Demographic Information

A total of 20 nation staff participated in the survey. They held diverse roles including team manager, coach, medical staff, physiotherapist, and sport psychologist.

Their demographic information is presented below:

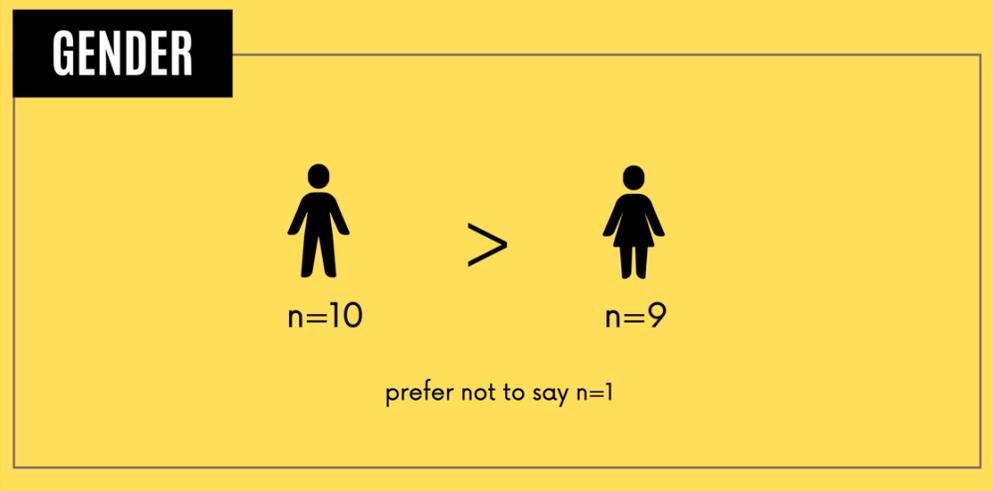


Figure 64. Best Practices Survey - Gender

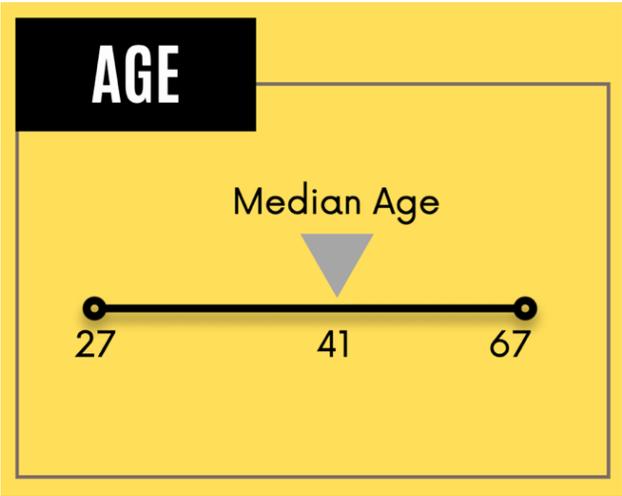


Figure 65. Best Practices Survey - Age

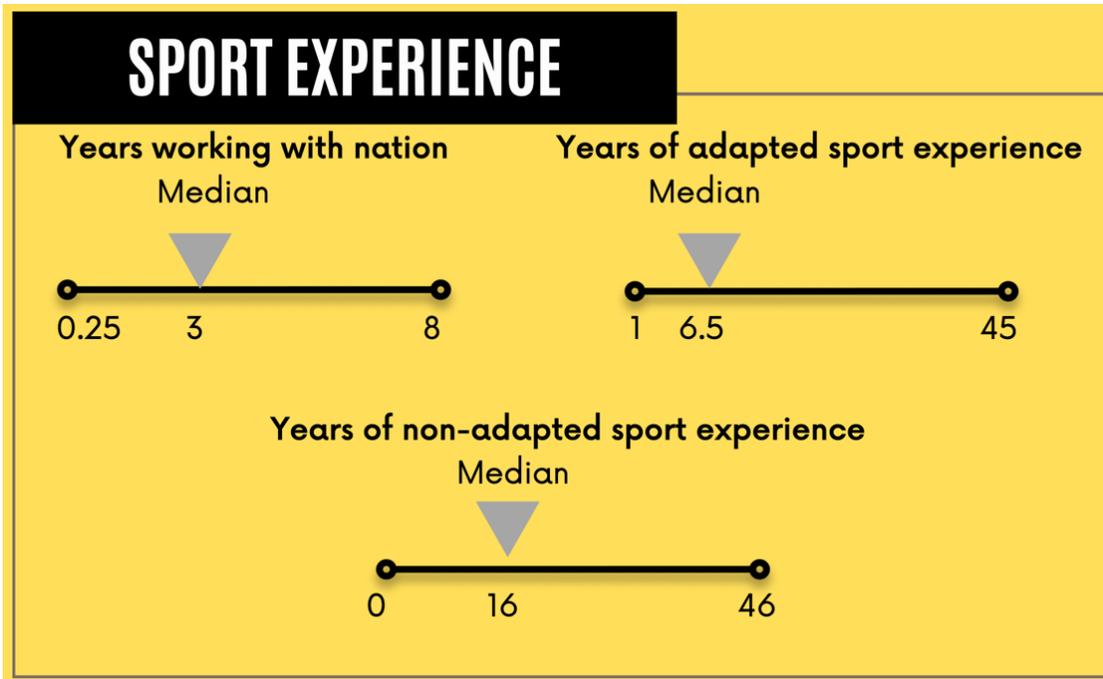


Figure 66. Best Practices Survey - Sport Experience

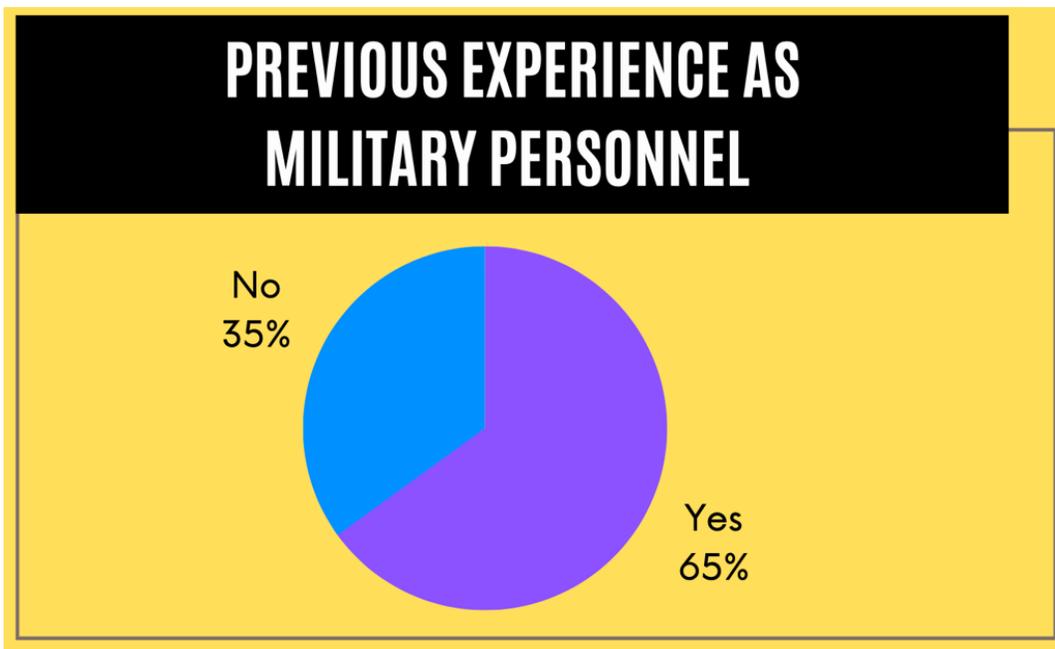
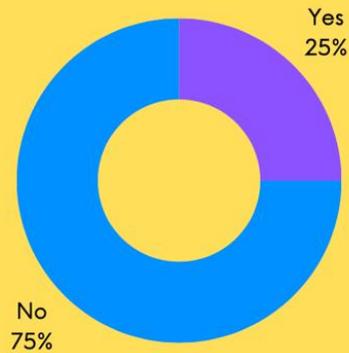


Figure 67. Best Practices Survey - Military Experience

SPORT PARTICIPATION

Currently participate in sport



Highest level of sport participation

Figure 68. Best Practices Survey - Sport Participation

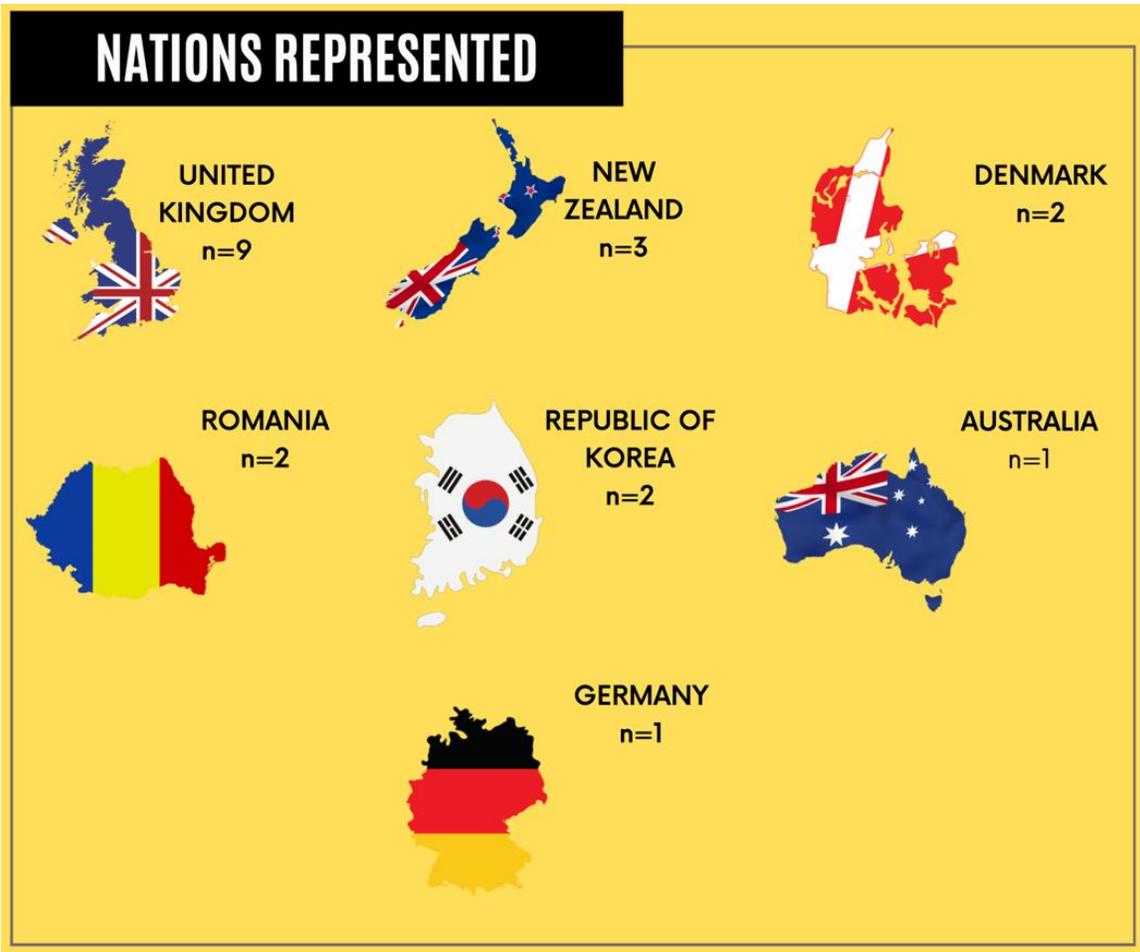


Figure 69. Best Practices Survey - Nations Represented

7.1.2.2 Results

All strategies were rated as important except for three:

- *Nation staff and coaches are military personnel (Belonging)*. Interviews with some nations and competitors suggested that this characteristic was important for staff and coaches to understand and connect with the competitors. However, as noted above, some nations prefer to situate their programming outside of the military or to focus on civilian integration in order to promote the transition to civilian life. In these cases, there would be less focus on military status as a requirement for staff and coaches. Some nations may also have fewer resources or be smaller, in these cases the focus may have to be on who is available or who has sport knowledge before considering their military status. Thus, the importance of this strategy likely varies significantly by nation.
- *Nation staff and coaches have disabilities (Belonging)*. As with the previous strategy, some nations and competitors suggested that if nation staff and coaches had disabilities they could better connect with and understand the team. Some nations also had programs to integrate former competitors into coaching staff in order to address this strategy. However, as with the previous strategy, the importance of this strategy likely varied by nation, particularly based on their goals for the programming and the availability or knowledge of coaches with disabilities who were available for inclusion in the team.
- *Competitor selection should be completed by an independent group with little to no representation from coaches to reduce bias (Engagement)*. This strategy was highlighted by a small number of nations in order to address suggestions of bias in the selection process. However, other nations' selection processes may rely on previous knowledge of the potential competitor for selection. Furthermore, other nations may not have access to the number of knowledgeable individuals available for an independent group to conduct the selection process.

Excluding the 3 strategies above, 163 strategies had a final average score demonstrating importance. However, ratings fluctuated across participants, and only 71 of the 163 strategies were rated as important by all participants. As such, in this document, we focus on presenting this final list of 71 strategies. The 71 strategies are organised according to each quality element of participation. Strategies are presented in order of importance. Each strategy is presented with examples of implementation from different national teams, which were either discussed during interviews or observed during training camps, selection trials, or the Games.

Note for implementation. While we highlight these strategies and examples, it is important that they not be interpreted or upheld as a checklist of requirements for program delivery. Every nation, team, or organisation will have different missions, goals, and resources that will influence how and why programming is delivered. The interpretation and usage of these strategies must accommodate these varied aims and perspectives. As such, rather than a rigid set of guidelines, during implementation, these strategies should instead be viewed as a menu of options for critical consideration. The goal is to support staff in identifying elements and sample strategies that may be useful to their aims and help serve the goals of their unique recovery program.

Table 6. Autonomy Strategies

Strategies	Implementation
<p>#1: Competitors are encouraged to think about goal setting</p>	<p>All nations include formal or informal goal setting. Informal goal setting is reflected in encouraging competitors to set goals regarding their participation and goal setting for after the Games. Formal goal setting involves resilience training with formal sessions on goal setting for short-term (the Games) and long-term (how to use what they learn from the Games to support recovery and life after the Games). (see <i>“how do we optimize rehabilitation through training”</i>)</p>
<p>#2: A physically accessible training space is provided (e.g., wide entrances and exits; space to access equipment independently)</p>	<p>Access to this type of training space varies based on the country, as well as nation accessibility regulations for buildings. Some nations either don’t have physically accessible training spaces or access to sport training facilities that also have residential space (for multi-day camps) and multiple sport participation components. In this case, we have seen nations partner for training purposes. For example, France hosted Belgium at their National Center of Defense Sports (C.N.S.D.).</p>
<p>#3 Training equipment is adapted to meet participants’ needs</p>	<p>Service Members and Veterans with physical and/or psychological illnesses and injuries present with diverse adaptive needs to participate in sport. The sport of archery at the Invictus Games provides an excellent example. Some competitors may need assistive devices (custom draw, release aids, mouth tabs, wheelchairs) while others may not. Having this different equipment available at competition or training (or helping competitors gain access to the equipment that meets their specific needs ahead of time) allows them to participate in the sport. Nation staff often work with competitors to determine what adaptive needs may exist. Some nations provide funding to allow individuals to purchase or rent their own adaptive equipment.</p>
<p>#4: Participants have the option to try different sports and choose which sport they want to compete in</p>	<p>This strategy suggests providing individuals with the option to try different sports so they can determine which ones they enjoy and would like to pursue further. Some nations have taster sessions as part of their pre-selection camps, whereby individuals can try different adaptive sports. Other nations ask potential participants to select a sport without Invictus Games taster sessions but have other multi-sport camps separate from their Invictus Games programming. These taster sessions do not have to be long but allow the individual to watch and participate in the sport, understanding what the adaptive version of the sport feels like and what the rules are. A note that some nations do implement rules about the number of sports an individual</p>

Strategies	Implementation
	can compete in so that they are not overtraining and aren't only focused on competition during the Invictus Games. Other nations set guidelines that individuals must participate in one team and one individual sport so as to gain diverse skills.
#5: Competitors can choose to modify the activity or environment to meet their unique needs (e.g., level of assistance provided, whether they need a caregiver present, option to bring their service dog)	This strategy suggests allowing the competitor to choose what adaptations are required to meet their needs. When choosing venues for training (and accommodations for multi-day training sessions), teams ensure that options are available for competitors to accommodate their needs, including additional space for caregivers and service dogs.
#6: Coaches ask competitors for ideas to best address their needs or make adaptations	Competitors may have different combinations of physical and/or psychological illnesses and injuries and may have unique medical needs. It was common during training camps for our research team to see competitors having sideline discussions with coaches about their needs, pain levels, and limb maintenance requirements. Team Ukraine formalizes these conversations during specific training camps early in the training process.
#7: Holding formal goal setting sessions when competitors are guided through how to develop a goal and what their recovery goals will be for the Games	See <i>Autonomy Strategy #1</i> . This formal resilience training often also includes presence of social workers, psychologists, and sport psychology consultant staff to support the goal setting process. Team Denmark integrates goal setting into a multi-faceted personal development plan that is developed with each competitor. The team follows up three to four months after the Games to check in on competitor mindset and discuss whether they are staying on track with their goals.
#8: Decreasing level of prompting and assistance as time goes on to encourage independence	Over subsequent training camps, coaches sought to give less assistance and direction, allowing the individual to focus on their skills and gain comfort in their abilities. Team Denmark noted the importance of decreasing support over time after the Games so competitors can feel comfortable moving on to other programs.
#9: Coaches ask competitors to choose the sport, skill, or technique that they feel is most important to work on	While coaches can have plans for training camps, at the beginning of sessions coaches can provide options for which skill to work on. Coaches can also get feedback between camps for what techniques competitors would like to practice. This strategy is also implemented by nations when allowing competitors to choose their sport.

Table 7. Belonging Strategies

Strategies	Implementation
#1: Show respect, treat participants with dignity	Teams ensure that options are available for competitors to accommodate their needs and that all participation occurs within supportive physical and social environments. Teams also have meetings with all competitors to discuss behavior expectations for the group environment.
#2: Show understanding and ability to deal appropriately with physical or mental health challenges	See <i>Autonomy Strategy #6</i> . Many nations who have the resources integrate social workers and psychologists as team staff in order to ensure that they can support physical and/or mental health challenges.
#3: Build trust and relationships between coaches, staff, and competitors	Social skills, and their importance for group dynamics and relationship building, were important to many nations for the team selection process. Some nations develop private social media channels, and WhatsApp groups to allow communication and relationship-building between training camps. Some coaches also regularly text competitors in the sport(s) they oversee, checking in on progress and challenges. Some nations also share a telephone contact list for all competitors, team staff, and coaches so individuals can reach out to each other directly as needed.
#4: Build trust and relationships between competitors	In addition to private social media channels and WhatsApp groups, some nation strategies included: (a) having roommates for training camps and switching the roommate for each camp; (b) having social events like group dinners and barbecues during team events; and (c) frequent training camps. Some coaches also integrated their own strategies with sport drills that required interaction with multiple teammates and learning everyone’s names.
#5: Implement strategies to help identify and deal with negative experiences	Provide competitors and non-competitors with contact information for individuals with whom they can discuss negative experiences without repercussion to their selection or ongoing team participation.
#6: Be aware of physical or psychological challenges	See <i>Autonomy Strategy #6</i> , as well as <i>Belonging Strategies #1 and #2</i> .
#7: Include training on other aspects of health (e.g., nutrition, sleep)	Coaches discuss how to optimally fuel training and necessary steps for recovery (e.g., sleep). Some nations also integrate mindfulness training. For example, during training camps, Team Ukraine includes evening sessions on “psychosomatic” training with a focus on mental health education and skill-building. Multiple nations also integrate training on nutrition and wellness.

Strategies	Implementation
#8: Focus on what participants can do vs what they can't do	See <i>Belonging Strategies #1 and #2</i> .
#9: Provide a forum for open and honest team discussion during team meetings	Team managers and coaches give the floor to competitors to discuss what they feel is important during team meetings. In one training camp attended by a member of the research team, team meetings were held at the beginning and end of the camp. Time was left at the end of the team meeting for open discussion. Competitors used this time to discuss a perceived lack of cohesion between those who had previously attended the Games and those who had not. As a team, competitors came to an agreement as to how to address this division.
#10: Regular communication from coaches with updates, encouragement, check-ins	See <i>Belonging Strategy #3</i> .
#11: Team bonding activities to integrate previous competitors and new competitors on the team	See <i>Belonging Strategy #4</i> . Bonding activities can include team dinners, social events, and friendly competition in sport events.
#12: Encouraging competitors to train together between training camps	Provide competitors with the opportunity to connect through social media, have an internal team directory with individual's contact info, or connect individuals living close to each other by e-mail.
#13: Providing competitors with coach and staff contact information	Teams create shared social networks and WhatsApp groups so coaches and staff are easy to contact.
#14: Coaches are understanding of competitors' needs and goals, and are able to relate to competitors	Coaches don't just focus on technical skills but also seek to understand the rehabilitation goals of competitors and how they plan to use the Games as a springboard for recovery. Some nations find value in coaches having military experience, individuals experiencing disability, or former competitors. <i>(Note. These latter strategies of coaches having military experience or being individuals experiencing disability did not score as important stand-alone strategies in the survey.)</i>
#15: Having team meetings	Nations hold pre- and post-training camp team meetings. Some nations also held daily team meetings during the Games.
#16: Involve participants in developing programming and team goal setting	Some nations may choose to involve competitors in determining which team sports they would like to compete in. They may also choose to co-develop a team mission and goal. This allows all competitors to feel that they had a say in their experience

Strategies	Implementation
	and contributed to the group, even if they didn't hold any formal or informal team leadership positions.
#17: Family and friends can attend competition as spectators or volunteers	Family and friends are an integral part of the Invictus Games. Family and friends have VIP seating during the Games (sport events, opening and closing ceremonies). There are also specific friends and family events.
#18: Provide family and friends with the opportunity to learn about sport and support their loved one's participation	<p>Family and friends are provided with the opportunity to attend training camps, trials, etc. and may be provided with their own orientation sessions covering the meaning of the competition and the value of sport. Many nations provide the family and friends with separate accommodation so as to allow the competitor to focus on training. Some nations, like Team New Zealand, host a friends and family barbecue so friends and family have an opportunity to learn about sport and connect with teammates and other families before the Invictus Games.</p> <p>Another important consideration here is the inclusion of caregivers, Team Ukraine noted the importance of accommodating any caregivers as full members of the team during training camps.</p>
#19: Creating team social media or chat groups	See <i>Belonging Strategies #3 and #4</i> .
#20: Encouraging support from the military leadership	As noted above, some national programs have different approaches as to whether programming is organised by the military, a civilian organisation, or both. Regardless, encouraging support from military leadership is seen as important. This can help those still actively serving be recognised for their involvement in the Games (and potentially receive support for time away to attend training camps and the Games). Some nations also invite key government officials, including national leaders, to national trials. Others invite military leaders to training camps or the Games themselves. This recognition is important to competitors who may feel forgotten by the military or are struggling with how their military career ended. At one training camp for Team USA, a top military leader attended and presented all competitors with a military coin as a sign of respect. An official American Presidential Delegation was also sent to the Invictus Games The Hague, and special coins were presented to recognize participation and commitment.

Table 8. Mastery strategies

Strategies	Implementation
#1: Be aware of physical or psychological challenges	<i>See Belonging strategy #6.</i>
#2: Ensure consistency in staff and training programs	Skill building requires competitors to have access to the same staff over time so staff can track progress and develop gradual training programs that focus on appropriate skill building at the optimal pace.
#3: Activities or equipment are modified and/or supervised to accommodate skill development	<i>See Autonomy strategy #3.</i>
#4: Coaches are understanding of competitors' needs and goals, and are able to relate to competitors	<i>See Belonging strategy #14.</i>
#5: Use right amount of structure and support	Team Ukraine and Team Germany discussed the importance of finding a balance between structure and independence. Certain timepoints during training were planned and focused on specific skills, whereas others were more autonomous. Some nations noted the importance of decreasing the structure and intensity of support over time during training and post-Games so individuals could feel comfortable and independently able to move on to new opportunities.
#6: Facilities make competitors feel safe to practice their skills	In addition to physical safety (e.g., the right equipment, accessible locations, etc.), this concept also speaks to feeling psychologically safe. For competitors with psychological illnesses or injuries, this may mean considering whether the training space has quiet spaces or is near any loud noises. It may also involve considering who else is using the space (public, military personnel) and the impact their presence will have on a competitor's sense of safety.
#7: More experienced participants model behaviours/provide instruction/offer advice for less experienced participants	Several nations implement a mentorship program and/or invite former competitors to speak to the current team or to be members of the current team, to share their experiences. Teams can also provide opportunities for competitors to learn from peers who may have previous experience in a sport through other teams or programs.
#12: Coach recognizes the progress of a competitor with verbal praise, awards, etc.	Progress recognized does not only have to focus on performance. They can include progress team spirit, effort, and improvement.

#13: Participants are given opportunities to sample different sport activities and progress to higher competitive levels when ready

See Autonomy strategy #4.

Table 9. Challenge Strategies

Strategies	Implementation
#1: Use constructive feedback	<i>See Belonging Strategies #1 and #2.</i> Focus feedback on actionable ways competitors can improve their skills.
#2: Coach understands the participants' needs or goals	<i>See Autonomy Strategies #1, #3, #6, #9, and Belonging Strategies #2, #6,</i>
#3: Activities are modified and/or supervised to accommodate skill development	<i>See Autonomy Strategies #5 and #6.</i>
#4: Give individualized support	Competitors benefit from receiving one-on-one attention tailored to their needs. In training camps, this varied from pulling a competitor aside after training for a discussion of things to work on at home or one-on-one time working on a skill during or after training.

Table 10. Meaning Strategies

Strategies	Implementation
#1: The focus is not only on sport but also on how sport will support recovery, with dedicated focus to personal development programming (e.g. program and training on how to transfer what is learnt to their personal lives)	One example of this approach is Team Denmark. Every Team Denmark competitor works with the Team Manager and social workers to develop a Personal Development Program. This individualized program asks competitors to reflect on how they will transfer the skills and rehabilitation achieved during the Games to their personal life. A key aspect of this program is goal setting and determining how skills will be implemented outside of the Games and in civilian life.
#2: Show participants that they are valuable (either verbally during meetings, in writing, or by inviting speakers to motivate them and share this message)	Showing participants they are valuable was achieved during training camps by inviting speakers (including high ranking government or military leadership) to meet competitors. This was also achieved by inviting staff from national sport organisations to lead training sessions.
#3: Allocation of resources and treatment of competitors is equitable regardless of skills, previous experience, and type of illness or injury	Competitors sometimes complain of unequal attention being given to those who have less likelihood of medaling or performing well at the Games. For example, spending the most time with a “higher performing” group. Coaches can overcome this perception by ensuring that the same quality of interaction is given to all competitors, and all receive feedback to improve their performance.
#4: Not just focus on sport. Provide dedicated sessions to focus on skills that are valuable in life or how what is being learnt in sport can support recovery and day-to-day life outside of sport	<i>See Belonging strategy #7.</i>
#5: Encourage social interaction with peers	<i>See Belonging strategy #4.</i>
#6: Recognize individual contributions	Taking time during team meetings or training sessions to verbally recognize effort and improvement.
#7: Family and friends have opportunities to learn about sport and support their loved one's sport participation	<i>See Belonging strategy #18.</i>
#8: Program fosters opportunities for mentorship (e.g., peer support)	<i>See Mastery strategy #7.</i> Competitors can mentor and support other competitors either in terms of sharing sport skills, coping strategies, or lessons learned during rehabilitation. Some nations, like Team USA or Team Canada, bring competitors back as coaches.

Table 11. Engagement Strategies

Strategies	Implementation
#1: Events have facilities (e.g., quiet space) and equipment available (e.g., earplugs) to support individuals with mental illness or injury	<i>See Mastery strategy #6.</i>
#2: Participation is framed as ongoing journey with Games as just one aspect	<i>See Meaning strategy #1.</i>
#3: Coach asks competitor for ideas to best address their needs or make adaptations	<i>See Autonomy strategy #6.</i>
#4: Competitors can choose to modify the activity or environment to meet their unique needs	<i>See Autonomy strategy #5.</i>
#5: All activities can be adapted or designed for participants with severe functional impairment	All individuals have the option to participate in each sport through modifications in the activity (e.g., classification options and subsequent activity adaptations) or environment (e.g. <i>See Autonomy Strategies #5, #6</i>)
#6: Coach allows competitors to choose the skill or technique that they feel is most important to work on	<i>See Autonomy strategy #9.</i>

7.2. Competitor Findings

The focus of this portion of the best practices research was to determine, based on the competitor surveys, what mechanisms during program delivery (in training and the Games) were linked to increases in competitor well-being. While the research presented in this chapter was originally supposed to combine findings from the Invictus Games Sydney and the Invictus Games The Hague changes to the nation programming delivered in response to COVID-19 resulted in the decision to focus on competitor findings from Sydney 2018 competitors.^{xi}

Competitors were asked to complete surveys assessing coaching behaviors and quality experiences during training (T2) and the during the Games (T3).^{75,76,88} Findings reinforced the results from the best practices identified in part one, particularly the importance of mental skills preparation and goal setting. Findings also highlight the importance of implementing this resilience training consistently over time during the training period. The table below highlights which strategies supported physical health and psychosocial well-being during training and the Games.

^{xi} For demographics information, please see Chapter 4.

Table 12. Significant Best Practice Mechanisms from Competitor Surveys

Outcome	Training	Competition
General Health	Goal Setting (OR 0.53, 95%CI 0.30–0.93, $p=0.03$)	-
Flourishing	Mental Preparation (beta: 0.33, 95%CI 0.57–0.01, $p=0.008$) Goal Setting (beta: -0.35, 95%CI -0.65 – -0.06, $p=0.019$) Mastery (beta: 0.50, 95%CI 0.18 – 0.81, $p = 0.002$)	Competition strategies (OR 0.49, 95%CI 0.25 – 0.98, $p=0.05$)
Satisfaction with Life	Challenge (beta: 0.40, 95%CI 0.03 – 0.77, $p = 0.04$)	-
PTG Appreciation of Life	Mental Preparation (beta: 0.35, 95%CI 0.08 – 0.63, $p=0.01$) Goal Setting (beta: -0.34, 95%CI 0.08 – 0.63, $p=0.02$) Meaning (beta: 0.35, 95%CI 0.06 – 0.65, $p=0.02$)	-
PTG Personal Strength	-	Competition strategies (beta: -0.37, 95%CI -0.73 – -0.01, $p=0.04$)
PTG New Possibilities	Lack of negative rapport with the head coach (beta: 0.63, 95%CI 0.06 – 1.21, $p=0.03$) Meaning (beta: 0.47, 95%CI 0.10 – 0.84, $p = 0.01$)	-

7.3. Best Practice Summary

All nations face similar questions in developing their adapted sport, and particularly their Invictus Games training and competition program. The key areas with ongoing questions and discussion are: creating a selection process that identifies participant readiness, trying to build a program that supports long-term rehabilitation, finding ways to support well-being after program completion (a finding relevant to the long-term timepoints for Sydney and The Hague participant data), and how to support non-competitors.

Our research team identified 71 best practice strategies that were then rated by nation staff as to their importance. A final list of best practice strategies is presented. Decisions as to strategy implementation will be heavily determined by resources available, including funding and physical training space, as well as nation size, which can impact ease and cost of travel. Implementation and importance of strategies will also be impacted by the illnesses and injuries that are more predominant in a nation: physical, psychological, or both. However, the goal is that this list of strategies can help to support evidence-informed decision-making and program development. In conversation with Invictus Games nation staff, these strategies may be particularly useful for new

nations with minimal previous military sport rehabilitation or competitive adapted sport experience, or any organization seeking to develop sport programming to support Service Members and Veterans with illnesses and injuries.

These findings from nation staff and competitors highlight the value of resilience training (e.g., personal development programming, that includes planning, goal setting, and mental preparation). The value lies in the implementation of these strategies during training and reinforcement of these strategies after the Games. Thus, the findings bolster the importance of the time between the Games for consistent delivery of strategies to support long-term health and well-being. For program implementation, this may mean having continuous touchpoints during training with nation staff, coaches, and teammates, as opposed to minimal engagement until Games-time. It also suggests following a post-Games format implemented by some nations with an in-person gathering two to three months post-Games and follow-ups from coaches.

Chapter 8: Conclusions and Recommendations



Key Points

- This research report presents, to our knowledge:
 - The first global longitudinal investigation of the benefits of international adapted sport competition for Service Members and Veterans experiencing physical and/or psychological illnesses and injuries.
 - The first global guide to evidence-based best practices for competitive military adapted sport.
- Three main findings are highlighted:
 - The value of competitive adapted sport
 - Sport as a platform for personal growth
 - Strengthen the entire community
- The research overlapped with the COVID-19, which provided an unparalleled opportunity to explore the impact of the pandemic on this unique population. Findings highlight the value of new eSport approaches to rehabilitation for broadening the reach and impact of sport recovery programming.
- Based on our findings, we present four practice recommendations and five recommendations for future research.

8.1. The Impact of the Invictus Games

The objective of this research was to fill knowledge gaps on competitive adapted sport participation as a means of rehabilitation for Service Members and Veterans experiencing physical and/or psychological illnesses and injuries. In particular, the research team was guided by three questions:

- What are the short- and long-term outcomes of participating in the Invictus Games?
- What components of competitor experiences best support health and well-being?
- What are best practices for delivering competitive sport rehabilitation programming?

Through a comprehensive examination of the health and well-being outcomes of competitors and non-competitors at the Invictus Games Sydney and the Invictus Games The Hague, this research report provides, to our knowledge, the first global longitudinal investigation of the benefits of international adapted sport competition for Service Members and Veterans with illnesses and injuries. Furthermore, by exploring approaches to military sport recovery programming across the 23 nations that participated in the Invictus Games during this project, we also present the first global evidence-informed best practices for competitive military adapted sport programming.

Our findings and recommendations can be summarized across three key conclusions: the value of competitive adapted sport, sport as a platform for personal growth, and strengthen the entire community.



The value of competitive adapted sport



Sport as a platform for personal growth



Strengthen the entire community



The value of competitive adapted sport

Findings for the Invictus Games Sydney 2018 demonstrate a “competitor effect” such that individuals who competed in the Games demonstrated greater physical health and well-being on key outcome measures compared to those who did not compete in the Games, even when controlling for baseline differences between the groups. This finding supports previous research on the value of sport in rehabilitation.^{23,37,39}

Graphical trends demonstrate greater long-term outcomes for competitors but, statistically, these benefits were not always significant. This could be due to the selection process for the Invictus Games The Hague 2020 which were conducted in 2022. Over half of non-competitors started participating in training and selections camps for The Hague during the post-Games timepoints, thus, potentially providing evidence for the decreased difference between groups at this time. This finding suggests the value of the period between the Games and integrating non-competitors into different types of national or IGF programming.

Practice Recommendation #1: Broadening programming to support non-competitors.

Programs should explore ways they can support individuals who are not selected for sport competition so that they continue to work towards their goals. Best practice strategies identified in this report include providing access to other program opportunities that are tailored to the interests of the non-competitor, as well as connecting the non-competitor to other opportunities available through the sport event. For example, significant uptake was seen in virtual eSports among non-competitors during the pandemic.

The long-term findings may also reflect that competitors are changing in ways that might not be captured in our surveys. This is highlighted in the Invictus Games The Hague data. Due to COVID-19 participant dropout – likely due to both the burden of the pandemic and extended length of training for the Games and participating in the research – no competitor effect was demonstrated for The Hague. However, graphical trends demonstrated greater health and well-being for competitors, and qualitative data highlighted that competitors and families viewed the Invictus Games experience as one that saved lives, supported families, and contributed to a sense of accomplishment and acceptance.

In addition to limitations regarding overlap between the Sydney long-term follow-up and the Invictus Games The Hague selection process, it is important to note additional limitations including the lack of pre-selection timepoint for Sydney, as well as the impact of COVID-19, including significant participant dropout during COVID-19. There was also another key limitation:

we were unable to explore differences across nations. While competitors may all share the experience of being an Invictus Games competitor, their nation's approach to the Games results in different experiences prior to, during, and after the Games. This limitation was the result of two factors. First, nations have access to different resources and a comparison may not have reflected training strategies as opposed to nation support and financial resources. Second, due to the differences in team sizes between countries, we did not have equal participation across all countries to run this analysis. However, nations have developed different approaches to the positioning of competition in rehabilitation, selection for the Games, how to deliver training, and how to support individuals that aren't selected. These factors potentially result in different experiences and program outcomes. Based on best practice findings (see *Chapter 7*), some of the national strategies that may have most influenced the findings is how nations approach training (multiple touchpoints vs 1-2 team touchpoints), how they support non-competitors (integrate into Invictus training, other training, or no support), whether they include resilience training into their training camps, and the type of follow-up provided. These latter two points are particularly essential to consider as findings suggest that individuals require follow-up and guidance to maintain physical activity participation, health, and well-being.

A final important finding was the value of the Games for families. Our qualitative data from Invictus Games The Hague competitors and families identified the importance of families as motivators for Invictus Games participation, as well as the value of the Games in supporting the healing of families themselves. These findings support our previous family-focused pilot research on Invictus Games experiences,^{17,59,89,90} which included a conceptual framework for understanding how families benefit from being included in rehabilitation sport experiences, as well as how the benefits for families further reinforce benefits for competitors. This conceptual framework has been reproduced with permission of the authors below. The findings reinforce this conceptual framework. This remains an important area for future research.

Research Recommendation #1: Explore the experiences of family.

Future research should test the conceptual framework, as well as explore the important role that families play in outcomes after illness and injury, the impact of programming on family, as well as how families themselves can be supported through the rehabilitation process.

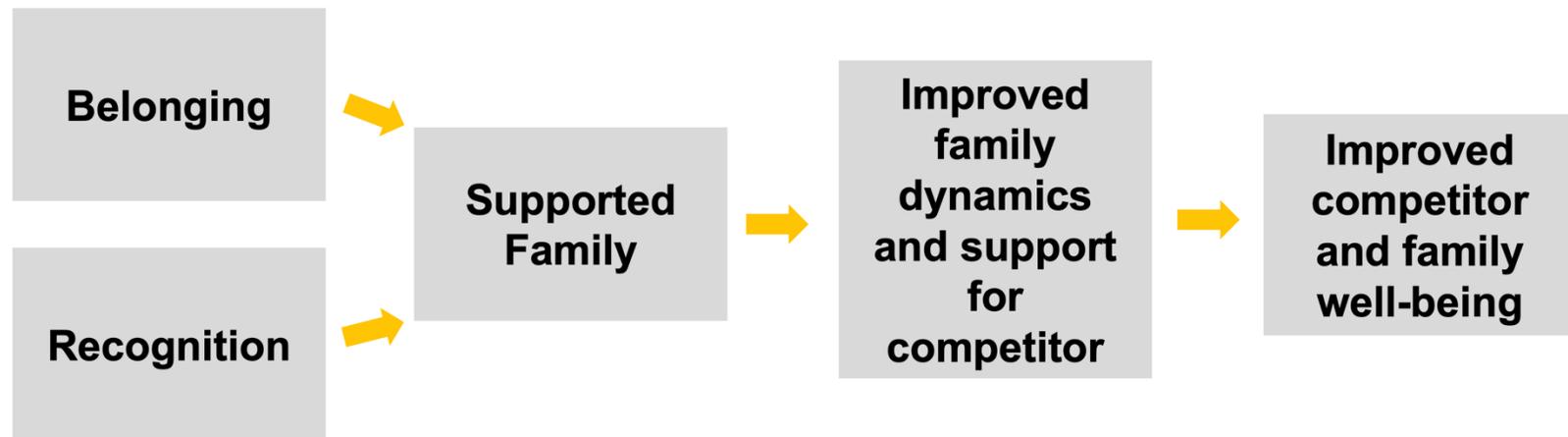


Figure 70. Conceptual Framework on Supporting Military Families through Adapted Sport

The framework provides an outline for how military families can be supported through adapted sport.¹⁷ The adapted sport event provides a sense of belonging for families and recognizes the contributions of families. This leads to more supported families, and improved family dynamics and support for the competitor. The end result is improved competitor and family well-being.



Sport as a platform for personal growth

Most of the research examining physical activity rehabilitation programming for Service Members and Veterans experiencing illnesses and injuries has focused on identifying whether programming is beneficial. However, few have examined *how* these outcomes can be achieved, and specifically what aspects of the program experience contribute to greater health and well-being. This is an important knowledge gap. Programs are proliferating due to an understanding of the benefits of sport participation but without best practices and knowledge of the strategies that optimize program experiences and outcomes, there is no guarantee that Service Members and Veterans experiencing physical and/or psychological illnesses and injuries are experiencing quality programming that supports their needs. This is a population with complex illnesses and injuries facing unique multifaceted challenges during rehabilitation. A specific focus on programmatic strategies that fulfill their needs is essential.

In this report, best practices were explored from both the competitor perspective (through the Invictus Games Sydney 2018 survey data) and through nation perspectives. Findings highlight the importance of resilience training, particularly formal classroom and at-home work on mental skills and goal setting to develop needed skills and determine how to leverage their experiences to benefit life outside of the Games and sport. Previous research with Team UK has highlighted the potential value of this type of programming for Invictus Games training.^{46,90} Given the prominence of this approach as a best practice from our global research, there is support for greater implementation across different nations and programs.

The importance of resilience training, as well as the findings from competitors on the importance of coaching behavior strategies, provides support for a focus on coach and nation staff behaviours. Coaching literature consistently notes the important influence that coaches play on experience and outcomes.^{91,92} It is notable that the strategies identified by nation staff and through competitor surveys most frequently focus on non-sport-related skills. Instead, support was provided for a focus on resilience training, specifically mental preparation strategies, goal setting, team building, and trust. These strategies are implemented not to create better competitors but to support the development of the individual. Sport, in this case, is harnessed to promote recovery and growth for life outside of sport. This is an important approach given the fact that sport as rehabilitation in the context of the Invictus Games is not only viewed as physical rehabilitation and fitness, but a way to support the future of the competitor (e.g., employment), as well as their social context (e.g., family, friends, etc.).

Practice Recommendation #2: Implement resilience training.

Programs should include resilience training in programming prior to competition to improve health and well-being. This training would benefit from focusing on how individuals will use what they are learning outside of sport and in life post-rehabilitation.

Research Recommendation #2: Further examine and evaluate implementation of resilience training.

Given the importance of resilience training, future research could evaluate implementation of resilience training best practices, particularly uptake of best practices, how they are adapted for different nations.

This approach is indicative of transformational leadership behaviours.¹⁶ In transformational leadership, leaders demonstrate behaviours that empower, inspire, and challenge their followers.¹⁶ Research across multiple domains suggests that transformational leadership approaches are related to positive follower outcomes.¹⁰ In sport, coach transformational leadership behaviours are associated with elements of personal development, including personal and social skills, goal setting, initiative, positive psychological well-being, and intrinsic motivation.⁹³⁻⁹⁸ As represented by the 71 best practice strategies identified in this report, the goal is to create an empowering environment that enables individuals to reach their full potential through such approaches as building motivation, a sense of autonomy, self-management, active participation in a task, and self-efficacy.^{99,100} This transformational leadership model likely resonated with nations and competitors as it is also used in military settings, where transformational leadership behaviors predict performance outcomes, emotional intelligence, citizenship behaviours, group cohesion, operational readiness, situational awareness, and interpersonal influence.¹⁰¹⁻¹⁰⁵

The four components of transformational leadership are presented here with implementation strategies for the Invictus Games, and adapted sport more generally, based on the findings in Chapter 7:

- **Idealized influence.** Nation staff and coaches are role models who build respect and trust with the team and encourage the same among teammates. Competitors are also provided with access to mentors, former competitors that can be trusted due to their shared history and can support development.
- **Inspirational motivation.** Nation staff and coaches build meaning and challenge into experiences by promoting goal setting and tailoring workouts and activities to promote skill development. This motivates and inspires training. It also promotes a sense of optimism, excitement, and cohesion.
- **Intellectual stimulation.** Nation staff and coaches promote new ways of thinking about experiences through resilience training and solicit input from the team to improve programming and solve any problems, leading to independence and post-traumatic growth.
- **Individualised consideration.** Nation staff and coaches build open and honest communication pathways with competitors. They consider the motivation for each participant's involvement in the Games, as well as their needs and long-term rehabilitation goals. They seek to understand and accommodate individual needs, encourage development, and promote autonomy.

Given how well the four domains of transformational leadership align with the best practice findings, this can be an important area for future research.

Research Recommendation #3: Explore transformational leadership in military sport recovery programming.

Transformational leadership was not a guiding framework for this research project; however, findings suggest its applicability for training, competition, and life after the Games to promote well-being and development within and outside of sport.



Strengthen the entire community

Another important finding is the importance of type of illness and injury. Individuals experiencing both physical and psychological illness and injury demonstrated significantly worse health outcomes for physical health measures regardless of whether they competed in the Games or not. Traditionally, researchers and program staff have often considered illnesses and injuries solely within the context of physical or psychological. However, there is growing recognition of the inevitable likelihood of co-occurrence of these illnesses and injuries.^{14,83-87} For example, a blast or combat injury is unlikely to solely cause physical illness or injury given the traumatic nature of the injury. Even in cases of medical illness, like cancer, research highlights the potential for PTSD due to trauma of cancer diagnosis and treatment.¹⁰⁶ This finding has important implications for future research and practice.

Practice Recommendation #3: Tailoring for each participant.

When developing sport training programs, special consideration should be given to the type of illness and injury experienced by participants. Individuals experiencing both physical and psychological illnesses and injuries may need additional support and consideration to achieve the health benefits experienced by those with solely physical or solely psychological illnesses and injuries.

Research Recommendation #4: Build an evidence base on Service Members and Veterans experiencing both physical and psychological illnesses and injuries.

There is an urgent need for research examining the health of Service Members and Veterans experiencing both physical and psychological illnesses and injuries, as well as how to tailor programming to meet their unique needs.

8.2 The COVID-19 Pandemic

Longitudinal data collection for the Invictus Games The Hague 2020 coincided with the COVID-19 pandemic. The impact of the COVID-19 pandemic cannot be understated for any population. However, for individuals focused on the health and well-being of Service Members and Veterans experiencing physical and/or psychological illnesses and injuries, there was substantial concern about how pandemic mitigation and containment policies would impact rehabilitation: Would military personnel in rehabilitation implement the tools they had learned and experience minimal changes or even positive outcomes? Or would military personnel, particularly those with anxiety, depression, and PTSD, struggle with the changes and return to baseline? This project provided an unparalleled opportunity to explore the effect of the pandemic on Service Members and Veterans across the globe participating in sport-based rehabilitation programming.

The COVID-19 pandemic presented as a potential trigger or trauma for this vulnerable population. Some studies identified worsening symptoms of PTSD and other mental health conditions such as depression and anxiety in response to the pandemic.¹⁰⁷ Findings from our qualitative interviews suggested a range of responses. More negative responses to the pandemic often stemmed from imposed isolation. Participants compared the difference between isolation that was self-imposed by the mental health condition with outwardly-imposed isolation. Isolation imposed by the pandemic was particularly difficult as individuals were just learning how to overcome their self-imposed isolation. Negative responses for Service Members, Veterans, and their families also stemmed from decreased access to medical care. During a time of isolation and uncertainty when management of PTSD, anxiety, and depression symptoms should be at the forefront of preventative care, many may have endured undue suffering. This finding may be reflected in the results on type of illness and injury for Invictus Games The Hague. Individuals experiencing psychological illness and injury demonstrated poorer outcomes across most measures of well-being compared to individuals experiencing physical illness and injury – a finding that was not present in the Invictus Games Sydney results.

Practice Recommendation #4: Screening and responding to COVID-19 related experiences.

Rehabilitation programs should screen for any additional trauma experienced during COVID-19, and any additional complexities that it contributes to the previous existing condition(s).

In contrast, other participants demonstrated growth or no change in response to the pandemic. Those that experienced growth linked this response to the pause provided during the pandemic to focus on themselves, as well as how they adapted their physical activity, and maintained links to their community and family. For many, these physical activity adaptations and social connections came from active eSports. In addition to individual efforts and national program efforts, IGF hosted over 50 eSport activities from 2020 through 2022. Over 500 individuals participated each year representing all but three Invictus Games nations. The Invictus Games The Hague survey data indicated that both competitors and non-competitors participated in active

eSports. However, participation was most prominent among non-competitors, who appreciated the opportunity to connect with the IGF family. This finding reinforces practice recommendation #1 regarding the need to broaden programming to support non-competitors. Findings on the uptake of active eSports, as well as the value of active eSports, particularly increased flexibility for participants and the opportunity to build connections that improve the experience of in-person activities suggest a need for further research on this new type of virtual rehabilitation programming.

Research Recommendation #5: Evaluate active eSports programming as an approach for sport-based rehabilitation.

Physical activity and social connection experienced through virtual programming, including the Invictus Games active eSports competitions, may have supported post-traumatic growth. Future research should examine active eSports as a means to support rehabilitation among Service Members and Veterans, particularly for individuals from countries that may not have resources to regularly bring individuals together for in-person training programs.

8.3 Summary

This report presents the findings from the “Beyond the Finish Line” study examining the impact of the Invictus Games on the health and well-being of Service Members and Veterans with illnesses and injuries and identifying best practices for competitive adapted sport rehabilitation for military personnel. Findings support the value of competitive sport in recovery but note the importance of sustaining programming after the Games to maintain benefits. We also present the first global evidence-based best practice strategies for military sport recovery programming. These strategies largely focus on the importance of promoting personal growth through resilience training and transformational leadership behaviours rather than focusing solely on sport skills. Finally, the COVID-19 pandemic, which coincided with our data collection for the Invictus Games The Hague, provided insight as to the value of programming for non-competitors and the potential impact that eSports can have in increasing the reach and impact of sport rehabilitation programming.

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Conflicts of Interest

A key partner in the research presented in this final report was IGF. IGF were involved in development of the research question, determining methods, and supporting study recruitment (e.g., sharing recruitment e-mails with nations, and disseminating social media posts). However, to address the potential for bias, IGF were not involved in data collection, analysis, and interpretation.