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Does Success Breed Success?

An Examination of Interpersonal Influences Within an Olympic National Team

Abstract

A number of studies have shown evidence of interpersonal influences between team members within a sports setting. However, only a few studies have examined such influences between team members of non-task interdependent teams, a team setting that has been typically overlooked in scientific research. In the current study this team setting was researched using data on Olympic national teams. The purpose of the study was to examine whether interpersonal influences, derived from performances, exist among members of an Olympic national team. 16 870 observations from six Winter Olympic Games and five Summer Olympic Games were collected. The data was analysed in two separate studies, using linear regression models and Chi-square tests of independence. The results from the study showed that interpersonal influences, derived from performances, exist among team members within an Olympic national team. The results also showed that these influences vary between nations and the type of Olympic game.

Key words: Performance, interpersonal influences, task interdependence, outcome interdependence, Olympic Games

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Dictionary

Competitive Task – The task that will be performed by an athlete when he or she is competing.

End – Day five and onwards of an Olympic Game.

Group Goal – An aim or desired result for what the group shall achieve.

Group Outcome Interdependence – The extent to which team members are dependent on other team members to achieve the group goal.

Individual Goal – An aim or desired result for what the individual shall achieve.

Individual Outcome Interdependence – The extent to which team members are dependent on other team members to achieve their individual goal.

International Olympic Committee – The supreme authority of the Olympic Movement and the facilitator of collaboration between all parts of the Olympic movement (the National Olympic Committees, the International Sports Federations, the athletes and the Organising Committees for the Olympic Games).

Interpersonal Influence – A type of social influence that can exist between two or more individuals. It occurs when one individual's emotions, opinions, or behaviour are affected by other individuals' emotions, opinions or behaviours.

Interpersonal Influence Derived From Performances – A type of social influence that can exist between two or more individuals. It occurs when one individual's performance is affected by other individuals' performances.

National Olympic Committee (NOC) – Each nation that participates in the Olympic Games has its own National Olympic Committee. A National Olympic Committee's mission is to develop, promote and protect the Olympic Movement in their respective country and to ensure that athletes from their nation attend the Olympic Games.

Non-Task Interdependent Team – A team in which team members are not required to collaborate in the competitive task.

Olympic National Team – A team of Olympic athletes that represent the same nation in an Olympic Game.

Outcome Interdependence – The extent to which team members are dependent on other team members to achieve the group goal or the individual goal.

Outcome Interdependent Team – A team in which team members are dependent on other team members to achieve the group goal or the individual goal.

Sports Discipline - Each individual sport where a medal is given out in the Olympic Games, i.e. athletics is referred to as the sport and high jump is referred to as the sports discipline.

Start - The first four days of an Olympic Game.

Task Interdependence - The extent to which team members are required to collaborate in the competitive task.

Task Interdependent Team - A team in which team members are required to collaborate in the competitive task.

Team – A group of at least two people that identify themselves as a team.

Type of Olympic Game – An Olympic Game can be either a Winter Olympic Game or a Summer Olympic Game.

Table of Content

1. Introduction

In this section, the subject of the study will be introduced, followed by a description of the purpose, theoretical contribution and delimitations of the study. Lastly, an outline of the study will be presented.

1.1. Background

In less than two months, it is once again time for one of the world's largest and most prestigious sports event to take place. From the 5th of August to the 21st of August this year, the eyes of the whole world will be turned towards Rio de Janeiro, Brazil, where the 31st edition of the Summer Olympic Games will take place. Ever since the first Olympic Game in 1896 in Athens, Greece, athletes from all over the world have competed against each other in what is considered as one of the world's most prestigious sports event. Since 1924, the Olympic Games have branched out to include winter sports in addition to the original summer sports. As a result, the Olympic Games now consist of two type of games, Winter Olympic Games and Summer Olympic Games, each hosted every fourth year.

Over the years, the number of competing nations and number of participants have increased tremendously. From being a sports event that only invited a limited number of nations, the Olympic Games now welcome athletes from all over the world to compete for the desired medals. In contrast to the first Olympic Game, where only 245 athletes from 14 nations participated, the most recent Summer Olympic Game in London in 2012, gathered almost 11 000 athletes from over 200 National Olympic Committees (www.olympic.org). These athletes competed for a total of 970 medals.

The Olympic Games do not only attract attention from those that are competing, but also from the ones that are watching it from the side. In the Olympic Games in London in 2012, a total of 99 982 hours of footage were broadcasted on television in 220 territories, equivalent to eleven years of broadcasting. As a result, 3.6 billion people from all over the world watched the Olympic Games in London in 2012 (London 2012 Global Broadcast Report, 2012).

Due to its tremendous worldwide attention and long historical background, the Olympic Games have become more than just a sports event. Succeeding in the Olympic is a highly desired payoff to the many years of hard training and dedication. However, winning an Olympic medal can represent more than just pride and athletic accomplishment, it can also be a complete life-changer. Olympic medallists in China are commonly offered a high ranked governmental job and are rewarded with 200 000 US dollar (The Economist, 2016). However, most athletes go their whole career without even getting the opportunity to compete in the Olympic Games.

To be able to achieve the dream of becoming an Olympic medallist, athletes need to qualify for the Olympic Games. In more detail, athletes need to reach the International Olympic Committee's qualification levels. In addition, in some countries those qualification levels are complemented with the nation's own qualification levels set by the nation's National Olympic Committee. This is the case in Sweden, where it is not enough to perform on a level in line with the International Olympic Committee's requirements. Instead, Swedish athletes need to perform on a level set by the Swedish National Olympic Committee, which in many sports disciplines are more difficult. For instance, in Women's 800 meter running, the qualification level set by the Swedish Olympic Committee is 1:59:50, compared to the International Olympic Committee's qualification level of 2:01:50. Thus, in order to qualify for the Olympic Games, a Swedish female 800 meter runner needs to run 2 seconds faster than her female competitors that represent other nations.

Swedish athletes have questioned the tough qualification levels. Swedish table tennis player, Matilda Ekholm even filed a lawsuit for not being allowed to participate in the Olympic Games in London in 2012, even though she had reached the International Olympic Committee's requirements (Larsson, 2012). There have been different speculations among Swedish athletes and other stakeholders in the industry to why the Swedish Olympic Committee has decided to set such tough qualification levels. Swedish athletics TV commentator, Jacob Hård, believes the Swedish Olympic Committee has increased the difficulty of the qualification levels due to the cost of having a large Olympic national team (Lann, 2015). Per Synnerman, coach to Swedish athletics runners believes the Swedish Olympic Committee has become a victim of a medal rush, and as a result need to have tougher qualification levels (Mattson & Holmberg, 2015).

The critique has not gone unnoticed by the Swedish Olympic Committee. Former President of the Swedish Olympic Committee, Stefan Lindeberg, has responded to the critique in Swedish media (Sundqvist, 2012). In an interview with Swedish radio channel, Lindeberg explains that the Swedish Olympic Comitte wants the Swedish Olympic athletes to be able to reach the finals and to position Sweden as a nation of top sport excellence (Sundqvist, 2012). Furthemore, in the official policy of the Swedish Olympic Committee one can read the following statement "The Swedish Olympic National team shall have a high level of achievement and be characterized by a high level of ambition, with the purpose of creating a good performance atmosphere for the athletes" (SOK, 2014). Hence, the Swedish Olympic Committee puts a strong emphasis on the culture within the Olympic team and seems to be under the belief that it can have an influence on Swedish athletes' performances in the Olympic

Games. In further detail, due to the fact that the Swedish Olympic Committee restricts Swedish athletes who are not considered capable of reaching a final position at the Olympic Games, to participate, they seem to be under the belief that these athletes' participation may have a negative influence on the rest of the Swedish Olympic athletes' performances.

There has been scientific research made on factors that can explain an Olympic performance. For instance, several attempts have been made to explain why certain nations take more medals than others in the Olympic Games. In these studies, factors such as nations' GDP, population level, political governance and climate have shown to explain why certain nations have greater success than others in the Olympic Games (Ball, 1972; Buts et al., 2011; Grimes, Kelly & Rubin, 1984; Hoffman, Ging & Ramsamy 2004; Levine, 1974 and Tcha & Pershin, 2003). Studies have also been made on an individual athlete level in the Olympic Games. In these studies, factors such as mental skills, preparation and coaching have proven to positively influence athletes' performances, while media distraction and coach issues have proven to negatively influence athletes' performances (Greenleaf, Gould & Dieffenbach, 2001).

Outside of the scientific world, perceptions on factors that can influence athletes' performances in the Olympic Games also exist. For instance, just recently, the clothes worn by athletes in the Olympic Games have been considered to be a potential influence on performance. Toralf Nilsson, former president of the Swedish Athletic Association, has expressed his concerns about the fact that Swedish Olympic athletes need to wear H&M branded uniforms in the upcoming Olympic Game in Rio de Janeiro. As quoted by Nilsson, "It can decrease the possibility to perform on top" (Segerdahl, 2016). Another aspect that is often mentioned, is the importance of a good start in the Olympic Games. Both former and active athletes have shared their opinions on this matter. Charlotte Kalla, Swedish cross-country skier and multiple Olympic gold medallist believes a good start is beneficial for everyone in the Olympic national team. As quoted by Kalla, "I think a good start is an advantage. I believe everyone benefits from it". Björn Lind, former Swedish cross-country skier and double Olympic gold medallist, shares the same opinion. As quoted by Lind, "For the team's sake, it is important that it runs smoothly from the beginning." However, Björn Ferry, former Swedish biathlete and Olympic Gold medallist, does not share neither Kalla's nor Lind's opinion. As quoted by Ferry on the question if he believes that the performances of his team members in the Olympic national team matters to him, "Huh, it doesn't matter. I don't care if the hockey team loses against Belarus" (Flinck & Thorén, 2010).

In conclusion, there seems to be diverse opinions on whether the performances of other athletes within an Olympic national team are important for the performance of other athletes within the same Olympic national team. On one side of the spectra, is the Swedish Olympic Committee who seems to strongly believe that it is necessary to have an Olympic national team in which all members of the team perform on a high level. On the other side of the spectra, are athletes like Ferry who do not seem to be affected by other team members’ performances. Which of these views is the more accurate depiction of the truth? Are Olympic athletes influenced by the performances of their team members, or are they focused on their own task and as such not influenced by how their team members perform? If the Swedish Olympic Committee is right, could it be so that the performance of one athlete in an Olympic national team, influence other team members’ performances in the same Olympic Game? Would then the performances of team members who compete early in the Olympic Game influence the performances of team members who compete later in the Olympic Game? Thus, will a national team’s results in the beginning of the Olympic Games be crucial in determining how the rest of the national team will perform? Or is the performance of one athlete only dependent on that individual’s own ability to perform? These questions will be examined in this study.

1.2. Purpose

The purpose of the current study was to examine whether athletes within an Olympic national team are influenced by the performances of other athletes within the same Olympic national team. In other words, whether interpersonal influences, derived from performances, exist among members of an Olympic national team.

In the current study, one additional layer was added to the examination of interpersonal influences derived from performances; the type of Olympic Game. Thus, whether such interpersonal influences differ between Winter Olympic Games and Summer Olympic Games.

1.3. Theoretical Contribution

1.3.1. Previous Research on The Olympic Games

Several previous studies have examined a number of factors that can help to explain nations’ Olympic successes. However, in the majority of the previous studies, the factors that have been studied, have taken place outside of the Olympic context. These factors have included a number of economic, socioeconomic and political factors. All of these factors have proven to explain why certain nations take more medals than others and consequently why athletes from certain nations perform better than others. However, these studies have not studied the actual performances taking place at the Olympic Games. In the current study, the actual performances of athletes in the Olympic Games were studied.

Furthermore, the majority of the previous studies on the Olympic Games have primarily investigated factors that can help to explain nations' Olympic performances, but not as many have examined factors that can explain individual athletes' Olympic performances. The few studies that have investigated individual athletes' Olympic performances, have focused on the individual athletes in isolation. Thus, not as many have examined the potential existence of interpersonal influences between members of an Olympic national team.

In conclusion, the current study will contribute to existing research on the Olympic Games by a number of dimensions; (i) by studying the actual performances at the Olympic Games and (ii) by studying interpersonal influences between athletes.

1.3.2. Previous Research on Teams

Different aspects of teams and groups have been researched previously in both organizational settings and sports settings. However, in sports settings, research has commonly focused the attention on one type of team. In further detail, the one in which frequent interaction between team members are required. As a result, teams in which such interaction is not required, have been largely overlooked in scientific research. In an Olympic national team such interaction is not considered necessary and as a result it offers a great research opportunity.

In conclusion, by researching a team environment, which has typically not been the focus in previous research on teams, the current study contributes to the existing research on teams.

1.3.3. Previous Research on Interpersonal Influences

Research on interpersonal influences has previous been conducted in sports settings. However, as with the general research on sports teams, previous research on interpersonal influences, has largely been focused on sports teams in which frequent interaction between team members is required. Researchers that have started to investigate interpersonal influences between members of teams where such interaction is not required, have primarily used a qualitative research method. In the current study, a quantitative research method will be used to study such interpersonal influences.

In conclusion, the current study will contribute to existing research by a number of dimensions; (i) by researching factors attached to the Olympic context, (ii) by researching individual athlete's performance and its potential influence on other athletes, (iii) by researching individual athlete's performances in typically overlooked team setting and (iv) by using a quantitative research method.

1.4. Delimitations

An Olympic athlete may have interpersonal relationships with a wide range of individuals such as coaches, competitors, team members, medical team, family and friends. However, the current study exclusively focused on interpersonal influences between team members of the same Olympic national team that compete in the same Olympic Game.

Furthermore, the current study focused on interpersonal influences derived from performances. No examination of other interpersonal influences between team members, such as cognitive or affective influences, was done in the current study.

Moreover, the current study examined whether interpersonal influences derived from performances exist between team members of an Olympic national team. However, no investigation on why these effects exist or not was conducted as it was not in the scope of the current study.

1.5. Study Outline

The purpose of the current study was to examine whether athletes within an Olympic national team are influenced by the performances of other athletes within the same Olympic national team. This will be answered with two separate studies, study 1 and study 2. The two studies are based on the same previous research and use the same methodology apart from the studied variables and statistical tests used. Both the results from study 1 and study 2 will be used to answer each of the hypotheses in the study.

The current study consists of seven sections. In section 1, the subject of the study is presented together with the purpose, theoretical contribution and delimitations. In the following section, a literature review on the subject of the study is presented. From previous research presented in the literature review, a number of hypotheses were developed, which are described in section 2. Section 3 covers the methodology used in the study, where a description of the research method, research design, data collection, data quality and statistical analysis, is given. The empirical results of the study are then presented in section 4. Whether the hypotheses in the current study have empirical support or not is also described in section 4. In section 5, a discussion based on the empirical results of the study is given. This is followed by suggestions on future research, managerial implications and a final conclusion. Section 6 contains the reference list of all used references in the study. The final section, section 7, is the appendix. Information that has not been presented in earlier sections but still been used in the study is presented in the appendix.

2. Literature Review

2.1. Interpersonal Influences Derived From Performances

Evidence from previous research has shown that individuals can be influenced by the performances of others in several ways. Already in 1898, Triplett showed that the mere presence of others could improve another individual’s performance. Triplett studied the performances of cyclists and showed that when cycling against each other, cyclists performed better compared to when they raced only against the clock (Triplett, 1898). After Triplett’s experiment, interpersonal influences have been tested in various contexts and on different types of interpersonal relationships. In contrast to Triplett’s results, Zajonc (1965) discovered that the presence of others can impair another individual’s performance. Zajonc explained that whether an individual’s performance will be facilitated or impaired by the presence of others, depends on the complexity of the task that is performed. For complex tasks, an individual can be better off working alone, but for simple tasks the presence of others can facilitate the performance. In conclusion, other individuals can both be a source of positive and negative influences.

Previous research has also studied interpersonal influences by measuring the quality of the other individuals’ performances. In research by Jane (2015), results showed that as the quality of a competitor increases, an individual’s performance increases as well. Heuzé, Raimbault and Fontayne (2006) also studied the quality of other individuals’ performances but within a team. The authors showed that when a team member performs at a lower level than expected, a downward performance spiral may arise for the rest of the team members. Thus, not only the fact that another individual is performing near an individual but also how well that other individual performs, can influence an individual’s performance.

Research has then been further extended to also examine interpersonal influences with regards to the order of the individuals’ performances. In more detail, through first and second mover performances. Apesteguia and Palacios-Huerta (2010) studied penalty shootouts in major international soccer competitions and found that by being the first team to shoot and thereby being the first-mover, the team’s probability of winning increases significantly. Kolev, Pina and Todeschini (2010) added another dimension to the first-mover advantage and showed that a team only gets a first-mover advantage if they score the first shootout. If the team instead fails to score the first shootout, the other team gets a second-mover advantage (Kolev et. al., 2010).

In conclusion, an individual’s performance have proven to be influenced by another individual’s performance by at least three dimensions; (i) the fact that another individual is performing near the individual, (ii) how well that individual performs and (iii) in what order the performances take place. However, evidence have not been as straightforward to what type of individuals that can act as a source of influence. Both athletes within the same team and athletes that are competitors to the individual athlete have proven to influence the individual's performance. In other words, it is not clear between what athletes these influences can occur. In order to understand these influences, it is deemed necessary to first examine athletes' social environments, both in general and in the Olympic Games' setting. Therefore, the next session will identify these environments.

2.2. Different Team Environments

2.2.1. Team Classification

A sports team has typically been defined as a group of at least two people that have structured relationships and a group goal. Whether the group goal will be achieved is dependent on the collected efforts by all members of the team. (Carron & Eys, 2012). Within sports research, only a fraction of all sports have been considered team sports. A distinction has been made between individual sports and team sports. The distinction has focused on the interdependence between team members and particularly on the interdependence between team members in the competitive task (Evans, Eys & Bruner, 2012). Interdependence is defined as the extent to which members of a team are reliant on each other and the level of interaction that is required between them (Johnson & Johnson, 2005). Task interdependence is defined as "...the extent to which group members must exchange efforts, information, or expertise during the performance" (Evans, 2014, pg. 8). Hence, being a task interdependent team means that the team members must work together in the competitive task. As a result, only sports with task interdependence have been categorized as team sports (e.g. hockey and baseball). In contrast, sports such as running, swimming and wrestling have been categorized as individual sports as team members are not required to collaborate in the competitive task.

Task interdependence has been considered a natural distinguisher as it has been assumed to determine whether group dynamics will have any sort of influence on a team's performance. Group dynamics, typically referred to team influences within sports research, are different constructs of a team's social environment that may influence the team's performance. One of the most researched team influences, team cohesion, has proven to positively affect team performance. Team cohesion refers to the team members' inclination to stay together in order to achieve the group goal (Heuzé, Raimbault & Fontayne, 2006). However, the relation between team cohesion and performance was found to be moderated by task interdependence. As a result, team cohesion and other team influences have been assumed to be irrelevant in teams with no task interdependence, in other words in individual sports (Carron & Chelladurai, 1981).

More recent research by Carron et al. (2002) and Widmeyer & Williams (1991) have challenged these assumptions. Carron et al. (2002) showed that the positive relation between team cohesion and performance can be found in individual sports as well. Widmeyer and Williams (1991) could also explain why this relation exists in individual sports. They showed that an increased team cohesion in individual sports leads to increased motivation and social support between team members, which in turn positively influence performance.

In light of these findings, Evans et al. (2012) developed a new team classification in which team influences in individual sports were not neglected. Evans et al. (2012), used variations in structural interdependence to distinguish different team types, instead of only task interdependence. Structural interdependence refers to the structures of the team environment. Two dimensions, task interdependence and outcome interdependence shape these structures. An underlying condition in the team typology by Evans et al. (2012) is team identification. Team identification refers to whether members of a team identify themselves as a team or not. In other words, members of a team need to identify themselves as a group with structured relationships that connect them in their pursuit of individual goals and/or group goals, to be considered a team (Carron & Eys, 2012). This means that if members of a team do not identify themselves as team, they are not considered a team. Team identification can be explained with social identity theory, developed by Tajfel and Turner (1986). Social identity theory explains how individuals categorize themselves as members of groups to feel a sense of belonging and emotional attachment. Individuals choose to categorize themselves as members of groups in which they find themselves to be similar to the group prototype. In other words, if they perceive a fit between themselves and the group (Tajfel & Turner, 1986). The perceived fit is likely to be higher if the individuals perceive the differences between themselves and the group members to be smaller than the differences between themselves and group members of other groups.

Similar to previous studies, Evans et al. (2012) define task interdependence as whether team members must interact in the competitive task. The second structural interdependence, outcome interdependence, is linked to team members' goals. These goals can be either on a group level or an individual level. Thus, outcome interdependence is divided into two separate interdependencies; group outcome interdependence and individual outcome interdependence. Being group outcome interdependent means that team members are dependent on other team members to achieve the group goal. In contrast, being individual outcome interdependent means that team members are dependent on other team members to achieve their individual goal. In the typology by Evans et al. (2012), individual outcome interdependence is measured by the extent to which team members compete against each other in the same competition.

Each of the above-described interdependence structures can either exist or not within a team. This results in six different combinations of team types, four of which traditionally would be considered individual sports. Evans et al. (2012) labelled these individual team types as collective, cooperative, contrient and independent. All different combinations can be seen in Figure 1.

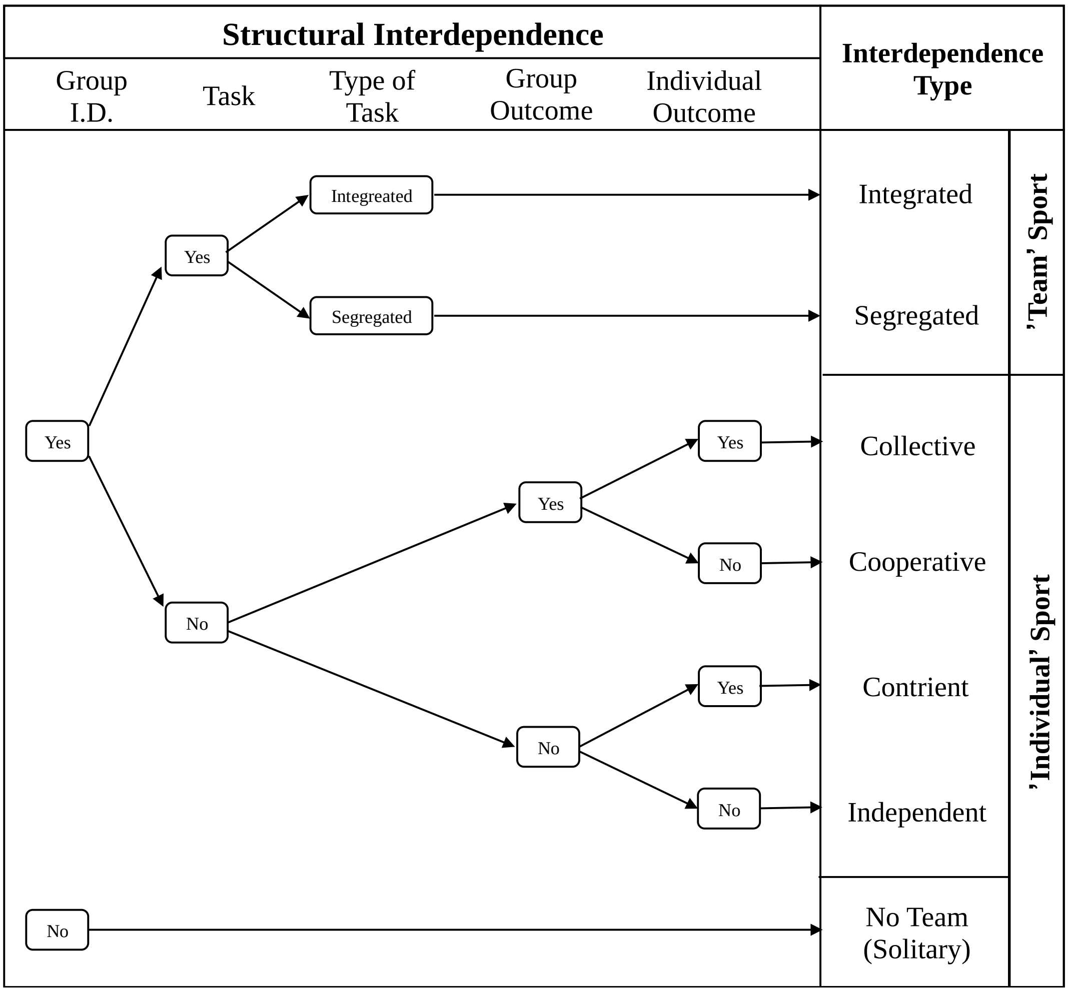

Figure 1: Decision tree for determining team interdependence types (Evans et al., 2012)

With the traditional distinction, an Olympic national team could be considered an individual sports team, due to the lack of task interdependence. However, with the new types of interdependence structures that have been researched, a more thorough analysis of how an Olympic national team could be classified is deemed necessary. This will be done in the next section.

2.2.2. Classifying an Olympic National Team

The classification of an Olympic national team has been done in accordance with the team typology by Evans et al. (2012). Unlike traditional teams, an Olympic national team typically includes members from a wide range of sports disciplines, some of which are competing together with others, and some of which are competing individually. In terms of task interdependence, a team member of an Olympic national soccer team would be considered task interdependent with his or her team members from the same soccer team, since they are required to collaborate in the competitive task. However, the same soccer player would not be considered task interdependent with athletes from other sports disciplines within the same Olympic national team, such as athletes competing in athletics or handball. Thus, on a collective level, athletes within an Olympic national team would not be considered task interdependent with each other.

Regarding individual outcome interdependence, only the athletes who are competing in the same sports discipline as other athletes in the same Olympic national team are considered individual outcome interdependent. For all other athletes, no individual outcome interdependence exists as they compete in different sports disciplines. In an Olympic national team, the number of athletes who are not individual outcome interdependent represent a greater share than the ones who are. Due to this fact, on a collective level, an Olympic national team is not considered individual outcome interdependent.

In an Olympic context, athletes' performances are both a representation of the nation's athletic excellence as well as the individual athlete's athletic excellence. Historically, the Olympic Games have been a way for nations to prove their athletic excellence. Taking many medals in an Olympic Game shows athletic strength and typically medal count has been a way to compare nations' performances. This still appears in the modern Olympic Games, and many nations set up goals for what their Olympic national team should achieve in the Olympic Game, typically in terms of medal counts. These goals are commonly set up by the nations' National Olympic Committees as well as by media or other stakeholders. For example, the Swedish Olympic Committee has set up a long-term goal for the Swedish Olympic team of 20 medals, whereof five gold medals. This goal is set to be achieved at the Summer Olympic Games 2020 and at the Winter Olympic Games 2022 (www.sok.se/in-english.html). Thus, an Olympic national team often has a group goal in terms of medal count. Consequently, an Olympic national team would be considered group outcome interdependent as defined by Evans et al. (2012).

Lastly, as described in the typology by Evans et al. (2012), the underlying condition to be considered a team is that team members identify themselves as a team. In an Olympic Game, athletes' national identities are emphasized on several levels. Athletes within the same Olympic national teams are commonly living together in the Olympic village during the weeks of the competition, walking together during the opening ceremony and wearing national team uniforms. In addition, as mentioned earlier, medal counts are conducted throughout the games, where number of medals are aggregated on a national level and compared with other nations. All of these factors are considered to emphasize team identification within an Olympic national team. As a result, Olympic national athletes should be considered to identify themselves as members of their respective Olympic national team.

In conclusion, an Olympic national team lacks task interdependence and individual outcome interdependence, but has group outcome interdependence. In the typology by Evans et al. (2012) an Olympic national team can therefore be classified as a cooperative team.

From the collected evidence presented so far, three important conclusions can be drawn; (i) an athlete's performance can influence another athlete's performance, (ii) structural interdependencies guide team classification and (iii) an Olympic national team can be classified as a cooperative team. The next section will discuss all of these conclusions jointly to determine whether an athlete's performance in an Olympic national team can influence another athlete's performance within the same Olympic national team. In other words, whether interpersonal influences can exist in an Olympic national team. The section will start with applying different levels of structural interdependencies on interpersonal influences, followed by an outline of factors that may contribute to the existence of interpersonal influences within an Olympic national team.

2.3. Interpersonal Influences Within an Olympic National Team

2.3.1. Applying Structural Interdependencies on Interpersonal Influences

Recall the evidence presented earlier on interpersonal influences. Evidence showed that the performance of one athlete can influence the performance of another athlete. However, such influence was shown to emerge from different types of athletes; both from team members and competitors. A common denominator is that both the team members and the competitors have some sort of outcome interdependence with the other athlete. In detail, the performance of the team member and the performance of the competitor will influence the other athlete's possibility to reach his/her group goal or his/her individual goal. However, as a competitor is not part of the same team as the other athlete, it becomes less relevant to the discussion of interpersonal influences within teams.

Applying task interdependence to the previous research on interpersonal influences derived from performances, all previous evidence have been on teams with task interdependence. In other words, in the studies were interpersonal influences have been researched, the team members collaborated in the competitive task.

With previous evidence on interpersonal influences in mind, it seems as group outcome interdependence and task interdependence are required for athletes to be influenced by other team members' performances. This reasoning can be strengthened by the fact that teams, which have both task interdependence and group outcome interdependence have shown to have the greatest perception of interdependence between team members compared to other team types (Comeau & Griffith, 2005). The combination of task interdependence and group outcome interdependence has also shown to positively increase team member satisfaction and cooperation (Campion et al., 1996; Van der Vegt et al., 1998). Thus, the presence of both task interdependence and outcome interdependence contribute to several positive aspects of the team environment, which could explain why interpersonal influences have proven to exist in this type of team setting. However, are the presence of both task interdependence and outcome interdependence required for team members to be influenced by each other's performances? Could there be other factors that can contribute to interpersonal influences between team members that are not task interdependent? A number of such factors will be discussed in the next section.

2.3.2. Potential Factors Contributing to Interpersonal Influences

2.3.2.1. The Importance of Group Outcome Interdependence

Evans and Eys (2015) have argued that group outcome interdependence can moderate the degree of influence that both task interdependence and individual outcome interdependence have on teams. In fact, Evans and Eys (2015) showed that by having a group goal, the degree of competitiveness that typically arise in teams with individual outcome interdependence, can be reduced. As such, a group goal can make team members who are competing against each other to act cooperatively instead of competitively (Stanne, Johnson & Johnson, 1999). Using this line of thinking, the presence of group outcome interdependence may also be more important than the presence of task interdependence when it comes to influencing the team environment. Thus, interpersonal influences may also exist in teams with no task interdependence, as long as they have a group goal.

2.3.2.2. Group Outcome Interdependence and Psychological Pressure

Another reason to why interpersonal influences may exist in teams with no task interdependence is the effect a group goal may have on an athlete's level of pressure. In general, goals drive people to achieve and act as a motivation for performance (Locke & Latham, 2002) According to Heath, Larrick and Wu (1999), goals act as reference points for performance in a similar way to the prospect theory developed by Kahneman and Tversky (1979). The prospect theory explains how people evaluate outcomes based on a reference point, such as a goal. Depending on how the outcomes fall relative to the reference point, the outcomes are either categorized as gains (successes) or losses (failures). Failure is typically regarded as more painful than success is regarded enjoyable. As a result, people tend to actively avoid failure (Kahneman & Tversky, 1979). In research by Heath et al. (1999), the prospect theory has been applied to goals and performances. According to Heath et al. (1999), if the outcome of a performance leads to an achieved goal, the outcome is categorized as a success. In contrast, when the goal is not achieved, the outcome is categorized as a failure. Since failures are viewed more painful than successes are viewed enjoyable, individuals try to avoid failing a goal. In all teams with group outcome interdependence, whether the group goal will be achieved is dependent on the collected efforts of all team members. In other words, if one athlete does not perform well, other athletes must perform well in order for the team not to fail their goal. This can be exemplified with the study by Kolev et al. (2010) on shootout situations. Whether a team in a shootout situation will win or not, depends both on the performances by members of the team as well as the performances of the competing team. Thus, in the situation in which the first team has scored, the second team needs to score as well, in order for them to achieve their goal i.e. to win. The evidence that the second team commonly does not perform well in this situation, has been attributed to increased levels of psychological pressure on the members of the second team (Kolev et al., 2010). According to the inverted U-hypothesis, also referred to as Yerkes-Dodson law, pressure can influence performance, through levels of arousal (Yerkes & Dodson, 1908). People require an optimal level of arousal to perform on top. Performance increases with the level of arousal, but only to a certain point. When the level of arousal becomes too high, performance is reduced (Yerkes & Dodson, 1908). Once the top level is reached, the performance declines drastically (Hardy & Parfitt, 1991). Baumeister (1985) defines this stage as “choking under pressure”, in which performance declines to a rapid rate caused by high pressure.

Applying this reasoning to an Olympic national team, the presence of group outcome interdependence between the team members, may contribute to increased levels of psychological pressure. Thus, if team members of an Olympic national team do not perform on a level required for the group goal to be achieved, the pressure on other team members to perform may increase, which can have a detrimental effect on their performances. In other words, if one athlete fails in his or her attempt to contribute to the achievement of the group goal, in this case fails to take a medal, the pressure on other team members to take medals can increase. Can it also be the other way around, that performances by other team members that are on a level required for the group goal to be achieved, leads to a positive effect on other team members’ performances? Thus, if one team member succeeds in his or her attempt to contribute to the achievement of the group goal, i.e. takes a medal, can it then boost other athletes’ performances? In the next section, successful performance on a sequential level will be discussed.

2.3.2.3. Successful Performances on A Sequential Level

A connection between past and current performances have been studied previously within sports. Researchers have studied the concept of the “hot-hand-fallacy”, which refers to the belief that individuals who have had success in previous performances are considered to be more likely to experience success in coming performances as well. This was first researched within a basketball setting, in which it was examined whether basketball players who had scored in the game were more likely to score again, i.e. if they had a so called “hot-hand” (Gilovich, Robert & Tversky, 1985). The authors found that if anything, an individual is less likely to experience success after having a streak of success (Gilovich et al., 1985). However, others have found evidence of sequential success (Taylor & Demick, 1994; Hooke, 1989 and Larkey, Smith & Kadane, 1989). Taylor and Demick (1994) developed a model to explain why such a “hot-hand” exists. In their model three types of psychological and physiological processes were included; cognition, affect and physiology, which all influence the individual’s chances of succeeding in his or her coming performances.

In conclusion, evidence of the “hot-hand” have been found an individual athlete level, such as within golf, basketball and football (Gilovich, Robert & Tversky, 1985; Livingston, 2012 and Ayton & Braennberg, 2008). However, could the same line of thinking be applied between team members? If one team member succeeds, does it increase the likelihood that other team members succeed as well? Could there be a concept of “hot-hand(s)”?

2.4.Conclusion

From the collected evidence presented so far, a number of important conclusions can be drawn. First, an athlete’s performance can influence another athlete’s performance. Second, the members in an Olympic national are non-task interdependent but group outcome interdependent. Third, there has been indications that both task interdependence and group outcome interdependence are required for interpersonal influences, derived from performances, to exist in teams. However, three factors have been identified that may contribute to the existence of interpersonal influences within an Olympic national team, even though the lack of task interdependence. These factors are; (i) group outcome interdependence can be more influential than task interdependence, (ii) the quality of other athletes’ performances may lead to increased levels of psychological pressure on other athletes and (iii) previous successful performances may lead to subsequent successful performances. Since it has not previously been tested whether interpersonal influences, derived from performances, exists within the cooperative team setting and the presented evidence argue both against and for this existence, the following two hypotheses will be tested:

H0a: The performance of an athlete in an Olympic national team is not influenced by other athletes’ performances within the same team.

H1a: The performance of an athlete in an Olympic national team is influenced by other athletes’ performances within the same team.

2.5. Difference Between Winter Olympic Games and Summer Olympic Games

As the Olympic Games are divided into Winter Olympic Games and Summer Olympic Games, it is of interest to examine whether there is any difference between the two types of games in terms of interpersonal influences. The two types of games are different by several dimensions; the types of sports disciplines, historical background and number of participating nations, among others. The difference in number of sports disciplines is considered to be the most important factor when examining interpersonal influences. A Summer Olympic Game typically includes around 300 different sports disciplines in each Olympic Game, whereas a Winter Olympic Game only includes around 100 sports disciplines (ww.olympic.org/). A smaller number of sports disciplines should lead to a smaller number of participating athletes in a Winter Olympic Game compared to a Summer Olympic Game. As a result, the size of any nation's Summer Olympic team should in most cases be greater than the size of any nation's Winter Olympic team. According to Widmeyer, Brawley and Carron (1990) team influences change with team size. In more detail, team influences are perceived to be more influential in smaller teams than larger teams. According to this line of thinking, interpersonal influences derived from performances, could differ depending on the type of Olympic Game. However, first it is necessary to examine if these influences even exist in the two type of games and thereafter whether a comparison can be made. This will be tested through the following four hypotheses.

H0b: In a Winter Olympic Game, the performance of an athlete in an Olympic national team is not influenced by other athletes' performances within the same team.

H1b: In a Winter Olympic Game, the performance of an athlete in an Olympic national team is influenced by other athletes' performances within the same team.

H0c: In a Summer Olympic Game, the performance of an athlete in an Olympic national team is not influenced by other athletes' performances within the same team.

H1c: In a Summer Olympic Game, the performance of an athlete in an Olympic national team is influenced by other athletes' performances within the same team.

2.6. Summary of Hypotheses

In table 1, a summary of the hypotheses is presented.

Hypothesis	Description of Hypothesis	Tested in Study
H0a	The performance of an athlete in an Olympic national team is not influenced by other athletes' performances within the same team	Study 1 & 2
H1a	The performance of an athlete in an Olympic national team is influenced by other athletes' performances within the same team.	Study 1 & 2
H0b	In a Winter Olympic Game, the performance of an athlete in an Olympic national team is not influenced by other athletes' performances within the same team	Study 1 & 2
H1b	In a Winter Olympic Game, the performance of an athlete in an Olympic national team is influenced by other athletes' performances within the same team.	Study 1 & 2
H0c	In a Summer Olympic Game, the performance of an athlete in an Olympic national team is not influenced by other athletes' performances within the same team	Study 1 & 2
H1c	In a Summer Olympic Game, the performance of an athlete in an Olympic national team is influenced by other athletes' performances within the same team.	Study 1 & 2

Table 1: Summary of hypotheses

3. Methodology

In this section, the methodology used in the study will be described. First, the scientific approach, research method and overall research design will be described. Thereafter, the sample, data collection, data quality and pre study will be discussed. The methodology part ends with a discussion of the rationale behind the decisions made concerning the analytical methods used in the study.

3.1. Scientific Approach

Several of the theoretical concepts used in this study have been tested empirically before. However, in the current study, these theoretical concepts are combined in a context in which they have typically not been studied in before. For instance, team influences have been broadly studied before, but typically in a team setting where task interdependence exists. Performances in the Olympic context has also been previously studied but the focus have primarily been on national factors influencing athletes' success. The evidence found in these previous studies, have been combined to fit the context studied in the current study. As a result, hypotheses could be developed for this study. These will be tested for empirical support in the following section. Thus, the current study uses a deductive approach. An inductive approach could have been used as limited research exist within the exact field of this study. However, as shown in the literature review, a number of studies have been conducted on related fields. These have been considered to act as an appropriate foundation of the current study. Thus, an inductive approach was not regarded as necessary.

3.2. Research Method

A quantitative research method was selected for the current study. The rationale behind this decision was threefold. First, a quantitative research method is common when using a deductive approach (Bryman & Bell, 2011). Second, a quantitative research method enables the use of a larger sample. As previous research within interpersonal influences has focused on a limited number of sport disciplines, the aim of this study was to expand existing research by including more sport disciplines. Therefore, a large sample was required. Since a qualitative research method commonly uses a smaller sample, a quantitative research method was deemed appropriate. In addition, a larger sample increases the likelihood of finding significant results (Bryman & Bell, 2011). Third, researchers that have started to investigate interpersonal influences between members of non-task interdependent teams, have primarily used a qualitative research method. In these studies, initial evidence of interpersonal influences on a perceived level have been found. The aim of the current study was to test whether these interpersonal influences actually exist. To do this personal reflections from interviews were not enough, instead a large number of observations on actual performances were necessary. In order analyse these, a quantitative research method was required.

3.3. Research Design

When doing business research, several research designs are possible. The research design that was deemed to fit the purpose of the current study best, was the cross-sectional research design. A cross-sectional research design is a type of observational design, in which data is collected from several case studies at a single point in time. Another type of observational design that could have been used is the experimental research design. However, since the purpose of the current study was to examine if interpersonal influences exist among team members of Olympic national teams, results from actual performances at the Olympic Games were required. To use an experimental research design, where the study environment is manipulated, was not regarded appropriate, as the aim was to examine real-life performances. In addition, since the Olympic Games have a long history and consequently a large number of results that can be accessed, it was not considered neither time efficient or cost-efficient to create new data from experiments. In addition, by using already existing data, researcher subjectivity could be eliminated. Furthermore, cross-sectional designs are used to study the relation between variables, which is in line with the purpose of the study (Bryman & Bell, 2011).

3.4. Sample

Before collecting the data needed for the study, it was necessary to determine the boundaries of the sample. The sampling process was done on three levels; selection of Olympic Games, selection of nations and selection of sports disciplines.

3.4.1. Selection of Olympic Games

A selection of Olympic Games was made. The selection resulted in a sample of eleven Olympic Games; six Winter Olympic Games and five Summer Olympic Games. This sample included all Winter Olympic Games and Summer Olympic Games between 1994 (Lillehammer, Norway) and 2014 (Sochi, Russia). There were several reasons to why these eleven Olympic Games were selected. The Olympic Game in 1994 was the first Olympic Game in which the former Soviet Union and Czechoslovakia no longer participated. In other words, it was the first Olympic Game in which all nations, as they look like today, participated. A consistent sample across the studied Olympic Games was considered to be more accurate. Furthermore, the official results from the Olympic Games were less detailed and not as easily accessible in earlier years. Furthermore, due to time constraints a large number of Olympic Games was not considered possible to collect or analyse within the given time frame. Lastly, both Winter Olympic Games and Summer Olympic Games were selected as it enables a comparison between the two types of games.

3.4.2. Selection of Nations

After the selection of Olympic Games was made, a selection of nations was conducted. The selection of nations was based on nations' medal counts in the selected Olympic Games. A line was drawn to only include nations that had taken at least 30 medals in total in the selected Olympic Games (at least 15 medals in the Winter Olympic Games and 15 medals in the Summer Olympic Games). Thus, the selected nations needed to have a proven capability to take medals in both Winter Olympic Games and Summer Olympic Games. The proven capability to take medals was important as the number of medals played a central role in the data analysis. With the distinction of a minimum of 30 medals, a sample of fourteen nations remained. In this sample, the four most successful nations in terms of medal count were included; USA, China, Russia and Germany. However, a decision was made to exclude these four nations due to their heterogeneity with the other ten nations in the sample. Homogeneity was deemed important due to the increased possibility of generalization within the sample. After the exclusion, the final sample consisted of the following ten nations: Canada, France, Great Britain, Italy, Japan, Netherlands, Norway, South Korea, Sweden and Switzerland.

3.4.3. Selection of Sports Disciplines

Since an Olympic national team can include athletes from all types of sports disciplines hosted in an Olympic Game, the decision was made to include all sports disciplines. Otherwise potential interpersonal influences would have been disregarded.

In conclusion, in terms of type of sample, the selection of Olympic Games, selection nations and selection of sports disciplines resulted in a non-probability sample. This means that the probability of a unit in the population to be selected in the sample was unknown. This is in contrast to a probability sample, where every unit in the population has the same probability to be selected to the sample. More specific, with the selection of Olympic Games and selection of nations this study consisted of a purposive sample. A purposive sample is a type of non-probability sample and means that the sample is selected based on the researchers' judgements of what units that should be included in the sample. This type of sample is commonly used when the study has a specific purpose, which requires a specific sample. The disadvantage of using a non-probability sample and purposive sample in particular is that the results cannot be fully generalized outside the sample (Zikmund et al., 2013). However, the authors considered the need of having a consistent and homogeneous sample as more important than the possibilities to generalize outside of the sample.

3.5. Data Collection

After the sampling process was completed, an extensive data collection was conducted. The data was collected from the official website of the Olympic Movement (www.olympic.org/). The Olympic Movement is governed by the International Olympic Committee and publishes official reports from the Olympic Games covering all the results from the different sports disciplines. From the official reports, the following data was collected; (i) the name of all sports disciplines included in each of the selected Olympic Games, (ii) the date for when each sports discipline's medals were given out in each of the selected Olympic Games, (iii) each participant's name in all selected nations and each participant's final ranking in their respective sports discipline. When two or more participants were competing together as a team, they were labelled as one participant. For instance, the performance and final ranking of a handball team was seen as one performance rather than 20 individual performances.

After collecting data on all participants' results of each of the ten nations in each of the eleven Olympic Games, the data set consisted of 16870 individual observations. With this extensive data set, Olympic results from 20 years back in time on eleven separate national Olympic teams were available. The result of each nation's participants in each individual Olympic Game that was studied was inserted into a separate Excel document that was later compiled into one aggregated Excel document and SPSS file consisting all 16870 observations.

3.6. Data Quality

When doing quantitative research it is of utmost importance that the quality of the data gathered is suitable and accurate (Bryman & Bell, 2011). Consequently, reliability and validity of the study are two important measures to evaluate.

3.6.1. Reliability

Reliability refers to the degree of likelihood that the results generated in the study would be similar if the study was to be repeated under consistent conditions (Malhotra, 2010). Reliability is evaluated by three measures; stability over time, internal reliability and inter observer consistency (Bryman & Bell, 2011).

Stability over time addresses the degree to which a measure can be considered stable over time (Bryman & Bell, 2011). In the current study, secondary data of Olympic results from 20 years back in time has been used. As the data consists of old sports results, the measures used in this study would not change over time. However, during the history of the Olympic Games, sports disciplines have been added and removed which may change the look of the data. As the data in the current study was not compared on a sports discipline level, this was not considered a concern. In the current study, interpersonal influences was measured based on the whole nation's performance regardless of the sports discipline. Furthermore, the Olympic Games have a long history and as of today there has been no indications that it will not continue in the future. As a result, the measures used in this study could be considered stable over time.

Internal reliability refers to the consistency of a measure. As mentioned earlier, studies within interpersonal influences within non-task interdependent teams have primarily used a qualitative research method. Thus, measures to examine interpersonal influences within these settings are limited. However, in order to confirm internal reliability in the current study, previous research that has measured performances during different time periods, interpersonal influences and performances at the Olympic Games were reviewed. Out of these, the ones that were believed to fit the purpose of the current study best were used as guidance when defining appropriate measures (Lago-Peñas & Sampaio, 2015; Berger & Pope, 2011; Hoffman et al., 2004; Ball, 1972; Levine, 1974; Grimes, Kelly & Rubin, 1984 and Tcha & Pershin, 2003).

Lastly, inter observer consistency is evaluated to determine a consistent accuracy of the results within the study. In order to confirm inter observer consistency in the current study, several steps were conducted. In the data processing, the accuracy of the data collection was checked. The most central measures; medal count per country, year and day, was controlled thoroughly. On the other measures; name and number of participants, randomized tests were conducted to ensure the accuracy. In conclusion, the overall assessment of the reliability is considered appropriate.

3.6.2. Validity

Validity refers to whether the results meet the requirements of the chosen research method. Validity is evaluated by two measures, internal validity and external validity.

Internal validity concerns the degree to which the study measures what was supposed to be measured. In other words, that the results depend on the studied variables and not on any external factors (Bryman & Bell, 2011). In the current study, all data was collected from real events that had already happened. In real events, the observations take place in controlled environments without any manipulations. Since the events had already happened, the subjects that were studied, in this case athletes, were not aware of the current study and could not alter their performance. As such, there was no problem of subject reactivity, which can be the case when using interviews and questionnaires (Heppner, Wampold, & Kivlighan, 2008). In addition, data from sports events can be easily measured in a systematic way and it enables the researcher to examine individual performances in detail. This further enables that the collected information measures what is supposed to be measured (Goff & Tollinson, 1990).

External validity concerns the degree to which the results from the study can be further generalized (Bryman & Bell, 2011). As mentioned earlier, the non-probability sample used in this study makes the generalizability outside the sample lower. However, since there is limited research on interpersonal influences, derived from performances, within non task interdependent teams, the aim of this study was primarily to investigate whether the phenomena exist or not. The limited possibility to generalize outside the sample was therefore not considered a disadvantage. As the collected data is a homogenous sample on the selected measures (medal count), the generalization within the sample can however be considered as high. In sum, even though the limitations of generalization outside the sample, the overall validity of the study can be seen as high.

3.7. Pre Study

A pre study was conducted for two main reasons; to ensure the feasibility of the data collection and the feasibility of the data analysis. The feasibility of the data collection was mainly dependent on the availability of the data. The availability of the data was assessed by examining the official reports of the chosen Olympic Games. The assessment showed that all necessary data was available and accessible.

The feasibility of the data analysis was tested through collecting data on a smaller sample. Data was collected on the Swedish Olympic national team's performance in the Olympic Game in London in 2012. With this data, the intended statistical tests were conducted. The results from this analysis showed that it was possible to conduct the intended statistical tests on the collected data and intended variables. After consultation with the authors' tutors, Professor Patric Andersson and PhD Student Gustav Almqvist, no need for a larger pre study was considered necessary.

3.8. Variables

In the current study, a number of variables were used in the statistical analysis, some of which were used in both studies and some of which were used in only one of the studies. These will be presented below.

3.8.1. Used in Both Studies: Success and Failure

As described in the literature review section, the study's hypotheses concern athletes' performances in the Olympic Games. In both studies, two dimensions have been used to classify these performances: success and failure. There are number of possible ways to determine an Olympic performance as either successful or not successful (failure). A majority of previous studies on the Olympic Games have used the number of medals as a way to determine success (Hoffman et al., 2004; Ball, 1972; Levine, 1974; Grimes, Kelly & Rubin, 1984 and Tcha & Pershin, 2003). In the current study, two additional ways were also considered: a participant's final rank and an Olympic national team's success rate. Final rank is defined as a participant's final position in his or her respective sports discipline in the Olympic Game that he or she competed in. An Olympic national team's success rate was calculated as a ratio between the Olympic national team's number of medals taken divided by that Olympic national team's number of possible medal chances (i.e. the number of participants). This ratio was calculated both on individual days in an Olympic Game as well on individual Olympic Games.

In the current study, a participant's final rank was not used as a way to determine success as it was shown to bring several difficulties. Different sports disciplines in the Olympic Games have different numbers of participants and as a result it was considered misleading to use this measure. As a result, the number of medals and an Olympic national team's success rates were deemed to be the most suitable methods to determine success. An Olympic national team's success rate was used to conduct descriptive statistics whereas the number of medals was used to test the hypotheses in the study.

In both study 1 and study 2, a number of descriptive variables were used. These included *Nation*, *Year* and *Type of Olympic Game*. The variable *Nation* was a nominal variable indicating what nation the athlete's performance belonged to. The variable *Year* was a nominal variable indicating what Olympic Game the athlete's performance took place in. The variable *Year* was used to compute the variable *Type of Olympic Game*. All data points with a value of either 1994, 1998, 2002, 2006, 2010 and 2014 in the *Year* variable were given a value of 0, which indicated that the performances took place in a Winter Olympic Game. Similarly, a value of 1 was given to all data points with a value of 1996, 2000, 2004, 2008 and 2012 in the variable *Year*, indicating that the performances took place in a Summer Olympic Game.

3.8.2. Used in Study 1: Performances at the Start and End

In study 1, athletes' performances at the start of an Olympic Game and athlete's performances at the end of an Olympic Game was used to examine interpersonal influences within Olympic national teams.

Performances between different time periods have been studied before. Lago-Peñas and Sampaio (2015) studied the relationship between teams' performances at the start and at the end of a football league season and found a significant correlation. A similar way as the one used by Lago-Peñas and Sampaio (2015) was used to examine the influence of athletes' performances in the current study. In the current study, the start was represented by an Olympic national team's performance in the first four days of an Olympic Game. In other words, the number of medals taken by an Olympic national team in the first four days of an Olympic Game.

There were a number of reasons for choosing the first four days to represent the start of an Olympic Game. First, during the first two days of an Olympic Game the number of medals handed out are only a few. Since medal count was the main way to measure success in this study, the selected countries should have a possibility to take at least some medals during the selected start. Consequently, only studying performances in day 1 and day 2 would not have been sufficient. Second, most of the Olympic Games in the current study lasted for 16 days. Thus, the first four days would count for 25% of the total amount of days, which was considered to be representable for a start. Consequently, day 5 and onwards were selected to represent the end of an Olympic Game.

A variable labelled *Performance: Start* was computed through aggregating the number of medals that each nation had taken during day 1 to 4 for each individual Olympic Game. Similarly, a variable labelled *Performance: End* was computed, which included the aggregated number of medals that a nation had taken during day 5 and onwards for each individual Olympic Game. Both variables were interval variables, with equal intervals between the values. For instance, the difference between three and four medals was the same as the difference between five and six medals.

3.8.3. Used in Study 2: Previous Performances

In study 2, interpersonal influences between Olympic athletes were examined based on athletes' performances on a sequential level. The outcome of one athlete's performance of an Olympic national team was compared with the outcome of previous athletes' performances of the same Olympic national team. The aim was to test whether one athlete's performance was influenced by the outcome of other athletes' performances of the same Olympic national team that had taken place the day before.

In study 2, two categorical variables were computed, labelled *Performance: Actual Day* and *Performance: Previous Day.* The variable *Performance: Actual Day*, measured the quality of an individual athlete's performance in a given day. If the athlete's performance resulted in a medal, the variable was given a value of 1. If the athlete's performance did not result in a medal, the variable was given a value of 0. The variable *Performance: Previous Day* measured the quality of all performances of athletes within the same Olympic national team taken place the day before the individual athlete's performance. If any athlete of the same Olympic national team had taken a medal the day before the individual athlete participated, the variable was given a value of 1. If no medals had been taken the day before, by any athletes of the same Olympic national team, the variable was given a value of 0.

Below a summary of all variables used in study 1 and 2 can be found in table 2 below.

Variable Name	Definition	Possible Values	Type of Variable	Used in Study
Nation	The nation that the performance had been performed by.	Canada, France, Great Britain, Italy, Japan, Netherlands, Norway, South Korea, Sweden and Switzerland	Nominal variable	Study 1 & 2
Year	The year of the Olympic Game that the performance had been performed in.	1994, 1996, 1998, 2000, 2002, 2004, 2006, 2008, 2012 and 2014	Nominal variable	Study 1 & 2
Type of Game	The type of game that the performance had been performed in.	0 = Winter Olympic Game 1 = Summer Olympic Game	Categorical variable	Study 1 & 2
Performance: Start	Number of medals taken by an Olympic national team during Day 1-4.	Any value equal or greater than 0.	Interval variable	Study 1
Performance: End	Number of medals taken by an Olympic national team during Day 5 and onwards.	Any value equal or greater than 0.	Interval variable	Study 1
Performance: Actual Day	The quality of the individual athlete's performance in a given day.	0 = if the athlete's performance did not result in a medal 1 = if the athlete's performance resulted in a medal	Categorical variable	Study 2
Performance: Previous Day	The quality of all performances of athletes within the same Olympic national team taken place the day before the individual athlete's performance.	0 = if no medal had been taken by any member of the same national team the day before 1 = if one or more medals had been taken by any member of the same national team the day before	Categorical variable	Study 2

Table 2: Summary of variables

3.9. Statistical Analysis

To test the hypotheses in the current study, a number of statistical tests were conducted. The different tests will be described separately for each study. All statistical tests were conducted using SPSS, a statistical computer program. A significance level of .05 was set for all the analyses. Statistical analyses were also conducted to descriptively present the data collected, which were not used to test the hypotheses for empirical support but to give a more in depth understanding of the data.

3.9.1. Study 1

In study 1, a linear regression model was conducted to examine whether the performances of athletes within an Olympic national that compete at the start of an Olympic Game influence the performances of athletes competing at the end of the same Olympic Game.

With a linear regression models it is possible to determine whether there is a significant correlation between two variables. A linear regression model also enables a prediction of the outcome of one variable based on the outcome of another variable. Thus, a linear regression model is commonly used when there is a directional hypothesis. A directional hypothesis is a hypothesis in which there is an indication in what direction two variables are related. Since the start of an Olympic Game takes place before the end of an Olympic Game, it can be assumed that the performances at the start could influence the performances at the end. Thus, a linear regression model could help to predict the performances of athletes within an Olympic national team that compete at the end of an Olympic Game with the knowledge of how the athletes within the same team have performed at the start of the same Olympic Game.

The outcome of one variable is predicted with the regression coefficients; the gradient of the line and the intercept of the line. The degree of relationship between the variables is described with the gradient, which can have a value that is either positive, negative or 0. A significant gradient means that the value is significantly different from 0, which in turn means that there is a significant relationship between the two variables.

A linear regression model can be used with both one and more predictor variables. In this study, only one predictor variable has been used: the number of medals taken by an Olympic national team during Day 1 to 4. There are a number of assumptions of a linear regression model. These will be presented in table 3 below together with a description of how the assumptions were fulfilled.

Assumption	Description of Assumption	How It Was Fulfilled
Variable type	At least two variables (one predictor and one outcome variable). These variables should be of either ratio or interval scale.	The variables used were two and interval variables (number of medals).
Linear relationship	A linear relationship between the two variables needs to exist.	Scatterplots was made in SPSS to confirm a linear relationship.
Non-zero variance	The predictor observations should have some variation.	Existing variation was found across the predictor variables (Olympic national teams' performances differed)
No perfect multicollinearity	No perfect linear relationship between two or more of the predictors should exist.	Only one predictor variable was used in the linear regression, hence no multicollinearity between predictor variables was possible.
Homoscedasticity	The data should not show heteroscedasticity. This means that the variances should be similar across all values of the predictor variable. If the variables are similar there is homoscedacity.	Koenker test of Heteroscedasticity was conducted. A p value of <. 05 was found in the sample of all Olympic Games and Summer Olympic Games, i.e. homoscedasticity was found. In the sample of Winter Olympic Games, homoscedacity could not be found. As a consequence a linear regression will not be made individually for Winter Olympic Games (Appendix 4).
Normally distributed errors	The residuals in the model should be normally distributed with a mean of 0. Thus, the differences between the model and the observed data should be zero most frequently or very close to zero.	The means of the residuals in all three samples (All Olympic Games, Summer Olympic Games and Winter Olympic Games) were tested for in SPSS and they all had a mean of 0.
Autocorrelation	The residuals should not be correlated with one another.	A Durbin-Watson statistic was calculated in SPSS for all linear regressions used. A value greater than 2 was found in each linear regression model.

Table 3: Assumptions of linear regression (Newbold, Carlson & Thorne, 2012).

3.9.2. Study 2

3.9.2.1. Chi-Square Test of Independence

In study 2, a Chi-Square test of independence was conducted to determine whether there was a significant association between the two variables *Performance: Previous Day* and *Performance: Actual Day*. In other words, if there was an association between the outcome of one athlete's performance in an Olympic national team and the outcome of other team members performances that had competed the day before. This was done through calculating the frequencies of the observed data of each possible combination of the two variables, and inserting it into contingency tables. Contingency tables were conducted on a national team level as interpersonal influences in the current study were only examined within the context of the same Olympic national team. Contingency tables were conducted both on an overall level taking all Olympic Games jointly into account and on a type of game level, separating Winter Olympic Games and Summer Olympic Games.

		Performance: Actual Day	
		No Medal	*Medal*
Performance: Previous Day	*No Medal*		
	Medal		

Table 4: Contingency table, study 2

With the knowledge of the observed frequencies, the Chi-Square test of independence then examines whether there is a significant difference between the observed data and what would be expected if there was no association between the variables. If the observed and expected values are significantly different, the variables cannot be considered independent (Newbold, Carlson & Thorne, 2012).

There are a number of assumptions that need to be considered when conducting a Chi-Square test of independence. The assumptions and how these were fulfilled are presented in table 5 below.

Assumption	Description of Assumption	How it was fulfilled
Variable Type	The number of variables should be at least two with two categorical levels.	The variables used in the Chi-Square test were two; *Performance: Actual Day* and *Performance Previous Day*. Each variable was classified in two categorical levels; *medal* and *no medal*.
Data Type	The data type should be frequencies.	The data consisted of frequencies of the four possible combinations of athlete's performances in the actual and previous day (i) *Medal actual day and medal previous day (ii) Medal actual day and no medal previous day* (iii) *No medal actual day and medal previous day* (iv) *No medal actual day and no medal previous day*.
Number of observations	The number of observations in each cell should be at least five.	Each cell consisted of at least five observations.
Independency	The observations are assumed to be independent and not related to each other.	Since the studied performances take place during different days, the observations are not related to each other.
Mutual Exclusion	The categories of the variables should be mutually exclusive. An observation should only be able to fit into one level of each category.	The quality of the performance can either result in medal or no medal and thereby it can only fit into one level of each category.

Table 5: Assumptions of Pearson's Chi-Square test of independence, Newbold, Carlson & Thorne, 2012).

3.9.3. Descriptive Statistics

Since the collected data consisted of 16 870 data points, the number of observations was very large. To be able to get a deeper understanding of the collected data, a number of different descriptive statistics were used to summarize the data in a comprehensive way and to correctly depict the data. All descriptive statistics conducted can be seen in table 6 below.

Expected success was calculated by dividing the number of medals taken with the number of possible medal chances (number of participants). Expected success was a ratio presented in percentage. Expected failure was calculated through (1-Expected success). Probability of success was calculated with the Poisson probability distribution function.

The Poisson probability function looks as following:

$P(x) = \frac{e^{-\lambda}\lambda^{x}}{x!}$, for x = 0,1,2...

Where P (x) = the probability of x successes over a given time or space, given λ

λ = the expected number of successes per time or space unit; λ > 0

e ≅ 2.71828 (the base for natural logarithms)

Number of Participants	
Empirical Results	Number of participants in all Olympic Games
	Number of participants in each type of Olympic Game
	Number of participants per nation in all Olympic Games
	Number of participants per nation in each type of Olympic Game
	Number of participants per nation in each individual Olympic Game
	Average number of participants per nation in each type of Olympic Game
Appendix	Number of participants per nation per day in each type of Olympic Game (Appendix 1 & 2)
Medal Count	
Empirical Results	Number of medals taken in all Olympic Games
	Number of medals taken in each type of Olympic game
	Number of medals taken per nation in all Olympic Games
	Number of medals taken per nation in each type of Olympic Game
	Number of medals taken per nation in each individual Olympic Game
	Average number of medals taken per nation in each type of Olympic Game
Appendix	Number of medals per nation per day in each type of Olympic Game (Appendix 1 & 2)
Probability of Success (Medals)	
Empirical Results	Probability of success per nation in each type of Olympic game
	Probability of success per nation in each individual Olympic Game
Appendix	Expected success per nation in each individual Olympic Game (Appendix 3)
	Expected failure per nation in each individual Olympic Game (Appendix 3)
	Expected success per nation per day in each type of Olympic Game (Appendix 1 & 2)
	Expected failure per nation per day in each type of Olympic Game (Appendix 1 & 2)
	Probability of failure per nation in each type of Olympic Game (Appendix 3)
	Probability of failure per nation in each individual Olympic Game (Appendix 3)
	Probability of success per nation per day in each type of Olympic Game (Appendix 1 & 2)
	Probability of failure per nation per day in each type of Olympic Game (Appendix 1 & 2)

Table 6: Summary of descriptive statistics used in the study

4. Empirical Results

In this section, the results of the statistical tests and whether the hypotheses in the study can be empirically supported or not will be presented. The section will start with a presentation of the descriptive statistics of the collected data, followed by the empirical results for study 1 and study 2 presented separately.

4.1. Descriptive Statistics

Below a number of descriptive statistics of data on the number of participants, medal count and probability of success is presented.

Number of Participants			
Nation	**All Olympic Games**	**Winter Olympic Games**	**Summer Olympic Games**
Canada	2330	1052	1278
France	2380	820	1560
Great Britain	1737	266	1471
Italy	2342	986	1356
Japan	2145	829	1316
Netherlands	933	290	643
Norway	1128	821	307
South Korea	1478	425	1053
Sweden	1180	606	574
Switzerland	1217	682	535
Total	16870	6777	10093

Table 7: Descriptive statistics: Number of participants

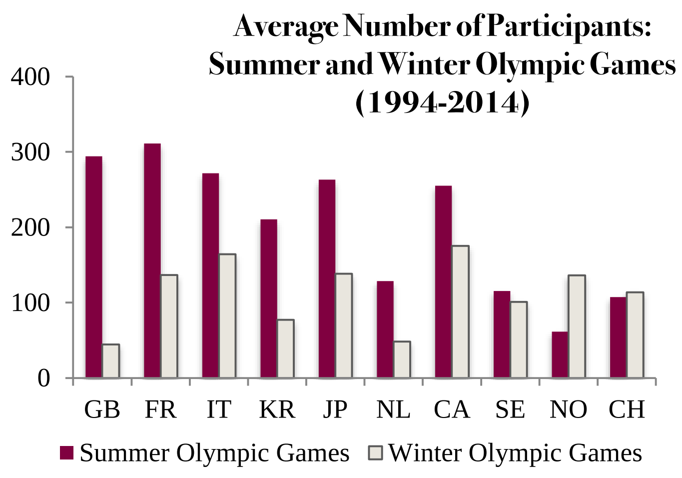

Diagram 1: Average number of participants

As can be seen in table 7 and diagram 1, the total number of participants in the studied Olympic Games differ across the studied nations. For all nations except Norway and Switzerland, the number of participants has been greater in the Summer Olympic Games than in the Winter Olympic Games.

Medal Count			
Nation	**All Olympic Games**	**Winter Olympic Games**	**Summer Olympic Games**
Canada	205	119	86
France	240	59	181
Great Britain	195	10	185
Italy	223	67	156
Japan	162	30	132
Netherlands	166	64	102
Norway	179	143	36
South Korea	190	52	138
Sweden	93	53	40
Switzerland	92	60	32
Total	1745	657	1088

Table 8: Descriptive statistics: Medal count

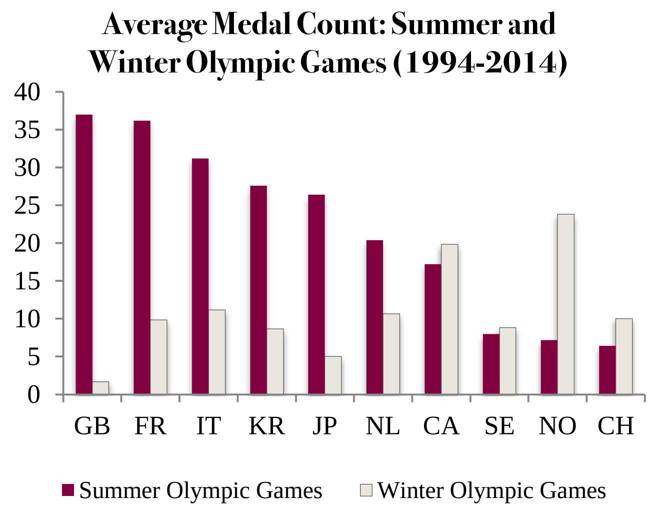

Diagram 2: Average medal count

As can be seen in table 8 and diagram 2, the total number of medals taken at the studied Olympic Games have differed across the nations. Norway have taken a greater number of medals in the Winter Olympic Games than the Summer Olympic, while Canada, Sweden and Switzerland have taken a slightly higher number of medals in the Winter Olympic Games than in the Summer Olympic Games. The rest of the studied nations have taken a greater number of medals in the Summer Olympic Games than in the Winter Olympic Games.

Probability of Success Per Year Winter Olympic Games (1994-2014)								
Year	**1994**	**1998**	**2002**	**2006**	**2010**	**2014**	**Max**	**Min**
CA	11%	11%	11%	10%	11%	10%	*11%*	*10%*
FR	4%	7%	8%	7%	6%	9%	*9%*	*4%*
GB	3%	4%	4%	2%	2%	7%	*7%*	*2%*
IT	13%	7%	7%	5%	3%	4%	*13%*	*3%*
JP	4%	6%	1%	1%	4%	7%	*7%*	*1%*
NL	10%	22%	19%	17%	14%	30%	*30%*	*10%*
NO	19%	18%	17%	14%	15%	15%	*19%*	*14%*
KR	13%	9%	5%	12%	18%	8%	*18%*	*5%*
SE	3%	3%	7%	12%	10%	15%	*15%*	*3%*
CH	10%	7%	9%	11%	7%	7%	*11%*	*7%*

Table 9: Probability of success: Winter Olympic Games

Probability of Success Per Year Winter Olympic Games (1994-2014)							
Year	**1996**	**2000**	**2004**	**2008**	**2012**	**Max**	**Min**
CA	8%	5%	5%	7%	8%	*8%*	*5%*
FR	11%	11%	10%	11%	11%	*11%*	*10%*
GB	5%	9%	11%	15%	15%	*15%*	*5%*
IT	11%	12%	11%	9%	11%	*12%*	*9%*
JP	5%	7%	14%	9%	14%	*14%*	*5%*
NL	14%	17%	15%	12%	14%	*17%*	*12%*
NO	9%	13%	12%	13%	7%	*13%*	*7%*
KR	8%	13%	13%	14%	14%	*14%*	*8%*
SE	6%	9%	7%	5%	8%	*9%*	*5%*
CH	5%	8%	4%	7%	4%	*8%*	*4%*

Table 10: Probability of success: Summer Olympic Games

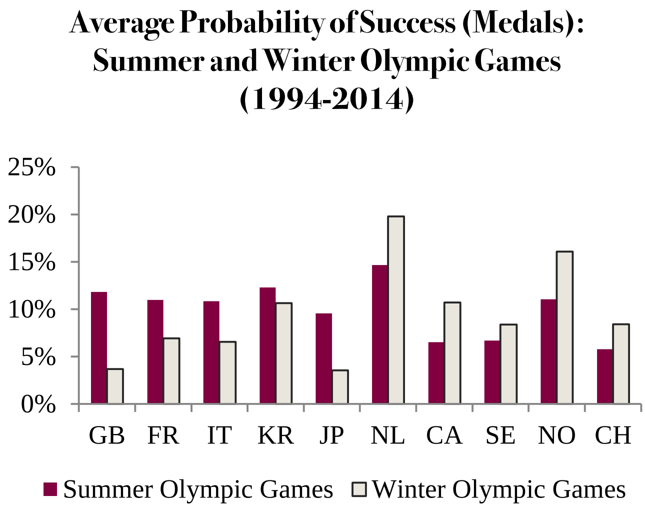

Diagram 3: Average probability of success

Based on the number of previous successes (number of medals) and number of participants in the studied nations, the probability for an athlete to succeed in the studied Olympic Games have differed across nations. In the studied Olympic Games, athletes from the Dutch Olympic national team have had the highest probability to succeed in both Winter Olympic Games and Summer Olympic Games.

4.2. Study 1 – Linear Regression

As the Winter Olympic Games did not pass through the test of homoscedacity when these observations were examined individually, a linear regression was only conducted when the Olympic Games were examined collectively and when the Summer Olympic Games were examined individually. As can be seen in table 11, the R-value of .659 shows a positive correlation between an Olympic national team's medal count during day 1 to 4 and an Olympic national team's medal count during day 5 and onwards in all Olympic Games. The R^2 value of .435, shows that the medal count during day 1 to 4 can account for 43.5% of the variation in the team's medal count in day 5 and onwards in all Olympic Games. Furthermore, as can be seen in table 11 all values are significant ($p < .01$). Thus, the regression model can significantly predict an Olympic national team's performances at the end of an Olympic Game.

When examining Summer Olympic Games individually, the R value of .660 in table 11 shows a positive correlation between an Olympic national team's medal count during day 1 to 4 and the medal count during day 5 and onwards. The R^2 value of .436, shows that an Olympic national team's medal count in day 1 to 4 accounts for 43.6 % of the variation in the team's medal count in day 5 and onwards in the Summer Olympic Games. As can be seen in table 11 all values are significant ($p < .01$). Thus, the regression model can significantly predict an Olympic national team's performances during the end of a Summer Olympic Game.

	All Olympic Games	Winter Olympic Games	Summer Olympic Games
R	0,659	N/A	0,660
β Constant	6,259**	N/A	9,690**
β Day 1-4	1,526**	N/A	1,410**
R^2	0,435	N/A	0,436
N.of observations	110	N/A	50

*Note: *P < 0.05, **P < 0.01*

Table 11: Empirical results: Linear regression

4.3. Study 2 - Chi Square Test of Independence

4.3.1. All Olympic Games Examined Collectively

As can be seen in table 12, the results of the Chi-square test of independence differed across nations when all Olympic Games were examined collectively. For all nations, except France, Great Britain and Italy, the difference between the expected frequencies and the observed frequencies were significantly different ($p < .01$). Thus, for these nations, the outcome of one athlete's performance in the Olympic national team and the outcome of previous athletes' performances of the same Olympic national team were found to be significantly dependent.

All Olympic Games				
Nation	Value	Degrees of freedom	P-value	N of observation
Canada	18,542	1	0,000	2330
France	1,584	1	0,208	2380
Great Britain	0,390	1	0,532	1737
Italy	1,481	1	0,224	2342
Japan	10,612	1	0,001	2145
Netherlands	13,120	1	0,000	933
Norway	8,536	1	0,003	1128
South Korea	11,832	1	0,001	1478
Sweden	18,662	1	0,000	1180
Switzerland	45,874	1	0,000	1217

Table 12: Pearson's Chi-square Test of Independence: All Olympic Games

In table 13 below, the differences between the observed frequencies and the expected frequencies for each of the four possible combinations are presented. As was described in the methodology section, the Chi-Square statistic calculates the value that can be expected if no dependency is found and the difference between this value and the observed value in each combination is presented below. For all nations that showed significant dependency between the performances of the actual day and the previous day, the number of cases where a medal was taken both on the previous day and actual day were fewer than expected. Similarly, the number of cases where no medal was taken on both the previous day and the actual day were also fewer than expected. In contrast, the number of cases were the outcomes were different on the actual day and the previous day (no medal/medal and medal/no medal) were more than what could be expected. The number of observed frequencies for each of the four possible combinations can be found in appendix 1.

All Olympic Games				*Performance: Previous Day* No Medal	Medal
Canada	*Performance: Actual Day*	Obs – Exp	No medal	-24	+24
		Obs – Exp	Medal	+24	-24
France	*Performance: Actual Day*	Obs – Exp	No medal	-7	7
		Obs – Exp	Medal	7	-7
Great Britain	*Performance: Actual Day*	Obs – Exp	No medal	3	-3
		Obs – Exp	Medal	-3	3
Italy	*Performance: Actual Day*	Obs – Exp	No medal	-7	7
		Obs – Exp	Medal	7	-7
Japan	*Performance: Actual Day*	Obs – Exp	No medal	-17	+17
		Obs – Exp	Medal	+17	-17
Netherlands	*Performance: Actual Day*	Obs – Exp	No medal	-19	+19
		Obs – Exp	Medal	+19	-19
Norway	*Performance: Actual Day*	Obs – Exp	No medal	-15	+15
		Obs – Exp	Medal	+15	-15
South Korea	*Performance: Actual Day*	Obs – Exp	No medal	-19	+19
		Obs – Exp	Medal	+19	-19
Sweden	*Performance: Actual Day*	Obs – Exp	No medal	-18	+18
		Obs – Exp	Medal	+18	-18
Switzerland	*Performance: Actual Day*	Obs – Exp	No medal	-30	+30
		Obs – Exp	Medal	+30	-30

Table 13: Differences between observed and expected frequencies in Pearson's Chi-square Test of Independence: All Olympic Games

4.3.2. Each Type of Olympic Game Examined Separately

4.3.2.1. Winter Olympic Games

As can be seen in table 14 below, the results of the Chi-square test of independence differed across nations when the Winter Olympic Games were examined separately. For all nations except Norway and Sweden the difference between the expected frequencies and the observed frequencies were significantly different ($p < .05$). Thus, in these nations, the outcome of one athlete's performance in the Olympic national team and the outcome of previous athletes' performances of the same Olympic national team were found to be significantly dependent. In contrast, for Norway and Sweden the outcome of one athlete's performance in the Olympic national team and the outcome of previous athletes' performances of the same Olympic national team were not found to be significantly dependent ($p > .05$).

Winter Olympic Games				
Nation	**Value**	**Degrees of freedom**	**P-value**	**N of observation**
Canada	6,427	1	0,011	1052
France	8,934	1	0,003	820
Great Britain	18,229	1	0,000	266
Italy	11,752	1	0,001	986
Japan	41,869	1	0,000	829
Netherlands	7,027	1	0,008	290
Norway	1,295	1	0,255	821
South Korea	27,28	1	0,000	425
Sweden	2,802	1	0,094	606
Switzerland	10,717	1	0,001	682

Table: 14: Pearson's Chi-Square test of independence: Winter Olympic Games

All nations that showed significant dependency between the performances of actual day and previous day in an Olympic Winter Game, showed a smaller number of cases where a medal was taken both on the previous day and actual day than expected, as can be seen in table 15. Furthermore, the number of cases were no medal was taken on both the previous day and actual day were also fewer than expected. In contrast, the number of cases were the outcomes were different on the actual day and previous day (no medal/medal and medal/no medal) were more than what could be expected. The number of observed frequencies of each of the four possible combinations can be found in appendix 2.

Winter Olympic Games				*Performance: Previous Day* No Medal	Medal
Canada	*Performance: Actual Day*	Obs – Exp	No medal	-11	+11
		Obs – Exp	Medal	+11	-11
France	*Performance: Actual Day*	Obs – Exp	No medal	-11	+11
		Obs – Exp	Medal	+11	-11
Great Britain	*Performance: Actual Day*	Obs – Exp	No medal	-6	+6
		Obs – Exp	Medal	-6	+6
Italy	*Performance: Actual Day*	Obs – Exp	No medal	-11	+11
		Obs – Exp	Medal	+11	-11
Japan	*Performance: Actual Day*	Obs – Exp	No medal	-18	+18
		Obs – Exp	Medal	+18	-18
Netherlands	*Performance: Actual Day*	Obs – Exp	No medal	-9	+9
		Obs – Exp	Medal	+9	-9
Norway	*Performance: Actual Day*	Obs – Exp	No medal	-5	+5
		Obs – Exp	Medal	+5	-5
South Korea	*Performance: Actual Day*	Obs – Exp	No medal	-17	+17
		Obs – Exp	Medal	+17	-17
Sweden	*Performance: Actual Day*	Obs – Exp	No medal	-6	+6
		Obs – Exp	Medal	+6	-6
Switzerland	*Performance: Actual Day*	Obs – Exp	No medal	-12	+12
		Obs – Exp	Medal	+12	-12

Table 15: Differences between observed and expected frequencies in Pearson's Chi-square Test of Independence: Winter Olympic Games

4.3.2.2. Summer Olympic Games

As can be seen in table 16, the results of the Chi-square test of independence differed across nations when Summer Olympic Games were examined separately. For Canada, Norway, Sweden and Switzerland the outcome of one athlete's performance in an Olympic national team and the outcome of previous athletes' performances of the same Olympic national team was found to be significantly dependent ($p < .01$). For France, Great Britain, Italy, Japan, The Netherlands and South Korea the outcome of one athlete's performance in an Olympic national team and the outcome of previous athletes' performances of the same Olympic national team was not found to be significantly dependent ($p > .05$).

Summer Olympic Games				
Nation	**Value**	**Degrees of freedom**	**P-value**	**N of observation**
Canada	13,151	1	0,000	1278
France	0,543	1	0,461	1560
Great Britain	2,377	1	0,123	1471
Italy	0,293	1	0,588	1356
Japan	0,399	1	0,527	1316
Netherlands	3,667	1	0,056	643
Norway	17,193	1	0,000	307
South Korea	0,79	1	0,374	1053
Sweden	21,871	1	0,000	574
Switzerland	47,826	1	0,000	535

Table 16: Pearson's Chi-square test of independence: Summer Olympic Games

All nations that showed significant dependency between the performances of actual day and previous day in an Olympic Winter Game, showed a smaller number of cases where a medal was taken both on the previous day and actual day than expected, as can be seen in table 16. Furthermore, the number of cases where no medal was taken on both the previous day and actual day were also fewer than expected. In contrast, the number of cases where the outcomes were different on the actual day and previous day (no medal/medal and medal/no medal) were more than what could be expected. The number of observed frequencies of each of the four possible combinations can be found in appendix 3.

Summer Olympic Games				*Performance: Previous Day* No Medal	Medal
Canada	*Performance: Actual Day*	Obs – Exp	No medal	-13	+13
		Obs – Exp	Medal	+13	-13
France	*Performance: Actual Day*	Obs – Exp	No medal	-3	+3
		Obs – Exp	Medal	+3	-3
Great Britain	*Performance: Actual Day*	Obs – Exp	No medal	+7	-7
		Obs – Exp	Medal	-7	+7
Italy	*Performance: Actual Day*	Obs – Exp	No medal	+2	-2
		Obs – Exp	Medal	-2	+2
Japan	*Performance: Actual Day*	Obs – Exp	No medal	-2	+2
		Obs – Exp	Medal	+2	-2
Netherlands	*Performance: Actual Day*	Obs – Exp	No medal	-8	+8
		Obs – Exp	Medal	+8	-8
Norway	*Performance: Actual Day*	Obs – Exp	No medal	-9	+9
		Obs – Exp	Medal	+9	-9
South Korea	*Performance: Actual Day*	Obs – Exp	No medal	-4	+4
		Obs – Exp	Medal	+4	-4
Sweden	*Performance: Actual Day*	Obs – Exp	No medal	-12	+12
		Obs – Exp	Medal	+12	-12
Switzerland	*Performance: Actual Day*	Obs – Exp	No medal	-16	+16
		Obs – Exp	Medal	+16	-16

Table 17: Differences between observed and expected frequencies in Pearson's Chi-square Test of Independence: Summer Olympic Games

4.4. Summary of Results of Hypotheses Tests

In table 18 below, a summary of whether the hypotheses could be empirically supported or not and an interpretation of the results are presented.

All Olympic Games	
H0a: No **H1a: Yes**	**Study 1:** The regression model showed significant correlation between an Olympic national team's performance at the start and at the end was found.
H0a: No **H1a: Yes**	**Study 2:** The majority of the cases (7/10) in the Chi-square test of independence showed significant dependency between the quality of an individual athlete's performance in a given day and the quality of the performances of athletes within the same Olympic national team taken place the day before
Interpretation	*The performance of one athlete in an Olympic national team is influenced by other athletes' performances within the same Olympic national team*
Winter Olympic Games	
H0b: N/A **H1b: N/A**	**Study 1:** A regression model was not possible to conduct.
H0b: No **H1b: Yes**	**Study 2:** The majority of the cases (8/10) in the Chi-square test of independence showed significant dependency between the quality of an individual athlete's performance in a given day and the quality of the performances of athletes within the same Olympic national team taken place the day before.
Interpretation	*In a Winter Olympic Game, the performance of one athlete in an Olympic national team is influenced by other athletes' performances within the same team.*
Summer Olympic Games	
H0c: No **H1c: Yes**	**Study 1:** The regression model showed significant correlation between an Olympic national team's performances at the start and at the end was found.
H0c: Yes **H1c: No**	**Study 2:** Only a minority of the cases (4/10) in the Chi-square test of independence showed significant dependency between the quality of an individual athlete's performance in a given day and the quality of the performances of athletes within the same Olympic national team taken place the day before.
Interpretation	*In a Summer Olympic Game, the performance of one athlete in an Olympic national team is partly influenced by other athletes' performances within the same team*

Table 18:Empirical support of hypotheses

5. Discussion

In this section, the empirical results will be discussed. The discussion will start with a general discussion, followed by suggestions for future research, managerial implications as well as critique of the study. Lastly, a final conclusion of the study will be presented.

5.1. General Discussion

5.1.1. Interpersonal Influences Found in Non-Task Interdependent Teams

The results from the linear regressions in study 1 showed that the number of medals taken by an Olympic national team at the start of an Olympic Game could be used to predict the number of medals taken at the end of the same Olympic Game. These results were found both when examining all Olympic Games collectively and Summer Olympic Games individually. With the significant positive correlation found, it was showed that an increase in the number of medals taken at the start of an Olympic Game can increase the number of medals taken at the end of the same Olympic Game. The results from the Chi-square tests of independence in study 2 showed that, in the majority of the cases, the outcome of one athlete's performance was associated with the outcome of previous athletes' performances of the same Olympic national team. Thus, with the collected evidence, the current study could show that one athlete's performance can influence other athletes' performances within the same Olympic national team. In other words, it was shown that interpersonal influences, derived from performances, can exist in teams with no task interdependence. This extends the current research on interpersonal influences within teams by showing that interpersonal influences do not only exist in teams with task interdependence but also in non-task interdependent teams.

However, although significant associations were found in the Chi-Square tests of independence, the direction of this association was in contrast to what was anticipated. In further detail, the number of frequencies in which a successful performance was followed by another successful performance was fewer than what would have been expected if no dependency had been found. In contrast, the number of frequencies in which a successful performance occurred after a non-successful performance had occurred, was greater than what would have been expected if no dependency had been found. Thus, performances of athletes within an Olympic national team were shown to be associated with each other, however not in the direction that was expected in line with the concept of the "hot-hand". Given that an individual has had a previous successful performance it should be more likely that the individual succeeds in the subsequent performance as well according to the concept of the "hot-hand". However, this was not the case in the current study. A reason to why this relationship was not found can be attributed to the fact that the concept of the "hot-hand" has previously been found when examining an individual athletes' performance in isolation. Sequential success between athletes' performances has not been studied before and the results of the current study do not show any indication that such a relationship would occur between athletes.

In the literature review, pressure was considered to be one factor that could explain why interpersonal influences, derived from performances, exist between members of an Olympic national team. As was argued in the literature review section, a bad performance of an athlete within an Olympic national team could affect the level of psychological pressure of other athletes within the same team and thereby lead to a decrease in their performances (Yerkes and Dodson, 1908). The results from the current study were not in line with this reasoning. An unsuccessful performance of one Olympic athlete, led in more cases than expected to a successful performance of other athletes within the same Olympic national team, than what would have been expected if no dependency had been found. It cannot be said whether the arousal levels of the other athletes were not influenced by the previous athlete's performance. However, it can be said that the performance was not unsuccessful enough to lead to a decrease of the other team members' performances. As this study only compared the actual performance with the performances of the previous day, a streak of unsuccessful performance and its potential influence was not measured. Potentially, if a streak of unsuccessful performances had occurred over a number of days, other athletes' performances would have been unsuccessful as well due to increased levels of psychological pressure.

Another factor that was discussed in the literature review was the group goal's impact on the team environment. With previous research by Evans et al. (2012) it was argued that the presence of a group goal can moderate the influence that task interdependence has on the team environment. As such, it was argued that whether interpersonal influences exist or not within a team, may be more determined by the team's degree of group outcome interdependence, rather than the team's degree of task interdependence. In other words, as long as a team has a group goal, the lack of task interdependence may not eliminate the possibility of interpersonal influences to exist. Since interpersonal influences were shown to exist in non-task interdependent teams it can be proven that the lack of task interdependence was not important enough to eliminate interpersonal influences. However, whether it was the presence of outcome interdependence that contributed to these interpersonal influences cannot be sure. Given that one member of an Olympic national team fails in his or her attempt to contribute to the achievement of the group goal, the motivation for other athletes to perform could be even higher. This can explain why one athlete's unsuccessful performance more frequently lead to a successful performance of other athletes within the same team. However, there seems to be no rational reason to why a successful performance of one team member should lead to an unsuccessful performance of another team member, in terms of achieving the group goal. Since a group goal in an Olympic national team is not set on a maximum level, in other words there is no maximum limit to how many medals an Olympic national team should take. In contrast, it is assumed that an Olympic national team would consider the more medals, the better. As such, one athlete should not be less motivated to perform on a high level even if the group goal is already achieved, as the individual athlete should still want to achieve their individual goal.

As a conclusion, the results presented in this study, shows that the performance of an athlete in an Olympic national team is influenced by other athletes' performances within the same team but in a different direction to what was anticipated.

5.1.2. Difference Between Winter and Summer Olympic Games

In the linear regression on Summer Olympic Games, the results showed that the number of medals taken by an Olympic national team at the start of a Summer Olympic Game could be used to predict the number of medals taken by the same Olympic national team at the end of the same Summer Olympic Game. Similarly, in the Chi-Square test of independence the outcome of one athlete's performance in an Olympic national team and the outcome of previous athletes' performances of the same team were shown to be associated in a majority of the cases in the Winter Olympic Games. For the performances in the Summer Olympic Games, this association was only found in a minority of all cases. There are a number of potential reasons behind this difference between the two types of Olympic Games. As discussed in the literature review section, interpersonal influences can vary with group size, where a smaller group often is characterized by greater interpersonal influences (Widmeyer et al., 1990). As the Winter Olympic Games include fewer disciplines compared to the Summer Olympic Games, the size of the average Olympic national team should be smaller in the Winter Olympic Games than in the Summer Olympic Games. This was true for all nations except Norway, who were the only nation that had a larger average national team size in the Winter Olympic Games than the Summer Olympic Games. The fact that athletes' performances were more often associated with each other in the Winter Olympic Games than the Summer Olympic Games are therefore not surprising.

Furthermore, the smaller number of sports disciplines in the Winter Olympic Games should also lead to fewer athletes that are from different sport disciplines within a Winter

Olympic national team than in a Summer Olympic national team. In theory, a Winter Olympic national team can at the most have 100 different types of sports disciplines that athletes can compete in. In contrast, a Summer Olympic national team can have up to 300 different sports disciplines that athletes can compete in. This may affect the level of perceived social identification among the team members of an Olympic national team. According to social identity theory, the likelihood of an individual to identify themselves with a group is higher if that individual perceives himself or herself to be similar with other members of the group (Tajfel & Turner, 1986). Thus, the perceived differences between athletes of a Winter Olympic Game could be considered to be smaller than the ones between athletes of a Summer Olympic Game. As a result, it should be more likely that a greater number of athletes within a Winter Olympic national team can identify themselves with other members of the team, compared the extent to which athletes within a Summer Olympic national can identify themselves with other members of the Summer Olympic national team. This could explain why interpersonal influences were shown to be significant in more Winter Olympic national teams than in Summer Olympic national teams.

5.1.3. Olympic National Team Differences

The results from study 2 showed that the association between the outcome of one athlete's performance in an Olympic national team and the outcome of previous athletes' performances of the same team differed across nations. In detail, for some nations previous and actual performances were significantly dependent but for other nations no significant dependency was found. The differences can be explained with the variance in medal count between the nations. Those nations where a significant dependency was found were the nations who took a smaller number of medals in the corresponding type of game. In contrast, for nations that typically take a large number of medals, the performances were typically not significantly dependent. Nations that took a large number of medals in an Olympic Game usually had more days where at least one medal was taken. Consequently, there were not many days where no medals were taken in these Olympic national teams. If a medal had been taken every day, the value of the performance on the previous day would be the same for every observation. For example, in 85% of the observations on British athletes' performances in the Summer Olympic Games a medal had been taken the day before and not surprisingly these outcomes were not shown to be dependent.

5.2. Future Research and Managerial Implications

5.2.1. Future Research

The current study has given important insights to the subject of interpersonal influences within non-task interdependent teams, a team setting which has typically been overlooked. Evidence in the current study has shown that interpersonal influences, derived from performances, can also exist within non-task interdependent teams. However, future research should also examine why these influences exist in order to understand the nature of these influences more thoroughly and how they emerge.

Furthermore, in future research on interpersonal influences it would also be of interest to take into account the relative importance that individuals put on individual goals contra group goals. It is not considered unlikely that this relative importance can moderate the interpersonal influences between individuals. As Wagner and Moch (1986) describe, some people, also referred to as individualists, put a greater relative importance on individual goals than group goals and view their performances as a result of individual efforts. In contrast, collectivists put more relative importance on group goals than their individual goals and view their performances as a result of the collective effort of all group members (Wagner & Moch, 1986). It would therefore not be unlikely that interpersonal influences between athletes could differ depending on if they are individualists or collectivists. However, this needs to be further researched.

It would also be interesting to measure athletes' mental constructs that have not been tested in the current study but which may impact the extent of interpersonal influences, such as individuals' ability to handle pressure, concentration levels and degree of confidence. These constructs have previously been studied in the context of sports performances (Hemery, 1986; Ungerleider & Golding, 1992; Vernacchia et al., 2000).

Lastly, in the current study an individual athlete's possibility to take medals has not been taken into consideration. For instance, based on previous performance, athletes should be considered to have different possibilities to take a medal in the Olympic Games. This could impact how influenced athletes may be by the quality of other athletes' performances. For instance, consider a situation in which a high ranked athlete who has been expected to win the gold medal in a sports discipline underperforms and does not take the expected gold medal. Would this have a greater influence on his or her team members, compared to if a team member that is not expected to take a medal does not do so? This dimension is of high interest to be researched further.

5.2.2. Managerial Implications

The results in the current study showed that interpersonal influences can exist within Olympic national teams. Hence, the Swedish Olympic Committee is right that athletes within an Olympic national team can be influenced by the performances of other members of the team. However, the interpersonal influences do not seem to work in the direction that the Swedish Olympic Committee had anticipated. Since the Swedish Olympic Committee puts a strong emphasis on that all members of the team should perform on a high level, it can be assumed that there is a belief within the Committee that successful performances will lead to other successful performances. However, as shown in the current study, the relation between athletes' performances works in the opposite direction. There is actually fewer cases in which successful performances occur on a sequential level than what is expected. In addition, there is no evidence that the success of the Swedish Olympic national team has improved since the tough qualification levels were implemented (Appendix 2). As such, to limit a number of Swedish athlete's possibility to participate in the Olympic Games, in other words to take away potentially the biggest dream an athlete can have, does not seem to be justified. If anything, the results show that more frequently a non-successful performance leads to a successful performance than what is expected. In other words, if one team member does not perform well should not have a negative influence on another athlete's performance. As a result, the Swedish Olympic Committee should consider revising their tough qualification levels.

In previous research within a sports context, the results found have commonly been applied to other contexts as well, such as the organizational context. Furthermore, teams with no task interdependence but group outcome interdependence are considered to also exist in other contexts than the sport context. For example, consider an organization with a sales team that consist of field sales men working alone on their task but with a common group goal. Also consider a bank with local bank offices that each contributes to the overall bank goal but with autonomy in the daily work. Both these organizational examples could be considered teams with no task interdependence but with group outcome interdependence. Given that such team settings exist in the organizational context, the interpersonal influences found in the current study, could exist in the organizational context as well. Similar to the Olympic setting, interpersonal influences, derived from performances, among members of non-task interdependent teams should be considered when composing a team. Most importantly, the organizational management should not be too worried that a non-successful performance of one team member will negatively influence the performances of other team members in teams where collaboration is not needed in the task. An unsuccessful performance may even lead to an increased number of successful performances by other team members.

5.3. Limitations to the Study

The current study has contributed to both the research field and managerial field. However, some limitations with the study are important to note. In an Olympic Game, the same athlete can participate in several sports disciplines and thereby it is possible for one athlete to take more than one medal. An implication of this is that when one athlete's actual performance has been compared to other athletes' previous performances, that specific athlete can have been compared to its own previous performance. Thus, the potential influence may have been derived from the individual athlete himself or herself. With 16 870 data points, this potential situation was considered to be minimal in relation to the number of observations where such a situation would not be present.

The purpose of the current study has been to investigate whether interpersonal influences exist within Olympic national teams. However, only brief discussions on why these interpersonal influences can exist have been made. No tests on different potential factors on why these influences exist have been made. As a result, this study can only state that these influences exist but not why.

As mentioned in the methodology section, the sample used in this study has been a non-probability sample, which brings difficulties to the generalization. In more detail, whether the result of the study can be generalized outside of the sample cannot be said. However, to increase the generalizability of the study, data on more nations' performances would have been required. This would have lead to an increased number of observations to the already extensive data set. Collecting this increased number of observations as well as analysing this data was not considered possible given the limited time frame.

5.4. Final Conclusion

The current study has shown that interpersonal influences exist among members of an Olympic national team. Both the performances by athletes at the start of an Olympic Game and the performances of athletes taking place the day before an athlete competes can influence how well other athletes within the same Olympic national team will perform.

Even though athletes such as Björn Ferry have stated that other team members' performances do not matter, these performances have in fact been shown to matter. Recall the question posed in the introduction on which of Ferry's or the Swedish Olympic Committee's views on interpersonal influences that was the most accurate depiction of the truth. In fact, no one is completely right. The results of the study showed that an athlete's performance can be influence by the performances of other athletes within the same Olympic national team. Thus, Ferry's view that performances of other athletes do not matter could not be considered correct. The Swedish Olympic Committee believes in a high performing culture and argues that it is necessary to have an Olympic national team in which all members of the team perform on a high level. However, the results showed that a successful performance actually leads to a successful performance fewer times than what was expected. Thus, the Swedish Olympic Committee is right that athletes within an Olympic national team can be influenced by the performances of other members of the team. However, the interpersonal influences do not work in the direction that the Swedish Olympic Committee had anticipated. As a result, the Swedish Olympic Committee is not completely correct either.

In less than three months it is once again time for the most prestigious sports event to take place. The level of success that the Swedish Olympic national team will experience in the upcoming Olympic Games is yet to be determined. However, based on the results of the current study, the success of the Swedish Olympic national team in Rio will most likely be lower than what it could have been if the Swedish Olympic Committee would have allowed more athletes to participate.

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7. Appendix

7.1. Appendix 1: Contingency Table: All Olympic Games

All Olympic Games			*Performance: Previous Day* No Medal	Medal	Total
Canada	*Performance: Actual Day*	No medal	422	1703	2125
		Medal	67	138	205
		Total	489	1841	2330
France	*Performance: Actual Day*	No medal	407	1732	2139
		Medal	54	187	241
		Total	461	1919	2380
Great Britain	*Performance: Actual Day*	No medal	255	1286	1541
		Medal	29	167	196
		Total	284	1453	1737
Italy	*Performance: Actual Day*	No medal	359	1760	2119
		Medal	45	178	223
		Total	404	1938	2342
Japan	*Performance: Actual Day*	No medal	405	1570	1975
		Medal	53	117	170
		Total	458	1687	2145
Netherlands	*Performance: Actual Day*	No medal	214	553	767
		Medal	70	96	166
		Total	284	649	933
Norway	*Performance: Actual Day*	No medal	196	752	948
		Medal	55	125	180
		Total	251	877	1128
South Korea	*Performance: Actual Day*	No medal	276	1009	1285
		Medal	63	130	193
		Total	339	1139	1478
Sweden	*Performance: Actual Day*	No medal	296	791	1087
		Medal	45	48	93
		Total	341	839	1180
Switzerland	*Performance: Actual Day*	No medal	349	775	1124
		Medal	61	32	93
		Total	410	807	1217

7.2. Appendix 2: Contingency Table: Winter Olympic Games

Winter Olympic Games			*Performance: Previous Day* No Medal	Medal	Total
Canada	*Performance: Actual Day*	No medal	188	745	933
		Medal	36	83	119
		Total	224	828	1052
France	*Performance: Actual Day*	No medal	265	496	761
		Medal	32	27	59
		Total	297	523	820
Great Britain	*Performance: Actual Day*	No medal	61	194	255
		Medal	9	2	11
		Total	70	196	266
Italy	*Performance: Actual Day*	No medal	202	717	919
		Medal	27	40	67
		Total	229	757	986
Japan	*Performance: Actual Day*	No medal	222	568	790
		Medal	30	9	39
		Total	252	577	829
Netherlands	*Performance: Actual Day*	No medal	92	134	226
		Medal	38	26	64
		Total	130	160	290
Norway	*Performance: Actual Day*	No medal	149	528	677
		Medal	38	106	144
		Total	187	634	821
South Korea	*Performance: Actual Day*	No medal	144	232	376
		Medal	38	11	49
		Total	182	243	425
Sweden	*Performance: Actual Day*	No medal	187	366	553
		Medal	24	29	53
		Total	211	395	606
Switzerland	*Performance: Actual Day*	No medal	252	369	621
		Medal	38	23	61
		Total	290	392	682

7.3. Appendix 3: Contingency Table: Summer Olympic Games

Summer Olympic Games			Performance: Previous Day No Medal	Medal	Total
Canada	*Performance: Actual Day*	No medal	234	958	1192
		Medal	31	55	86
		Total	265	1013	1278
France	*Performance: Actual Day*	No medal	142	1236	1378
		Medal	22	160	182
		Total	164	1396	1560
Great Britain	*Performance: Actual Day*	No medal	194	1092	1286
		Medal	20	165	185
		Total	214	1257	1471
Italy	*Performance: Actual Day*	No medal	157	1043	1200
		Medal	18	138	156
		Total	175	1181	1356
Japan	*Performance: Actual Day*	No medal	183	1002	1185
		Medal	23	108	131
		Total	206	1110	1316
Netherlands	*Performance: Actual Day*	No medal	122	419	541
		Medal	32	70	102
		Total	154	489	643
Norway	*Performance: Actual Day*	No medal	47	224	271
		Medal	17	19	36
		Total	64	243	307
South Korea	*Performance: Actual Day*	No medal	132	777	909
		Medal	25	119	144
		Total	157	896	1053
Sweden	*Performance: Actual Day*	No medal	109	425	534
		Medal	21	19	40
		Total	130	444	574
Switzerland	*Performance: Actual Day*	No medal	97	406	503
		Medal	23	9	32
		Total	120	415	535

7.2. Appendix 4: Descriptive Statistics: Per Day in All Winter Olympic Games

Canada

	Winter Olympic Games															
Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Participants	71	87	74	98	76	65	62	89	55	45	61	75	47	60	66	21
Number of medals	6	5	9	5	3	6	10	5	5	10	4	14	8	12	14	3
Expected success	8,5%	5,7%	12,2%	5,1%	3,9%	9,2%	16,1%	5,6%	9,1%	22,2%	6,6%	18,7%	17,0%	20,0%	21,2%	14,3%
Expected failure	91,5%	94,3%	87,8%	94,9%	96,1%	90,8%	83,9%	94,4%	90,9%	77,8%	93,4%	81,3%	83,0%	80,0%	78,8%	85,7%
Probability of success	8,1%	5,6%	11,5%	5,0%	3,9%	8,8%	14,9%	5,5%	8,7%	19,9%	6,3%	17,0%	15,7%	18,1%	19,1%	13,3%
Probability of failure	91,9%	94,4%	88,5%	95,0%	96,1%	91,2%	85,1%	94,5%	91,3%	80,1%	93,7%	83,0%	84,3%	81,9%	80,9%	86,7%

France

	Winter Olympic Games															
Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Participants	59	67	61	64	65	46	52	75	45	32	46	47	41	51	55	14
Number of medals	1	6	5	5	1	5	1	2	5	3	6	5	7	2	5	0
Expected success	1,7%	9,0%	8,2%	7,8%	1,5%	10,9%	1,9%	2,7%	11,1%	9,4%	13,0%	10,6%	17,1%	3,9%	9,1%	0,0%
Expected failure	98,3%	91,0%	91,8%	92,2%	98,5%	89,1%	98,1%	97,3%	88,9%	90,6%	87,0%	89,4%	82,9%	96,1%	90,9%	100,0%
Probability of success	1,7%	8,6%	7,9%	7,5%	1,5%	10,3%	1,9%	2,6%	10,5%	8,9%	12,2%	10,1%	15,7%	3,8%	8,7%	0,0%
Probability of failure	98,3%	91,4%	92,1%	92,5%	98,5%	89,7%	98,1%	97,4%	89,5%	91,1%	87,8%	89,9%	84,3%	96,2%	91,3%	100,0%

Great Britain

	Winter Olympic Games															
Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Participants	12	17	14	19	22	17	15	31	10	12	16	18	10	25	25	3
Number of medals	0	1	0	0	0	1	2	0	1	0	0	1	2	2	0	0
Expected success	0,0%	5,9%	0,0%	0,0%	0,0%	5,9%	13,3%	0,0%	10,0%	0,0%	0,0%	5,6%	20,0%	8,0%	0,0%	0,0%
Expected failure	100,0%	94,1%	100,0%	100,0%	0,0%	94,1%	86,7%	100,0%	90,0%	100,0%	100,0%	94,4%	80,0%	92,0%	100,0%	100,0%
Probability of success	0,0%	5,7%	0,0%	0,0%	0,0%	5,7%	12,5%	0,0%	9,5%	0,0%	0,0%	5,4%	18,1%	7,7%	0,0%	0,0%
Probability of failure	100,0%	94,3%	100,0%	100,0%	100,0%	94,3%	87,5%	100,0%	90,5%	100,0%	100,0%	94,6%	81,9%	92,3%	100,0%	100,0%

Italy

	Winter Olympic Games															
Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Participants	71	88	67	83	81	62	47	88	40	37	55	70	43	62	74	17
Number of medals	4	10	5	4	4	4	2	4	6	2	5	5	3	2	4	3
Expected success	5,6%	11,4%	7,5%	4,8%	4,9%	6,5%	4,3%	4,5%	15,0%	5,4%	9,1%	7,1%	7,0%	3,2%	5,4%	17,6%
Expected failure	94,4%	88,6%	92,5%	95,2%	95,1%	93,5%	95,7%	95,5%	85,0%	94,6%	90,9%	92,9%	93,0%	96,8%	94,6%	82,4%
Probability of success	5,5%	10,7%	7,2%	4,7%	4,8%	6,2%	4,2%	4,4%	13,9%	5,3%	8,7%	6,9%	6,7%	3,2%	5,3%	16,2%
Probability of failure	94,5%	89,3%	92,8%	95,3%	95,2%	93,8%	95,8%	95,6%	86,1%	94,7%	91,3%	93,1%	93,3%	96,8%	94,7%	83,8%

Table 19: Number of participants, number of medals, expected success, expected failure, probability of success and probability of failure for Canada, France, Great Britain and Italy in the Winter Olympic Games

Japan

Winter Olympic Games																
Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Participants	61	88	56	72	67	50	41	77	38	24	40	56	52	42	56	9
Number of medals	1	0	3	5	1	1	4	4	0	3	0	2	3	2	1	0
Expected success	1,6%	0,0%	5,4%	6,9%	1,5%	2,0%	9,8%	5,2%	0,0%	12,5%	0,0%	3,6%	5,8%	4,8%	1,8%	0,0%
Expected failure	98,4%	100,0%	94,6%	93,1%	98,5%	98,0%	90,2%	94,8%	100,0%	87,5%	100,0%	96,4%	94,2%	95,2%	98,2%	100,0%
Probability of success	1,6%	0,0%	5,2%	6,7%	1,5%	2,0%	9,3%	5,1%	0,0%	11,8%	0,0%	3,5%	5,6%	4,7%	1,8%	0,0%
Probability of failure	98,4%	100,0%	94,8%	93,3%	98,5%	98,0%	90,7%	94,9%	100,0%	88,2%	100,0%	96,5%	94,4%	95,3%	98,2%	100,0%

The Netherlands

Winter Olympic Games																
Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Participants	21	19	19	24	20	20	7	33	27	7	21	26	4	25	16	1
Number of medals	9	4	3	3	4	5	0	9	6	3	5	4	0	6	3	0
Expected success	42,9%	21,1%	15,8%	12,5%	20,0%	25,0%	0,0%	27,3%	22,2%	42,9%	23,8%	15,4%	0,0%	24,0%	18,8%	0,0%
Expected failure	57,1%	78,9%	84,2%	87,5%	80,0%	75,0%	100,0%	72,7%	77,8%	57,1%	76,2%	84,6%	100,0%	76,0%	81,3%	100,0%
Probability of success	34,9%	19,0%	14,6%	11,8%	18,1%	22,1%	0,0%	23,9%	19,9%	34,9%	21,2%	14,3%	0,0%	21,3%	17,1%	0,0%
Probability of failure	65,1%	81,0%	85,4%	88,2%	81,9%	77,9%	100,0%	76,1%	80,1%	65,1%	78,8%	85,7%	100,0%	78,7%	82,9%	100,0%

Norway

Winter Olympic Games																
Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Participants	73	87	52	68	65	49	38	81	32	26	64	43	34	37	49	18
Number of medals	14	12	5	15	14	9	5	10	5	6	13	8	9	7	9	2
Expected success	19,2%	13,8%	9,6%	22,1%	21,5%	18,4%	13,2%	12,3%	15,6%	23,1%	20,3%	18,6%	26,5%	18,9%	18,4%	11,1%
Expected failure	80,8%	86,2%	90,4%	77,9%	78,5%	81,6%	86,8%	87,7%	84,4%	76,9%	79,7%	81,4%	73,5%	81,1%	81,6%	88,9%
Probability of success	17,5%	12,9%	9,2%	19,8%	19,4%	16,8%	12,3%	11,6%	14,5%	20,6%	18,4%	17,0%	23,3%	17,2%	16,8%	10,5%
Probability of failure	82,5%	87,1%	90,8%	80,2%	80,6%	83,2%	87,7%	88,4%	85,5%	79,4%	81,6%	83,0%	76,7%	82,8%	83,2%	89,5%

South Korea

Winter Olympic Games																
Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Participants	29	42	27	38	38	33	16	51	12	20	21	40	17	41	30	7
Number of medals	2	0	1	4	4	2	0	6	1	6	2	5	3	13	2	1
Expected success	6,9%	0,0%	3,7%	10,5%	10,5%	6,1%	0,0%	11,8%	8,3%	30,0%	9,5%	12,5%	17,6%	31,7%	6,7%	14,3%
Expected failure	93,1%	100,0%	96,3%	89,5%	89,5%	93,9%	100,0%	88,2%	91,7%	70,0%	90,5%	87,5%	82,4%	68,3%	93,3%	85,7%
Probability of success	6,7%	0,0%	3,6%	10,0%	10,0%	5,9%	0,0%	11,1%	8,0%	25,9%	9,1%	11,8%	16,2%	27,2%	6,4%	13,3%
Probability of failure	93,3%	100,0%	96,4%	90,0%	90,0%	94,1%	100,0%	88,9%	92,0%	74,1%	90,9%	88,2%	83,8%	72,8%	93,6%	86,7%

Table 20: Number of participants, number of medals, expected success, expected failure, probability of success and probability of failure for Japan, The Netherlands, Norway and South Korea in the Winter Olympic Games

Sweden																
	Winter Olympic Games															
Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Participants	48	52	41	53	43	40	27	48	20	15	36	44	36	36	48	19
Number of medals	1	1	2	5	2	4	4	5	3	2	0	8	4	5	4	3
Expected success	2,1%	1,9%	4,9%	9,4%	4,7%	10,0%	14,8%	10,4%	15,0%	13,3%	0,0%	18,2%	11,1%	13,9%	8,3%	15,8%
Expected failure	97,9%	98,1%	95,1%	90,6%	95,3%	90,0%	85,2%	89,6%	85,0%	86,7%	100,0%	81,8%	88,9%	86,1%	91,7%	84,2%
Probability of success	2,1%	1,9%	4,8%	9,0%	4,5%	9,5%	13,8%	9,9%	13,9%	12,5%	0,0%	16,6%	10,5%	13,0%	8,0%	14,6%
Probability of failure	97,9%	98,1%	95,2%	91,0%	95,5%	90,5%	86,2%	90,1%	86,1%	87,5%	100,0%	83,4%	89,5%	87,0%	92,0%	85,4%

Switzerland																
	Winter Olympic Games															
Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Participants	39	67	33	54	56	40	42	45	36	28	39	57	42	35	54	15
Number of medals	3	4	1	2	5	1	6	5	7	1	2	10	6	4	3	0
Expected success	7,7%	6,0%	3,0%	3,7%	8,9%	2,5%	14,3%	11,1%	19,4%	3,6%	5,1%	17,5%	14,3%	11,4%	5,6%	0,0%
Expected failure	92,3%	94,0%	97,0%	96,3%	91,1%	97,5%	85,7%	88,9%	80,6%	96,4%	94,9%	82,5%	85,7%	88,6%	94,4%	100,0%
Probability of success	7,7%	6,0%	3,0%	3,7%	8,9%	2,5%	14,3%	11,1%	19,4%	3,6%	5,1%	17,5%	14,3%	11,4%	5,6%	0,0%
Probability of failure	92,6%	94,2%	97,0%	96,4%	91,5%	97,5%	86,7%	89,5%	82,3%	96,5%	95,0%	83,9%	86,7%	89,2%	94,6%	100,0%

Table 21: Number of participants, number of medals, expected success, expected failure, probability of success and probability of failure for Sweden and Switzerland in the Winter Olympic Games.

7.2. Appendix 5: Descriptive Statistics: Per Day in All Summer Olympic Games

Canada

	Summer Olympic Games															
Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Participants	48	61	62	64	85	82	70	101	139	117	82	64	78	69	107	46
Number of medals	0	5	1	3	2	3	3	14	13	3	9	5	5	7	10	3
Expected success	0,0%	8,2%	1,6%	4,7%	2,4%	3,7%	4,3%	13,9%	9,4%	2,6%	11,0%	7,8%	6,4%	10,1%	9,3%	6,5%
Expected failure	100,0%	91,8%	98,4%	95,3%	97,6%	96,3%	95,7%	86,1%	90,6%	97,4%	89,0%	92,2%	93,6%	89,9%	90,7%	93,5%
Probability of success	0,0%	7,9%	1,6%	4,6%	2,3%	3,6%	4,2%	12,9%	8,9%	2,5%	10,4%	7,5%	6,2%	9,6%	8,9%	6,3%
Probability of failure	100,0%	92,1%	98,4%	95,4%	97,7%	96,4%	95,8%	87,1%	91,1%	97,5%	89,6%	92,5%	93,8%	90,4%	91,1%	93,7%

France

	Summer Olympic Games															
Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Participants	75	85	70	80	116	91	84	118	196	177	93	69	70	74	114	45
Number of medals	7	20	16	13	12	13	15	23	16	9	5	3	5	6	12	6
Expected success	9,3%	23,5%	22,9%	16,3%	10,3%	14,3%	17,9%	19,5%	8,2%	5,1%	5,4%	4,3%	7,1%	8,1%	10,5%	13,3%
Expected failure	90,7%	76,5%	77,1%	83,8%	89,7%	85,7%	82,1%	80,5%	91,8%	94,9%	94,6%	95,7%	92,9%	91,9%	89,5%	86,7%
Probability of success	8,9%	21,0%	20,4%	15,0%	9,8%	13,3%	16,4%	17,7%	7,8%	5,0%	5,2%	4,3%	6,9%	7,8%	10,0%	12,5%
Probability of failure	91,1%	79,0%	79,6%	85,0%	90,2%	86,7%	83,6%	82,3%	92,2%	95,0%	94,8%	95,7%	93,1%	92,2%	90,0%	87,5%

Great Britain

	Summer Olympic Games															
Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Participants	53	66	57	74	85	86	85	144	154	142	88	84	111	78	122	41
Number of medals	2	5	5	7	13	8	11	32	21	15	11	7	10	11	21	6
Expected success	3,8%	7,6%	8,8%	9,5%	15,3%	9,3%	12,9%	22,2%	13,6%	10,6%	12,5%	8,3%	9,0%	14,1%	17,2%	14,6%
Expected failure	96,2%	92,4%	91,2%	90,5%	84,7%	90,7%	87,1%	77,8%	86,4%	89,4%	87,5%	91,7%	91,0%	85,9%	82,8%	85,4%
Probability of success	3,7%	7,3%	8,4%	9,0%	14,2%	8,9%	12,1%	19,9%	12,7%	10,0%	11,8%	8,0%	8,6%	13,2%	15,8%	13,6%
Probability of failure	96,3%	92,7%	91,6%	91,0%	85,8%	91,1%	87,9%	80,1%	87,3%	90,0%	88,2%	92,0%	91,4%	86,8%	84,2%	86,4%

Italy

	Summer Olympic Games															
Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Participants	72	75	57	71	91	80	78	90	189	132	79	61	62	75	91	55
Number of medals	8	11	14	6	12	14	11	12	15	5	2	3	4	10	14	15
Expected success	11,1%	14,7%	24,6%	8,5%	13,2%	17,5%	14,1%	13,3%	7,9%	3,8%	2,5%	4,9%	6,5%	13,3%	15,4%	27,3%
Expected failure	88,9%	85,3%	75,4%	91,5%	86,8%	82,5%	85,9%	86,7%	92,1%	96,2%	97,5%	95,1%	93,5%	86,7%	84,6%	72,7%
Probability of success	10,5%	13,6%	21,8%	8,1%	12,4%	16,1%	13,2%	12,5%	7,6%	3,7%	2,5%	4,8%	6,2%	12,5%	14,3%	23,9%
Probability of failure	89,5%	86,4%	78,2%	91,9%	87,6%	83,9%	86,8%	87,5%	92,4%	96,3%	97,5%	95,2%	93,8%	87,5%	85,7%	76,1%

Table 22: Number of participants, number of medals, expected success, expected failure, probability of success and probability of failure for Canada, France, Great Britain and Italy in the Summer Olympic Games

Japan

	Summer Olympic Games															
Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Participants	66	64	60	71	88	88	90	84	165	163	75	58	66	68	67	42
Number of medals	8	9	11	9	13	9	13	11	11	9	5	6	5	7	4	2
Expected success	12,1%	14,1%	18,3%	12,7%	14,8%	10,2%	14,4%	13,1%	6,7%	5,5%	6,7%	10,3%	7,6%	10,3%	6,0%	4,8%
Expected failure	87,9%	85,9%	81,7%	87,3%	85,2%	89,8%	85,6%	86,9%	93,3%	94,5%	93,3%	89,7%	92,4%	89,7%	94,0%	95,2%
Probability of success	11,4%	13,1%	16,8%	11,9%	13,7%	9,7%	13,4%	12,3%	6,4%	5,4%	6,4%	9,8%	7,3%	9,8%	5,8%	4,7%
Probability of failure	88,6%	86,9%	83,2%	88,1%	86,3%	90,3%	86,6%	87,7%	93,6%	94,6%	93,6%	90,2%	92,7%	90,2%	94,2%	95,3%

The Netherlands

	Summer Olympic Games															
Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Participants	30	37	34	22	46	45	45	65	52	31	39	50	41	50	45	11
Number of medals	4	5	9	3	10	9	2	8	12	4	9	4	5	10	7	1
Expected success	13,3%	13,5%	26,5%	13,6%	21,7%	20,0%	4,4%	12,3%	23,1%	12,9%	23,1%	8,0%	12,2%	20,0%	15,6%	9,1%
Expected failure	86,7%	86,5%	73,5%	86,4%	78,3%	80,0%	95,6%	87,7%	76,9%	87,1%	76,9%	92,0%	87,8%	80,0%	84,4%	90,9%
Probability of success	12,5%	12,6%	23,3%	12,7%	19,5%	18,1%	4,3%	11,6%	20,6%	12,1%	20,6%	7,7%	11,5%	18,1%	14,4%	8,7%
Probability of failure	87,5%	87,4%	76,7%	87,3%	80,5%	81,9%	95,7%	88,4%	79,4%	87,9%	79,4%	92,3%	88,5%	81,9%	85,6%	91,3%

Norway

	Summer Olympic Games															
Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Participants	23	16	14	8	17	11	13	33	30	16	17	26	22	20	35	6
Number of medals	1	0	1	0	1	0	1	7	1	0	0	2	4	6	9	3
Expected success	4,3%	0,0%	7,1%	0,0%	5,9%	0,0%	7,7%	21,2%	3,3%	0,0%	0,0%	7,7%	18,2%	30,0%	25,7%	50,0%
Expected failure	95,7%	100,0%	92,9%	100,0%	94,1%	100,0%	92,3%	78,8%	96,7%	100,0%	100,0%	92,3%	81,8%	70,0%	74,3%	50,0%
Probability of success	4,3%	0,0%	6,9%	0,0%	5,7%	0,0%	7,4%	19,1%	3,3%	0,0%	0,0%	7,4%	16,6%	25,9%	22,7%	39,3%
Probability of failure	95,7%	100,0%	93,1%	100,0%	94,3%	100,0%	92,6%	80,9%	96,7%	100,0%	100,0%	92,6%	83,4%	74,1%	77,3%	60,7%

South Korea

	Summer Olympic Games															
Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Participants	63	62	67	50	86	73	77	67	131	97	53	32	44	43	65	43
Number of medals	10	6	8	15	15	8	13	6	6	8	4	7	6	7	12	7
Expected success	15,9%	9,7%	11,9%	30,0%	17,4%	11,0%	16,9%	9,0%	4,6%	8,2%	7,5%	21,9%	13,6%	16,3%	18,5%	16,3%
Expected failure	84,1%	90,3%	88,1%	70,0%	82,6%	89,0%	83,1%	91,0%	95,4%	91,8%	92,5%	78,1%	86,4%	83,7%	81,5%	83,7%
Probability of success	14,7%	9,2%	11,3%	25,9%	16,0%	10,4%	15,5%	8,6%	4,5%	7,9%	7,3%	19,6%	12,7%	15,0%	16,9%	15,0%
Probability of failure	85,3%	90,8%	88,7%	74,1%	84,0%	89,6%	84,5%	91,4%	95,5%	92,1%	92,7%	80,4%	87,3%	85,0%	83,1%	85,0%

Table 23: Number of participants, number of medals, expected success, expected failure, probability of success and probability of failure for Japan, The Netherlands, Norway and South Korea in the Summer Olympic Games

Sweden

	Summer Olympic Games															
Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Participants	22	32	23	35	32	33	21	52	47	33	26	46	60	33	66	16
Number of medals	2	2	0	2	2	2	1	5	3	3	3	2	3	2	5	3
Expected success	9,1%	6,3%	0,0%	5,7%	6,3%	6,1%	4,8%	9,6%	6,4%	9,1%	11,5%	4,3%	5,0%	6,1%	7,6%	18,8%
Expected failure	90,9%	93,8%	100,0%	94,3%	93,8%	93,9%	95,2%	90,4%	93,6%	90,9%	88,5%	95,7%	95,0%	93,9%	92,4%	81,3%
Probability of success	8,7%	6,1%	0,0%	5,6%	6,1%	5,9%	4,7%	9,2%	6,2%	8,7%	10,9%	4,3%	4,9%	5,9%	7,3%	17,1%
Probability of failure	91,3%	93,9%	100,0%	94,4%	93,9%	94,1%	95,3%	90,8%	93,8%	91,3%	89,1%	95,7%	95,1%	94,1%	92,7%	82,9%

Switzerland

	Summer Olympic Games															
Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Participants	34	35	16	15	44	23	18	37	62	48	36	48	40	23	44	13
Number of medals	3	1	0	2	4	1	0	5	4	1	1	4	3	0	2	1
Expected success	8,8%	2,9%	0,0%	13,3%	9,1%	4,3%	0,0%	13,5%	6,5%	2,1%	2,8%	8,3%	7,5%	0,0%	4,5%	7,7%
Expected failure	91,2%	97,1%	100,0%	86,7%	90,9%	95,7%	100,0%	86,5%	93,5%	97,9%	97,2%	91,7%	92,5%	100,0%	95,5%	92,3%
Probability of success	8,4%	2,8%	0,0%	12,5%	8,7%	4,3%	0,0%	12,6%	6,2%	2,1%	2,7%	8,0%	7,2%	0,0%	4,4%	7,4%
Probability of failure	91,6%	97,2%	100,0%	87,5%	91,3%	95,7%	100,0%	87,4%	93,8%	97,9%	97,3%	92,0%	92,8%	100,0%	95,6%	92,6%

Table 24: Number of participants, number of medals, expected success, expected failure, probability of success and probability of failure for Sweden and Switzerland for the Summer Olympic Games.

7.3. Appendix 6: Descriptive Statistics Per Year : Both Types of Olympic Game

Canada

	Winter Olympic Games						Summer Olympic Games				
	1994	1998	2002	2006	2010	2014	1996	2000	2004	2008	2012
Participants	107	134	143	210	214	244	271	255	247	266	236
Number of successes	13	15	17	23	26	25	22	14	12	19	19
Expected success	12,1%	11,2%	11,9%	11,0%	12,1%	10,2%	8,1%	5,5%	4,9%	7,1%	8,1%
Expected failure	87,9%	88,8%	88,1%	89,0%	87,9%	89,8%	91,9%	94,5%	95,1%	92,9%	91,9%
Probability of success	11,4%	10,6%	11,2%	10,4%	11,4%	9,7%	7,8%	5,3%	4,7%	6,9%	7,7%
Probability of failure	88,6%	89,4%	88,8%	89,6%	88,6%	90,3%	92,2%	94,7%	95,3%	93,1%	92,3%

France

	Winter Olympic Games						Summer Olympic Games				
	1994	1998	2002	2006	2010	2014	1996	2000	2004	2008	2012
Participants	118	113	127	133	165	164	317	312	323	326	279
Number of successes	5	8	11	9	11	15	37	38	33	39	34
Expected success	4,2%	7,1%	8,7%	6,8%	6,7%	9,1%	11,7%	12,2%	10,2%	12,0%	12,2%
Expected failure	95,8%	92,9%	91,3%	93,2%	93,3%	90,9%	88,3%	87,8%	89,8%	88,0%	87,8%
Probability of success	4,1%	6,8%	8,3%	6,5%	6,4%	8,7%	11,0%	11,5%	9,7%	11,3%	11,5%
Probability of failure	95,9%	93,2%	91,7%	93,5%	93,6%	91,3%	89,0%	88,5%	90,3%	88,7%	88,5%

Great Britain

	Winter Olympic Games						Summer Olympic Games				
	1994	1998	2002	2006	2010	2014	1996	2000	2004	2008	2012
Number of participants	38	28	48	40	56	56	267	283	248	286	386
Number of successes	1	1	2	1	1	4	15	28	30	47	65
Expected success	2,6%	3,6%	4,2%	2,5%	1,8%	7,1%	5,6%	9,9%	12,1%	16,4%	16,8%
Expected failure	97,4%	96,4%	95,8%	97,5%	98,2%	92,9%	94,4%	90,1%	87,9%	83,6%	83,2%
Probaiility of success	2,6%	3,5%	4,1%	2,5%	1,8%	6,9%	5,5%	9,4%	11,4%	15,2%	15,5%
Probaility of failure	97,4%	96,5%	95,9%	97,5%	98,2%	93,1%	94,5%	90,6%	88,6%	84,8%	84,5%

Italy

	Winter Olympic Games						Summer Olympic Games				
	1994	1998	2002	2006	2010	2014	1996	2000	2004	2008	2012
Number of participants	139	133	167	198	169	179	288	256	270	295	249
Number of successes	20	10	13	11	5	8	35	34	32	27	28
Expected success	14,4%	7,5%	7,8%	5,6%	3,0%	4,5%	12,2%	13,3%	11,9%	9,2%	11,2%
Expected failure	85,6%	92,5%	92,2%	94,4%	97,0%	95,5%	87,8%	86,7%	88,1%	90,8%	88,8%
Probaiility of success	13,4%	7,2%	7,5%	5,4%	2,9%	4,4%	11,4%	12,4%	11,2%	8,7%	10,6%
Probaility of failure	86,6%	92,8%	92,5%	94,6%	97,1%	95,6%	88,6%	87,6%	88,8%	91,3%	89,4%

Japan

	Winter Olympic Games						Summer Olympic Games				
	1994	1998	2002	2006	2010	2014	1996	2000	2004	2008	2012
Number of participants	105	162	168	154	123	117	289	248	252	271	255
Number of successes	4	10	2	1	5	8	14	18	37	25	38
Expected success	3,8%	6,2%	1,2%	0,6%	4,1%	6,8%	4,8%	7,3%	14,7%	9,2%	14,9%
Expected failure	96,2%	93,8%	98,8%	99,4%	95,9%	93,2%	95,2%	92,7%	85,3%	90,8%	85,1%
Probaiility of success	3,7%	6,0%	1,2%	0,6%	4,0%	6,6%	4,7%	7,0%	13,7%	8,8%	13,8%
Probaility of failure	96,3%	94,0%	98,8%	99,4%	96,0%	93,4%	95,3%	93,0%	86,3%	91,2%	86,2%

Table 25: Total number of participants, number of successes, expected success, expected failure, probability of success and probability of failure per nation in each type of Olympic Gam

The Netherlands

	Winter Olympic Games						Summer Olympic Games				
	1994	1998	2002	2006	2010	2014	1996	2000	2004	2008	2012
Participants	39	44	39	49	53	66	124	130	134	127	128
Number of successes	4	11	8	9	8	24	19	25	22	16	20
Expected success	10,3%	25,0%	20,5%	18,4%	15,1%	36,4%	15,3%	19,2%	16,4%	12,6%	15,6%
Expected failure	89,7%	75,0%	79,5%	81,6%	84,9%	63,6%	84,7%	80,8%	83,6%	87,4%	84,4%
Probability of success	9,7%	22,1%	18,5%	16,8%	14,0%	30,5%	14,2%	17,5%	15,1%	11,8%	14,5%
Probability of failure	90,3%	77,9%	81,5%	83,2%	86,0%	69,5%	85,8%	82,5%	84,9%	88,2%	85,5%

Norway

	Winter Olympic Games						Summer Olympic Games				
	1994	1998	2002	2006	2010	2014	1996	2000	2004	2008	2012
Participants	121	125	137	131	138	164	73	69	47	64	54
Number of successes	26	25	25	19	22	26	7	10	6	9	4
Expected success	21,5%	20,0%	18,2%	14,5%	15,9%	15,9%	9,6%	14,5%	12,8%	14,1%	7,4%
Expected failure	78,5%	80,0%	81,8%	85,5%	84,1%	84,1%	90,4%	85,5%	87,2%	85,9%	92,6%
Probability of success	19,3%	18,1%	16,7%	13,5%	14,7%	14,7%	9,1%	13,5%	12,0%	13,1%	7,1%
Probability of failure	80,7%	81,9%	83,3%	86,5%	85,3%	85,3%	90,9%	86,5%	88,0%	86,9%	92,9%

South Korea

	Winter Olympic Games						Summer Olympic Games				
	1994	1998	2002	2006	2010	2014	1996	2000	2004	2008	2012
Participants	42	67	77	109	70	97	244	201	217	198	193
Number of successes	6	6	4	14	14	8	21	28	30	31	28
Expected success	14,3%	9,0%	5,2%	12,8%	20,0%	8,2%	8,6%	13,9%	13,8%	15,7%	14,5%
Expected failure	85,7%	91,0%	94,8%	87,2%	80,0%	91,8%	91,4%	86,1%	86,2%	84,3%	85,5%
Probability of success	13,3%	8,6%	5,1%	12,1%	18,1%	7,9%	8,2%	13,0%	12,9%	14,5%	13,5%
Probability of failure	86,7%	91,4%	94,9%	87,9%	81,9%	92,1%	91,8%	87,0%	87,1%	85,5%	86,5%

Sweden

	Winter Olympic Games						Summer Olympic Games				
	1994	1998	2002	2006	2010	2014	1996	2000	2004	2008	2012
Participants	110	86	101	109	110	90	141	124	104	106	102
Number of successes	3	3	7	14	11	15	8	12	7	5	8
Expected success	2,7%	3,5%	6,9%	12,8%	10,0%	16,7%	5,7%	9,7%	6,7%	4,7%	7,8%
Expected failure	97,3%	96,5%	93,1%	87,2%	90,0%	83,3%	94,3%	90,3%	93,3%	95,3%	92,2%
Probability of success	2,7%	3,4%	6,7%	12,1%	9,5%	15,4%	5,5%	9,2%	6,5%	4,6%	7,5%
Probability of failure	97,3%	96,6%	93,3%	87,9%	90,5%	84,6%	94,5%	90,8%	93,5%	95,4%	92,5%

Switzerland

	Winter Olympic Games						Summer Olympic Games				
	1994	1998	2002	2006	2010	2014	1996	2000	2004	2008	2012
Number of participants	90	94	113	109	126	150	125	110	111	99	91
Number of successes	9	7	11	13	9	11	7	9	5	7	4
Expected success	10,0%	7,4%	9,7%	11,9%	7,1%	7,3%	5,6%	8,2%	4,5%	7,1%	4,4%
Expected failure	90,0%	92,6%	90,3%	88,1%	92,9%	92,7%	94,4%	91,8%	95,5%	92,9%	95,6%
Probaiility of success	9,5%	7,2%	9,3%	11,2%	6,9%	7,1%	5,4%	7,9%	4,4%	6,8%	4,3%
Probaility of failure	90,5%	92,8%	90,7%	88,8%	93,1%	92,9%	94,6%	92,1%	95,6%	93,2%	95,7%

Table 26: Total number of participants, number of successes, expected success, expected failure, probability of success and probability of failure per nation in each type of Olympic Gam

7.4. Appendix 7: Linear Regression: Residuals of Winter Olympic Games

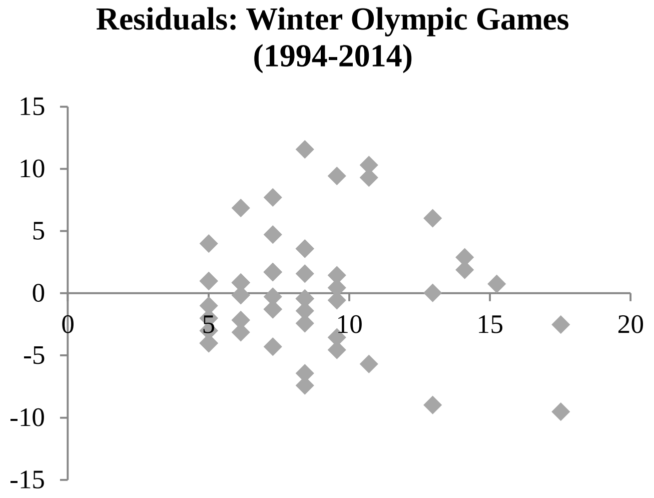

Diagram 4: Scatterplot: Linear Regression Residuals: Winter Olympic Games