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Complex Ice Hockey Team Performance Model based on Expert Interviews

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Gergely Géczi *[1A-B-C-D], Lilla Gurisatti[2 C], László Imre Komlósi [1A-C-D]

[1]*Széchenyi István University, Győr, Hungary*
[2]*University of Physical Education, Budapest, Hungary*

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***Correspondence:** Gergely Géczi, Unit 6, 2nd floor, 207E. Megyeri street, email: geczi.gergely@sze.hu

Abstract

Scientific research focusing on ice hockey is growing, although a complex model describing team performance is yet to be added to the knowledge base. The purpose of the study is to finalize the authors' proposed model of ice hockey team performance and gain insights on how the included factors contribute to the operation of the team and the coach. Based on the processed literature, it was assumed that the psychological aspect is among the key factors contributing to team performance. Semi-structured interviews were conducted with highly qualified experts on Hungarian ice hockey (five national team coaches and five senior national team players). The results indicate that the psychological factors of the coach and the team are essential for high team performance, along with the influence ability of both sides, creating two-way communication and feedback loops. The practical knowledge of the coach was emphasized over theoretical knowledge, and the team's tactical knowledge was emphasized over technical knowledge. It also emerged that the coach must know the team well in order to make appropriate decisions. The role of the coach is no longer to act as a stressor, but rather to set a good example as a role model while remaining open to feedback from the team's side. It was concluded that although many psychological methods are available to improve performance, the use of these methods has not yet been sufficiently exploited. While the use of these methods could improve performance, the team could experience more success and make sporting activity a fundamental part of players' health through bonding and belonging.

Keywords: Ice hockey, role change of coach, sports psychology, team performance

Introduction

Ice hockey is said to be one of the most complex games among all sports (Schulze et al., 2021), as the whole body of the player is used in order to achieve a set goal, either in scoring a goal or winning a championship. As the competition level of the game increases along with new knowledge that enters the field from outer sources, players must be equipped with knowledge and abilities that allow them to compete for success (Davletmuratov, 2021). When considering success from the coach's point of view, the measure of success is not always the final result of the game, as coaches are responsible for teaching the game to the athletes, and this process might include periods without success. Professional and recreational ice hockey have different characteristics, as the aims of the activities are different by nature. Although a recreational ice hockey player might want to win as their primary aim, learning

and playing on a team that offers a great community for building relationships might become a preference over winning. Professional sports are inherently competitive, and winning is expected from the stakeholders of professional clubs. In order to proceed, it is reasonable to consider both as part of a system, with professional ice hockey on the top as a role model for recreational ice hockey. Teaching sometimes takes the form of focusing on a specific element of the whole (Lemyre, Trudel, & Durand-Bush, 2007). By learning that specific element, the player may experience success over the long term. Therefore, ice hockey games have both short – and long-term goals, making them a complex phenomenon and creating the possibility to learn about processes of life (Chard, Edwards, & Potwarka, 2015). Although many sports have this common feature, success is an inevitable form of positive feedback that the players and the coach must face in order to maintain intrinsic motivation to participate in the game (Haraczkiewicz, 1979). When executing an action plan that aims to help children develop so they may pursue a professional career, many players experience anxiety, which has diverse effects on their sports performance (Listea et al., 2017). It is best if children begin learning the game around 6 or 7 years of age, as the players can possibly master the game if they invest a significant amount of time in practice (Ericsson, Krampe, & Tesch-Römer, 1993). The numerous hours spent training to improve performance have multiple beneficial effects. First, the time spent training protects children from spending time in troublesome situations that could put them in danger. Second, the main idea behind participation in sports is to increase one's wellbeing by satisfying the basic need for movement. Third, coaches with a skilled pedagogical sense can protect children from adverse childhood events that could lead to health-harming behaviors (Bellis et al., 2014). Participating on a team in which realistic feedback loops are present could balance out the effects of bad parenting, which could lead to the development of perfectionism (Damian et al., 2013). In the case of an effective action plan for helping children develop into professional athletes, learning to work hard is part of the process. Hard work is said to overcome talent if the talent does not work hard (Larsen et al., 2013). However, being talented and investing energy in improvement is a crucial combination for long-term development. This applies to the coach as well, although the coach's knowledge of the game can be acquired through an athletic career before coaching, and such a background increases their chance of being accepted as an authentic person leading the team (Pitts & Evans, 2020). The leadership function of the coach is strengthened by naming them the formal leader of the team, although team captains also help teams function, along with the informal, situational leadership functions that arise when leadership is necessary to achieve a goal. Everything the players learn comes from a hybrid source: the players learn from the coach by doing and watching (Keays & Pless, 2013). This hybrid solution is best if the player has intrinsic motivation, as the coach can help guide them and make sure they retain long-term knowledge of what they have learned, even when they learn by watching. This solution is similar to situated learning, as highly educated teams share some of the properties of a well-established community of practice (Kirk & Kinchin, 2003). Although competition has downsides if the goal of the players does not match the team's goal, highly competitive players are very useful assets in the hands of a coach as these players show high intrinsic motivation towards the game. It is up to the coach to set goals for these players to maximize their use when working towards the team's goal (Bennie & O'Connor, 2010). As these highly competitive players find doing sports a great activity for development, they show a strong orientation towards sports (Gill, Dzewaltowski, & Deeter, 1988). Personality characteristics can possibly differ regarding the age, gender, and position of the player (Kőnig-Görögh et al., 2017). The development of a player never stops, even when they are playing in a professional league. In a similar vein, the greatest coaches never stop learning about their sports, either (Olusoga et al., 2011). The need for power – in this case, defined as the control over resources – is present in the behaviors of competitive players. Although hierarchy is a natural phenomenon when teams, especially sports teams, work together (Waldron, 2015), the roles in this system are dynamic and ever-changing, meaning players have the chance to restructure the team in an endogenous process. The role of the coach in this process depends on the coach's personality and their method for achieving success (Lanning, 1979). Coping with success is a phenomenon in which players learn how to handle situations when they face the pressure to succeed (Kuleva & Iancheva, 2017). In addition, the perceived motivational climate may have a contributing effect on the level of motivation (Szemes, Szájer, & Tóth, 2017). The psychological status of the coach and the players is assumed to be the most important factor contributing to excellent performance (Swann et al., 2017). Working on intra-team relationships with psychological support is a proposed method for increasing team performance (Brynzak et al., 2021). Excellent performance may take the form of winning more competitions on the ice than the opposing team (Parnican, Tóth, & Peracek, 2020), but it is characterized by the creation of many chances to score, which results in winning (Sgro, Barresi, & Lipoma, 2015). Psychologically strong players are capable of making use of powerplay situations that often lead to scoring goals (Barilla et al., 2019). The current research represents a research stage in which the proposed model is finalized with the help of highly qualified experts from the Hungarian ice hockey sector (see Fig. 1).

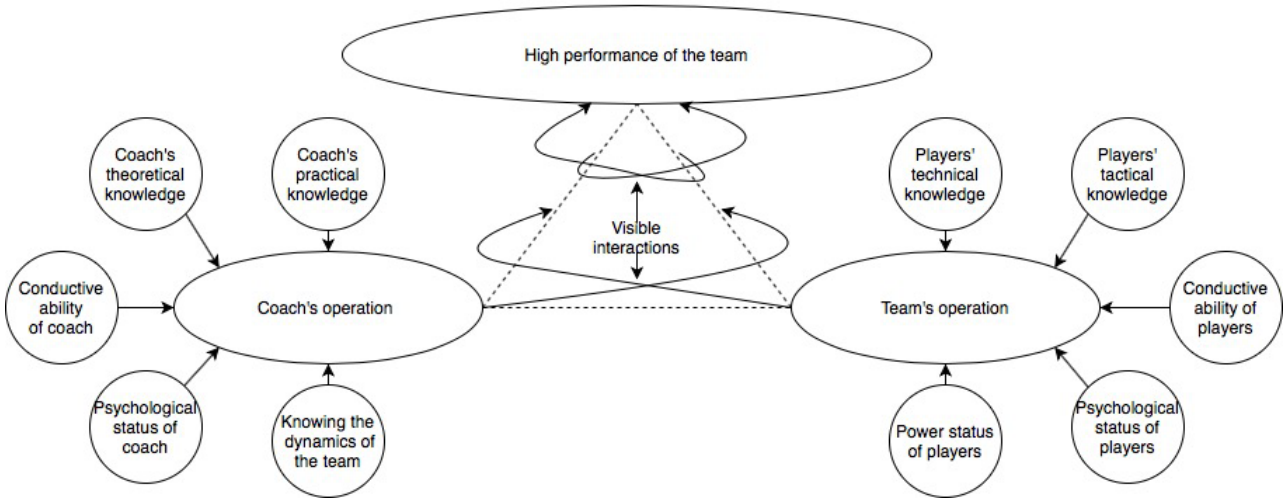


Figure 1. The authors' proposed model of ice-hockey team performance

The complexity of the model lies in its inherent feature of non-linearity and the dynamic emergence of the mix of factors that are reciprocal with the environment. For example, in a game against an opponent, the opposing team is an environmental factor and has an effect on how factors contribute to high performance. The high number of factors enables synergies to develop between factors, resulting in emergent phenomena. Although a mix of factors is present, the interaction and orbit dynamics (the middle part of the model) are to be explained as follows: the coach and the players have characteristics that they are both responsible for developing. The interactions are a result of the development orbits crossing each other, in which information exchange is present. As in professional sports, the aims of the coach and the players are similar (mainly involving the goal of winning the game through high performance), the orbits are moving towards a shared goal, and if group dynamics processes are present, the distance between orbits decreases over time. In this process, the interactions are inherently characterized by having an attracting effect afterwards, which brings the parties towards the shared direction. This attractive force relies on cooperation and cross co-adaptation towards the characteristics of the parties.

Methods

As the aim of the research is to finalize the model that describes the factors of high performance for ice hockey teams, the proposed model was tested with the help of highly qualified experts on Hungarian ice hockey. It is assumed that professional-level coaches and players are capable of providing insights for practitioners and players of any level of sports activity. In order to meet these quality standards, five Hungarian national team coaches and five Hungarian male senior national team players were interviewed through semi-structured interviews (Whiting, 2008). The mean age of the coaches was 48.4, with a standard deviation of 7.37, while the mean age of the players was 31.2, with a standard deviation of 3.63. The interview questions were published in a previous study (Géczi, 2021). As the interviews were semi-structured, all the factors and interactions were covered by the questions, enabling the interviewees to provide feedback on each part of the model and highlight their relationships. In the case of choosing the national team players to be interviewees, diversity was the main goal. Therefore, a goalie, two defensemen, and two forwards were interviewed; two of them were team captains in their club teams. Seven of the ten interviews were held in person, while three of them were conducted online. The proposed model was shown and explained to the interviewees before the questions were presented. The interviewees were numbered from 1–10: 1–5 for coaches, 6–10 for players. The in-person interviews were recorded with an audio recorder, while the online interviews were recorded with the built-in record function of the software that was used. All of the interviewees gave their permission for the interviews to be recorded and used for the current research.

Results

The factor of the coach's practical knowledge turned out to be an important factor in team performance, as was highlighted by many of the interviewees. For example, one interviewee stated the following: "*It includes the experience of the coach, how many years he spent working as a coach, and who he could learn from*" (Int1). The interviewed players clarified that work experience as a coach is a crucial factor, as less experienced coaches are unable to properly understand complex situations that arise. Some of them identified the tactical knowledge of the coach as being included in this factor, along with the ability to transfer this knowledge to players. Int7 clearly identified this as the most important factor: "*I think this factor is 90% from the coach's side, the remaining 10% is what the coach brings from other areas of his/her life.*" This factor also includes the coach knowing what to expect from the opponent. According to Int10, "*As the competition level increases, the coach's practical knowledge level must improve as well.*" Therefore, the factor is included in the final model.

Regarding the factor of the coach's theoretical knowledge, the interviewees made clear that although theoretical knowledge is important, putting it into practice is essential. This was emphasized by statements such as, "*I think theoretical knowledge gains significance if the theoretical knowledge can be seen in practice*" (Int3). It also turned out that the higher the team's level, the more important theoretical knowledge becomes. Therefore, it is included in the final model.

The third factor, the conductive ability of the coach, is related to communication and feedback mechanisms in the team. For example, according to Int1, "*From my own experience, it was always important for me to get feedback. If no one talks to you for months, you don't know whether what you do is good or not.*" The coach must be a strong motivating force, although it is important that the coach find a common language with the team: "*The players and the coach must also want to win; then it is easy to influence the players. If a player decides that he does not care about the coach, the coach can't influence him.*" Transferring or controlling players' feelings is a top priority for coaches, as it significantly affects team performance. According to Int4, "*Nowadays is not like the old days, in which the coach yelled at the players. The modern coach is a teacher as well*."

Respect and authenticity also turned out to be important in relation to this factor. If a coach cannot transfer their knowledge, the team is not going to work. Int8 clearly pointed out that "*If you are convincing as a coach, there is going to be performance.*" This factor is said to unlock doors and enable the coach to build trust with the players. This factor is included in the final model with a small modification in the name: the conductive ability of the coach is modified to the conductive influence ability of the coach.

The factor of the coach's psychological status has serious effects on team performance as, according to the interviewed players, the psychological status of the coach is transferred to the players. Although Int6 pointed out that "*The coach's status does not matter if he/she can still manage and motivate players,*" most of the interviewees clarified that the coach sets an example for the players. For example, in a high-pressure situation, the coach can act as a role model.

The factor of knowing the dynamics of the team is seen as an important factor as well. Int6 expressed the following: "*I think this is very, very important. If this is clear for you as a coach and you know who to use for specific tasks, it is important to be successful.*" There are different types of coaches; some of them keep a certain distance from the players, while others are more player-oriented and try to learn as much about the players as possible. Although Int7 pointed out that "*I think in the modern world, the distance between the coach and players is fading away,*" there is information about players that is said to be "*personal business*" (Int10), while other types of information must be shared with the coach so they can make appropriate decisions. The leading players of the team, therefore, are used to filter the information and present the important pieces of information to the coach.

Regarding the coach's operation, an important process emerged: the coach must be able to read the coached team. This phenomenon is present in conductive ability, as influencing the players requires the coach to know what path can be used to influence the players. In addition, knowing the dynamics of the team enables the coach to know the players. Theoretical and practical knowledge also involves reading the team as an important process when transferring knowledge to them. Int9 stated that "*The factors are well taken. If you stick to those five, you are going to be a good coach. The factors serve as a great foundation.*" In order to build the phenomenon into the model, the factor of knowing the dynamics of the team was replaced with knowing the team. With this modification, the coach's operation was finalized.

The next factor is the players' technical knowledge. Int1 clarified that "*It is good, if you have a lot of highly skilled players because you can send a strong team onto the ice, although technical knowledge is not everything. Less skilled players can make up with working harder.*" Technical knowledge is also related to tactical knowledge

when the team plays. In an optimal case, the tactics are well suited to the technical knowledge of the players. Technical improvement is said to be important for players at the highest levels as well because it could offer a competitive edge among the players. Int7 stated that "*A team can still be successful if players are not that skilled, although good, fitting tactics are played.*"

The factor of players' tactical knowledge was marked as highly important in the interviews and seems to be the key for high performance. According to Int2, "*Tactical and technical knowledge are related. If a coach teaches a certain tactic, and four players know where to go, but the fifth does not go in his place, he messes up everything*." What emerged from the interviews is that not only tactical knowledge, but also tactical discipline contributes to high performance. Int4 said, "*I would use zero tolerance in this factor. A player not knowing the tactics but being highly skilled will not build himself in the team, and performance will not happen in the end.*" The role of the coach in this process is to make clear how the player should act in adverse situations. Ice hockey is said to be a read-and-react game in which tactical knowledge is crucial.

The factor of the conductive influence ability of the players was cut short by Int2: "*You are convincing, if you win. Many of the players try to convince the coach that he is a good player, but in reality, he is not. It's more important that you put 100% on the ice.*" The teams have team captains and leading players who are mostly highly experienced older players. It is important that these players have some influence on the coach; otherwise, the coach will not be capable of knowing the team on a sufficient level. Int7 said that "*In the old days, one-way communication between the coach and players worked, but in modern times, two-way communication is needed to step forward.*" This factor is also included in the final model with a modification from the conductive ability of players to the conductive influence ability of players.

Regarding the factor of the psychological status of players, Int4 clarifies that "*Every player must be in a good psychological status to avoid rampages and penalties*." During a long tournament, it is often the case that players first become mentally exhausted long before physical exhaustion sets in. Int8 adds that "*If the psychological status is good, there is performance.*" This factor is related to conductive influence ability as well because if the coach can convince the team that there is a chance to win, it becomes the most important reason the players will perform well.

The importance of the factor of the power status of players is seen as an important one that must have a condition for the players. According to Int3, "*If a player is not in an appropriate condition, the team performance will decrease over the long term. In the first 10 games, you are okay, but on the 40th game, you are not usable.*" A certain condition status is expected from a player when they are trying to play in a professional league; otherwise, the player cannot get a contract from the team. The hierarchy in the team also has an effect on team performance. Int10 made this clear by saying, "*I think the stronger the hierarchy in the team, the more damaging it could become. I believe that the sense of unity, purpose and that each individual player has a value he/she can bring to the team. If players start to feel that a fourth line player is less important than a first line player, the team is going to underachieve.*" Making the players feel valued is part of the coach's job when working with teams.

Three out of ten interviewees suggested that team unity should be included as a sixth factor in the model, although Int8 said, "*Yes, the five factors cover the whole operation of a team, but the factors could be spoken of in detail all day long.*" Team unity is a factor that is contained in the psychological status of the players, as the optimal mentality includes thinking in a team context, not according to individualistic behaviors. To build this phenomenon into the model, the five factors of the team's operation were all modified from that of the players to that of the team. In addition, the tactical discipline part was built into the tactical knowledge factor. With these modifications, the team's operation part of the model was finalized.

For the question of whether the coach and the teams should have visible and non-visible interactions, the answers were homogenous. Int3 highlighted this by saying, "*Absolutely, both types are needed. In a case when team cohesion is needed, the non-visible interactions are needed the most.*" When answering the next interview question, the interviewees confirmed that when the orbits of the two participants of the model are moving towards each other and interactions happen, it supports high performance. Int10 said that "*Obviously, there has to be cooperation, yes. When there is a lot of cooperation, the key elements – honesty, reinforcement, positive energy, positive environment – create more opportunity for learning.*"

For the next question of whether the system is balanced and both participants keeping their orbits supports high performance, the answers were once again homogenous. Int1 confirmed, "*Absolutely, this is an ideal case, but it happens rarely.*" Int10 added valuable information: "*Having the balance is really important, because it is a high-speed game that depends on decision-making in a split second, and in terms of team chemistry, players that are too dominant can really divide the team. Coaches that are too dominant paralyze the team.*" The next question in

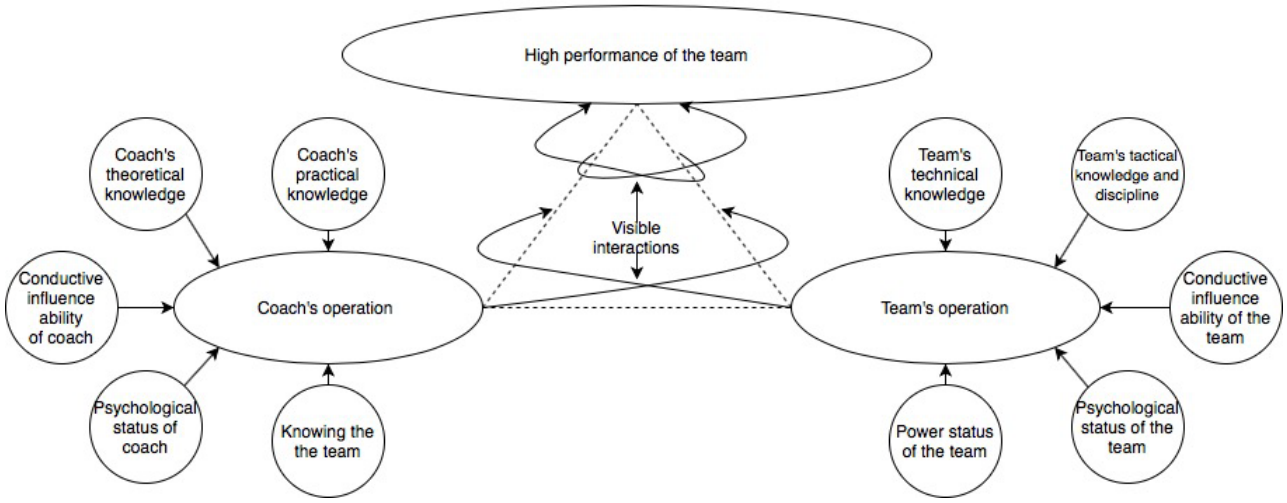


Figure 2. The authors' finalized model of ice-hockey team performance

the interviews was whether the model describes the operation of a high-performing team. Int2 confirmed, "*Yes, the model describes a team that is capable of reaching high performance in an optimal case.*" Int4 went further: "*Yes. The model is ideal, and it would be great if all teams would work like this.*" Therefore, the middle part of the model was also finalized (see Fig. 2).

Discussion

Many factors could contribute to the success of an ice hockey team, and success correlates with high performance in ice hockey. The finalized model contains the ten most important factors that have the highest possible effect on ice hockey team performance, although all teams work differently, as each coach and player has a different personality and a unique way of performing well (de Haan et al., 2013). Based on the interviews, it is clear that the psychological side of performance dramatically increases in significance when a coach wants to improve the team's performance. This finding is analogous with previous studies (Newland et al., 2013; Swann et al., 2017). In high-level ice hockey leagues, enlisting the help of sports psychologists is a frequently used method for keeping players and even coaches balanced and in condition to perform their best (Brewer et al., 1998). In addition, the old-fashioned style of coaching, in which coaches yelled at players to perform well, is exceeded by the modern and friendly method of coaching mentioned by the interviewees. This method includes having an open-door policy (Lenskyj, 1994), two-way communication, and feedback loops (Nash, Sproule, & Horton, 2016). The coach must know the players deeply in order to recognize and make use of players' moods (Zanini et al., 2018). Strong unity is required by the team and can be maintained by the players when they are guided by the coach and the leading players (Nacar & Gacar, 2013). In order to make all players feel they are valued and are a useful part of the team, the coach must pay attention to properly communicate the roles of certain players on the team and provide feedback based strictly on their roles. The coach, as a strategist, must be up-to-date with the latest knowledge on theoretical and practical matters. In addition, the coach must improve their communication abilities to act as an authentic role model for the players (Lau, Chung, & Hwa, 2020). Ice hockey is said to be "*very beautiful from the outside, but very complex from the inside*" (Int4). The finalized model is capable of providing a thorough framework for practitioners who want to understand the performance issues of their teams or further improve the overall performance of their teams. The major limitation of the study is the fact that only professional-level practitioners were included in the research, and no experiment was done to confirm the model's validity for practical contexts, meaning it is assumed that theory drives the action of practitioners in real-life situations. It is also assumed that professional sports represent a goal for different levels of ice hockey activities to move towards. The assumption that the operation of professional-level ice hockey teams should be adopted by recreational-level teams should also be researched in the future.

Conclusion

The psychological aspect of team performance is gaining significance in modern sports, and the role of the coach is evolving into that of a role model who sets an example for athletes. We have observed and acknowledged that many psychological tools – such as team building with the help of sports psychologists and psychological self-development – are all accessible, and the use of these is emerging from the cooperation of athletes and coaches. The common interest of the parties is to cooperate in such a way that enables the sport to function as a source of wellbeing and offer competition as a method for development. It is recommended that coaches equip themselves with psychological knowledge to promote athletes' wellbeing, even in professional ice hockey. From the players' side, it is recommended to create a team culture with the help of the coach in which positive feedback is dominant and competitiveness is balanced even in the leagues of the highest level. Experiencing success in sports contributes significantly to the development of emotional bonds, and feeling unified within the team offers a great experience for both athletes and coaches. These experiences establish sports as a lifelong activity, make athletes love their sport, and help sports become a fundamental part of the image of health. Thus, bonding and belonging support the health of athletes for a lifetime.

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