

From Imaginative Experiments to Inventive Performances

On the Role of Creativity in the Developmental Experiences of Professional Ice Hockey Players

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From Imaginative Experiments to Inventive Performances:

On the Role of Creativity in the Developmental

Experiences of Professional Ice Hockey Players

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Abstract

Despite an increasing interest in studying creativity in sport, previous research has primarily focused on in-game creative performance and employed research designs neglecting sport participants' perspectives. Hence, this study explored professional athletes' developmental experiences involving creativity. Semi-structured retrospective interviews were conducted with eight ice hockey players performing in or retired from National Hockey League (NHL), Kontinental Hockey League (KHL), or Swedish Hockey League (SHL). Players described 15 modalities of creative actions emerging when playing, practicing, and performing. Based on the players' experiences, creativity led to augmented levels of enjoyment (i.e., elicit passion), development (i.e., enhance potential), achievement (i.e., enrich in-game qualification), and fulfillment (i.e., extend career progression). Findings contribute to a more nuanced understanding of creativity in sport and provide novel insights on the role of creativity in the development and maintenance of expertise in sport and the nature and role of deliberate play and deliberate practice in developing creativity.

Keywords: *Deliberate Play; Deliberate Practice; Creativity; Pragmatism; Developmental Activities;*

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From Imaginative Experiments to Inventive Performances: On the Role of Creativity in the Developmental Experiences of Professional Ice Hockey Players

The term “creative” is often used by sports coaches, researchers, and media to describe athletes capable of making surprising and rare decisions, for the benefit of themselves and/or their team. For such reasons, creative players such as ice hockey legend and NHL Hall of Famer, Wayne Gretzky, are celebrated as sporting geniuses (Hopsicker, 2011). Known as “The Great One”, Gretzky could invent things on the ice that no one had ever seen before (Campos, 2014). While research in sporting creativity has portrayed such greatness at its fruition and has taken several steps to determine how it is developed, there is a limited number of in-depth explorations of sport participants’ perspectives on developmental experiences involving creativity (e.g., Bar-Eli et al., 2008; Durand-Bush & Salmela, 2002; Goldenberg et al., 2010). Based on an in-depth exploration of the creative career experiences of professional ice hockey players, this paper discloses that diverse modalities of creative actions may not only lead to highly creative and innovative game performances but play important roles in the development of sporting expertise. Before delineating the purpose and pragmatist position of this study, we address a gap in the extant literature: The underexplored voice of the sport participants.

The underexplored perspectives

The amount of creativity research in team invasion games has increased exponentially in recent decades (Fardilha & Allen, 2020), including several theoretical accounts of definitional criteria (e.g., Campos, 2014; Vaughan et al., 2019) and developmental activities towards becoming an extraordinary creative player (e.g., Santos et al., 2016). Two systematic reviews of creativity in sports have been published in the last few years. In the first review, Fardilha and Allen (2020) investigated definitions, correlates, assessments, and developmental activities. Among more, the study showed that extant research has been limited by cognitive tradition in the field of creativity research, with definitions and measurements privileging creative thinking over creative action, as well as an emphasis on examining relations between creativity and cognitive rather than social

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variables. As Fardilha and Allen (2020) argue, the field of sporting creativity is skewed towards quantitative, experimental, and quasi-experimental designs. Consequently, the voices of sports participants' have to a large degree been neglected. This also limits the understanding of doing as an integral feature of creativity in sport (e.g., scoring the player's actions for motor components such as versatility instead of describing unique solutions and experiential advantages). Besides adopting qualitative methods to gain additional insights into creativity, Fardilha and Allen (2020) called for more detailed descriptions of developmental activities leading to creativity and a more accurate conceptualization of what constitutes deliberate play and practice, which have been too broadly defined in the extant literature. These suggestions guided the design of the present study.

In the second review, Zahno and Hossner (2020) classified the diverse conceptualizations and operationalizations of sporting creativity. Adding to the suggestions above, their results showed that most studies focus on creative game performance rather than creative activities taking place beyond matches. Moreover, the study exhibited that the term creativity is mainly defined and applied as a personal attribute. Few studies focus on exploratory processes or creative actions.

Quantitative designs are important to access the relationships between creativity and selected variables and compare the efficiency of approaches. Still, as stressed in a critical examination of creativity-enhancing approaches, such designs rarely encompass other outcomes than creativity variables (Rasmussen & Rossing, 2022). Put differently, a narrow focus on creative outcome measures tells little about who created what, how they did it, and what this meant to them. It fails to situate the creative process within the wider life context of the embodied subjects (Glăveanu & Beghetto, 2020). To bring together player, process, context, and outcomes, there is a need for in-depth research on sport participants' lived experiences of creative activities. Hence, sport researchers need to embrace the complexity of creativity by moving away from focusing on testable relationships and studying individual elements in isolation (Richard et al., 2021).

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Despite the necessity of qualitative research designs, a limited number of studies have aimed to study sport participants' perspectives on creativity and its development and potentials (e.g., Fardilha, 2021; Martin & Cox, 2016). For example, an autoethnographic study discussing the possibilities to transfer general creative skills from jazz to field hockey stressed the transfer of pattern recognition and selective pattern breaking to surprise, confound expectations, and create scoring opportunities (Harrison, 2016). This offers a unique insider perspective, with a focus on real-time improvisatory creativity in expert performances. Despite the unique contribution of such research, only a few studies on creativity-enhancing approaches in invasion games explored participants' perspectives and thereby transcended the focus on creative performance correlates, as described above. As a rare exception, Rasmussen and Østergaard's (2016) qualitative study focusing on the application of *The Creative Soccer Platform* on a recreational U15 team, showed that the approach established a safe and autonomous environment, with playful engagement in flexible, original, and abnormal actions without fearing mistakes. Similarly, Santos and Morgan (2019) showed that the application of principles transferred from jazz improved U14 recreational volleyball players' tactical and strategic knowledge, communication, and improvised gameplay. Studies like these offer insights into young people's experiences of creative activities applied in practice by the initiative of researchers. However, they do not capture experiences resulting from creative activities emerging in various sports contexts across the sport participants' careers.

Such insights could be gained from exploring athletes' perspectives on the role of creativity. Studying the development and maintenance of expert performance, Durand-Bush and Salmela (2002) showed that multiple Olympic gold-medalists perceived creativity as a vital personal attribute in the maintenance years. Since creativity was not the central topic of investigation, no insights were provided on the role of creativity during the sampling, investment, or specialization years. Hence, and to sum up, there is a need for in-depth, contextualized knowledge regarding the role of creativity in the development and maintenance of expert sport performance.

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95 **Purpose and positions**

96 Considering the points detailed above, the purpose of this study was to explore professional ice
 97 hockey players' creative experiences across different contexts in their careers. Creative
 98 experiences are “novel person-world encounters grounded in meaningful actions and
 99 interactions, which are marked by the principles of open-endedness, nonlinearity, pluri-
 100 perspectives and future-orientation” (Glăveanu & Beghetto, 2020, p. 76). Such markers of
 101 creativity help account for the uniqueness of creative experiences. Creativity results in a diversity
 102 of lived experiences since it emerges in indefinite and dynamic “encounters and entanglements
 103 with the people, ideas, objects, projects, situations, uncertainties, and actions of everyday life”
 104 (p. 76). Rather than considering creativity as an outcome, focusing on creative experiences turns
 105 attention towards outcomes of creative activities, where the creating is oriented towards thinking,
 106 acting, and being in new ways, engaging with fresh, unexpected potentials, exploring emerging
 107 directions, and moving away from any dogged pursuits of pre-determined ends.

108 As creativity is personally meaningful, adopting a pragmatist stance allowed great sensitivity
 109 to and context-dependent exploration of individual perspectives. From this position, human
 110 experience is generated through dynamic transactions between person and environment,
 111 meaning that our inner (e.g., subjective realities and personal capacities) and outer environments
 112 (e.g., physical, social, and cultural features) are continuously constructed in co-dependent
 113 relationships. Hence, pragmatism is portrayed by a practical, plastic, prospective, and pluralist
 114 worldview, where reality is created through human action (Rasmussen & Glăveanu, 2019).
 115 Considering the pragmatist position, the study design recognized that all participants experience
 116 the world differently since they bring unique interests, dispositions, and histories to the situation.

117 To clarify our position as researchers, we are inspired by the socio-cultural stream in the field
 118 of creativity research. Within this area, Glăveanu (2013) has proposed the five A's (i.e., actors,
 119 actions, artifacts, audiences, and affordances) as a useful framework to empathize the articulation
 120 of creativity in concrete socio-cultural settings. From this perspective, creativity “is concerned

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with the action of an actor or groups of actors, in its constant interaction with multiple audiences and the affordances of the material world, leading to the generation of new and useful artifacts” (p. 76). Hence, we neither understand creativity as a cognitive process, personality trait, or a feature of products or ideas, but as a dynamic quality of action. As highlighted by Rasmussen et al. (2019), we are oriented toward the developmental potentials of creative experiences for sport participants at all levels and all playing positions (i.e., not only important for offensive players). Considering creativity as a means rather than an end, everyone can be creative (i.e., by exploring new and unusual action possibilities) and, among more, this process may enrich and expand experiences and foster generative capacities to transform persons and environments.

Methods**Participants**

Seven current and one former player volunteered to take part (i.e., one goalie, two defensemen, two centers, two wingers, and one winger/center). At the time of the interviews, they were 26–40 years old (M age = 32.4; SD = 4.7), had played an average of 458 games across NHL, KHL, and SHL (SD = 311), and represented Denmark in 49 World Championship games (SD = 27). Ice hockey was chosen as the sport of interest due to opportunistic and purposive case selection (Smith & Caddick, 2012). Recruitment was led by the second author, who had practiced and played children, youth, or senior hockey with most participants. Contact was made by phone, explaining the study’s aims and scope, or through gatekeepers on the National Team. Moreover, purposeful criterion measures were applied to enhance the possibility to gain insights into the role of creativity in athletes’ developmental experiences. To recruit Danish players performing at the highest international level (or retired for no more than four years), criteria included at least 200 games across NHL, KHL, and SHL, and partaking in the IIHF World Championship. Players from all field positions were recruited to emphasize varied experiences. Considering the focus

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on creative experiences it was expected that players had relevant insights although they did not suffice as stereotypes of in-game creative players. Hence, no criteria were related to creativity.

Context

Compared to the rest of Scandinavia, Denmark has no proud winter sports tradition. For example, Denmark only has 26 indoor ice hockey rinks and nearly 5.000 registered players. Both numbers are at least 10 times greater in Sweden (363 rinks; 73.293 players) and Finland (282 rinks; 71.064 players) (Statistia, 2022). Nevertheless, in the last few decades, Danish ice hockey has advanced from competing in the C-group in the IIHF National Championship to currently competing in the A-group since 2003, and progression to the quarterfinals in 2010 and 2016. Today, Denmark is the nation with the most NHL players (i.e., 14 in total) per registered player (Larsen, 2018).

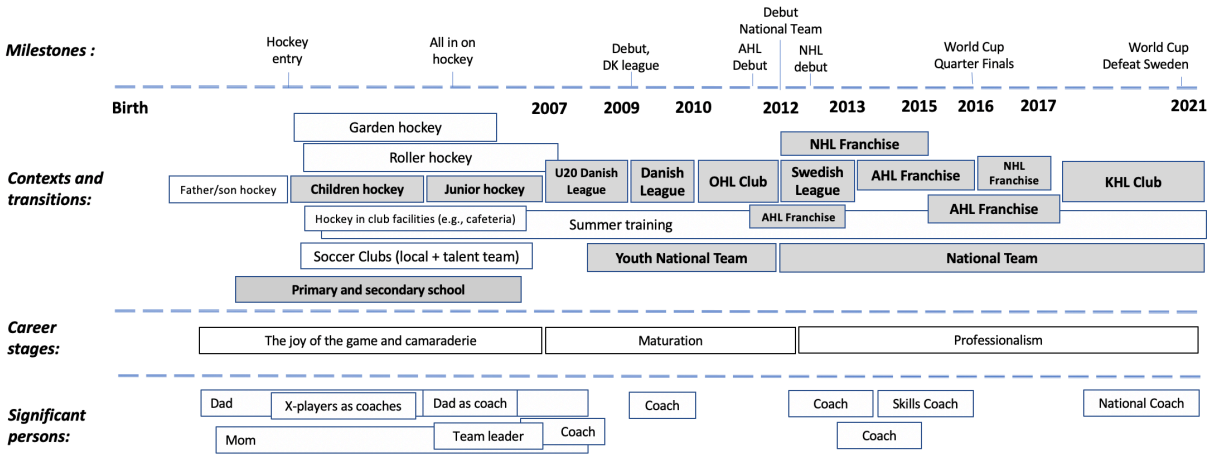


Figure 1: Timeline example. Gray-scaled boxes were prepared before the interview, and the rest was added during the interview. Names of hockey clubs and coaches have been removed for the purpose of anonymity.

Interviews

Suiting the purpose, interviews are useful to gain complex and detailed insights into events and experiences (Smith & Sparkes, 2016). Interviews were conducted in a semi-structured manner to allow further exploration of emerging narratives. This process was inspired by the small story approach, which is oriented toward “real-life small stories-in-interaction” across timepoints and contexts (Bamberg, 2005, p. 368). Accounting for the situatedness of telling stories, the small story method avoids the tendencies of narrative inquiry to equate life and story and to essentialize

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identity with the core organizing concept found in “big stories” (Bamberg, 2008). Rather than excavating enough episodes to be strung together into a coherent and authentic life-organizing narrative for each player, it also allowed a more flexible approach to the interview. To discover relevant life episodes, the interviewer applied a timeline as an elicitation technique to facilitate and structure the conversations. Inspired by Storm et al. (2012), and as exemplified in figure 1, a timeline representing each participant’s time in children, junior, and senior hockey was roughly sketched. Preparing these timelines by searching the internet (e.g., www.eliteprospects.com) allowed tailoring the interviews to players. While interviewing, the personalized sketches were displayed on a shared screen on Zoom. Players portrayed key narratives from their life, while LJTR wrote keywords to develop the timeline. To finalize these timelines, the first part of the interviews comprised open-ended questions about personal, social, and cultural qualities playing significant roles in their career (e.g., “How did you begin playing hockey?”; “How would you describe your time in junior hockey?”). Players were also asked to portray self-organized sport activities and name different career stages (e.g., “just for the fun of it”). Besides serving purposes of elicitation and contextualization, this provided a basis for bringing forth creative experiences. Hence, the last part of the interviews covered creativity-related questions directed against these developmental activities and stages (e.g., “Was there any creativity involved when playing hockey in the garden as a kid? “Which role did creativity play in the X stage defined earlier?”). Players were encouraged to provide detailed examples of 1) their conception of creativity (e.g., “what does creativity mean to you?” and 2) its role in their development (e.g., “In your experience, why is creativity important for ice hockey players?”). A generic interview guide is provided as supplemental material to this paper (this was translated from Danish to English).

Due to COVID-19 and geographical distance, all interviews were conducted and recorded via Zoom. Seven players took part from home, and one was traveling to a game. Before interviews, informed consent was obtained after reminding players about the aims, use of personal data, and the nature of qualitative interviewing. In this regard, the project was conducted in accordance

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with national and institutional guidelines for research ethics as approved by an institutional unit governing the use of personal data (project serial no. 2021-068-01449).

Interviews were conducted by the first author, who curiously, respectfully, and responsively, encouraged them to elaborate on their narratives (e.g., “Can you say more about why that’s creative?”). As Glăveanu and Beghetto (2020) argue, we are not “always aware of creative experiences as ‘creative’.” (p. 77). Thus, players’ experiences could be externally evaluated as creative if (most of) the creativity markers apply (cf. *Purpose and positions*). The interviews lasted 70–160 minutes (M time = 108; SD = 32) and were transcribed verbatim. All interviews were conducted in Danish, whereas specific quotes used in the results were translated to English after being selected during the thematic analysis.

Analysis

An inductive approach was used to analyze the data guided by reflexive thematic analysis (Braun et al., 2016), which was chosen due to its flexibility and ability to adapt the analytical process to the research question (Braun & Clarke, 2019). This iterative process was led by the first author, whereas the second author and a sport psychology expert continuously served as critical friends to constructively challenge findings. First, all transcripts were read twice to become familiarized with overall career experiences, while making notes on attention-grabbing sequences (also when transcribing). In coding, analytically relevant data segments were located, extracted, and named with informative, concise labels (e.g., “design drills and duels”). To preserve players’ experiences, this stage focused on the semantic level. In later stages, a more latent level of analysis was used to differentiate outcomes (e.g., to interpret underlying assumptions about the nature of creativity). Guided by the purpose of the study, three overarching themes were initially generated: A) definition of creativity, B) contexts for creativity, and C) outcomes of creativity. During further theme development (i.e., generate sub-themes), these were apportioned to 1) experiences of creative modalities (i.e., uniting definitions and contexts) and 2) experiences of

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creative outcomes. The underlying themes and sub-themes were generated inductively, based on emerging codes and relations between sub-themes. To shape and classify themes and sub-themes, the original codes were iteratively clustered in core meaning patterns around central constructs that formed the sub-themes (e.g., “inventive play” and “the joy of invention”). Themes and sub-themes were continuously refined by carefully examining whether they represented the textual data extracts. Amongst other things, this resulted in dividing “re-inventive play” and “impulsive play” which were initially compiled and reconceptualizing the outcomes, which were first divided into “passion”, “progression”, and “performance”. Such alterations prevented redundancy and ensured attending to the purpose in a compelling yet perspectival and partial way (Braun et al., 2016). Throughout the analytical steps naming and especially theme writing served as tools of inquiry and discovery (Richardson & St. Pierre, 2005). Before finalizing the analysis, e-mails with two-page summaries of the findings were sent to the players for member reflections (Smith & McGannon, 2018), inviting them to access whether their views and experiences were adequately represented. Within four weeks, three players responded and all three endorsed the findings. All names are pseudonyms.

Consideration of research quality

Based on the pragmatist position, the knowledge produced is to be considered time and context-bound and cannot be seen as independent truths. Similarly, in a changeable and contingent world, it would not be meaningful to apply universal approaches to research appraisal. As this may counteract innovative and valuable research, authors should disclose their chosen markers of quality (Smith & McGannon, 2018). Coherence, credibility, transparency, and resonance were emphasized in this study. For example, credibility was enhanced by crystallization (Richardson & St. Pierre, 2005), which regards appreciating an unstable and complex world (e.g., reflecting a multivocality of lived experiences). To this end, the diverse narratives about creativity may entail resonance, or naturalistic generalization, by stimulating readers’ curiosity, making them

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form connections to their situations, and provoking actions (Smith & Caddick, 2012). Moreover, transparency was *inter alia* enhanced by providing the general interview guide as supplemental material, and coherence by ensuring an alignment between the purpose and our methodological choices (e.g., analytical categories and topics chosen for the discussion).

Results

As shown in tables 1 and 2, the results illustrate 1) how the players were creative (i.e., modalities of creativity), and 2) why these modes of creativity were important (i.e., outcomes of creativity).

Themes	Sub-themes	Description
Playing	Inventive play	Self/peer-led invention of challenging drills and duels
	Explorative play	Explore different ways to solve unusual challenges
	Impulsive play	Attempt all kinds of foolish and frivolous moves
	Imaginative play	Impersonate idols and imagine game scenarios
	Reinventive play	Curiously reproduce others' moves or solutions
	Self-training experiments	Test ideas and explore how to do things differently
Practicing	Illusionistic approach	Exploring original ways to duke and deceive others
	Self-imposed exploration	Inventing ways to add variability to repetitive drills
	Refining technical finesses	Geeking with the small details of specific skills
	Utilizing novel equipment	Exploiting new and alternative ways to practice
Performing	Individual and unrestricted decisions	Independently find ways to solve game situations
	Changeable and spontaneous solutions	Make quick decisions to adapt to unexpected events
	Disguised and misleading actions	Outsmart the opponents with unexpected solutions
	Frisky and risky attempts	Try stunning moves to make an impact on the game
	Co-creative plays	Improvisation to create possibilities for each other

Table 1: Modalities of creativity across play (i.e., self-led activities), practice (i.e., coach-led activities), and performance (i.e., in-game actions) contexts during children, youth, and senior hockey.

Modalities of creativity

Results comprise 15 modalities of creativity that occurred in the contexts of *playing* (i.e., during self- or peer-led activities), *practicing* (i.e., coach-led activities), or *performing* (i.e., in-game).

Playing

The players engaged in a variety of creative modalities during unsupervised and self-controlled play activities throughout their childhood and early adolescence. These modalities of creative

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play took place at an array of locations, such as outdoor courts (i.e., “street hockey”), backyards (i.e., “garden hockey”), and club facilities (i.e., rinks on the ice during the off-season; pre/post games and practice). In these play contexts, creativity emerged as *inventive play*, which regards the process of designing challenging drills and duels with competitive and/or explorative tasks.

It’s creative to make small competitions. If you made a contest about who could hit a cola can on a goal, for example, then you took turns to be creative, saying “okay, now we have to drive around that cone and shoot”. We were creative in the ways we challenged each other and didn’t take it all too seriously, but just found different ways to test each other. For example, a small obstacle course with some cones to dribble around, and then see who could get the best time. (Alen)

While some players mostly linked creativity to the self- or peer-led crafting of the competitive challenges and “putting each other in unfamiliar situations” (Leo), others described creativity as *explorative play*, which regarded exploring different a way to solve the challenges:

I often put a hockey goal in front of the garage to practice different things and invent things. I made these contests, where I had to hit things hanging from the crossbar with a tennis ball. In this way, I tried to set some challenges and ask myself “how can I do this.” Try one thing, and “no, that was not the right way to shoot, let me try another way instead. Okay, now it worked.” I didn’t have all the answers to how to solve the challenges, but I found the process to succeed. (Ron)

Whereas *inventive* and *explorative play* were explicit and relatively structured ways of being creative by defining the rules and coming up with varied solutions, a more frivolous, irrational, and random modality of creativity could be portrayed as *impulsive play*. Here, players attempted all kinds of remarkable and difficult tricks, including many actions that would not be proper in games, but emerged when fooling around, doing whatever came to mind.

In street hockey, one tried some even more stupid and silly things, in a funny way. Trying some weird things, juggling all the way through, putting it through the feet, or something. This is exactly the part of the sport that you thought was fun back then, no matter if it was on ice or streets. (Ned)

This lighthearted extemporization possibly also involved *imaginative play*, which regards impersonating hockey idols and envisioning fictive hockey scenarios to try out imaginative solutions. For example, Gus was inspired by a previous Danish national player:

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He could do fantastic things with the puck that I would like to learn. So, I practiced it daily, running around and playing with the puck, flipping it, juggling it, all those things. I just ran around playing I was him, and then it was not just shooting, but trying to dangle [a hockey-specific term describing different kinds of moves used to fake opponents] by sliding the puck under the opponent's stick, and such, because he did those kinds of things. (Gus)

Reinventive play also relied on the players' imaginative capacity but was seen as a re-creation of alluring tricks or solutions observed among peers or on videos. This was not seen as copying, but as an appropriation of their style and as a curious reproduction based on certain prerequisites.

Being curious about how to become better, or find an advantage, without cheating of course, but finding out how can I become better than the others during the summer. Spend time playing, for example, trying things out and see if you can do the things you see in highlight videos. (Alen)

The abovementioned modalities of creative play primarily occurred during children and junior hockey, but gradually faded out as players progressed to a professional level. Most of the time previously devoted to playful activities was later occupied by rigorous training and tournament programs, professional routines, and demands. Yet, most players managed to maintain a modality of creative play at home gyms, after practices, and during the off-season, namely *self-training experiments*, where the players devoted extra time to optimizing specific parts of their game by creatively setting up drills that improved soft spots or sharpened peak competencies.

One of the things I am good at is being creative in offensive moments. That's something I work a lot at. Being creative by learning a new move, feint, or a new way to drive to the net or something. After serious team training with coaches, playing systems, and the things you need to get through, we usually have 30 minutes where you can practice whatever you want. I often fool around with a buddy or two and find some silly things to do, like getting a hard pass on the heel and trying to take it with you. It can be all kinds of things and you just laugh all the time because you often fail. (Ned)

Compared to the five above modes of creative play, these self-directed experiments resulted in attempting more mature and realistic innovation, focusing on nuances of game-related skills or roles. As Ned stated, "you do some quite silly things, but there is a limit. You can't practice juggling it through a whole zone". As shown below, such limits to irrational acts also occurred as players progressed from children to youth and especially in professional hockey.

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Practicing

Whereas the above modalities of creative action emerged in self-organized contexts, others took place in coach-led contexts (e.g., skills-coach training and supervised summer training). Several players labeled children hockey as “pure play” (Gus), especially the last half of training sessions (60 minutes in total) which involved free play without any coach intervention. Such freedom enabled players to engage in reinventive, imaginative, and impulsive play. The open limits also enabled an *illusionistic approach*, involving what-if-thinking to explore personally new ways to duke and deceive opponents, find ways to fake it and surpass their expectations.

In children hockey, we played a lot across the rink and I would say that this relates to creativity, because we just played in two teams and might have been around 15 players in one endzone, so you had to try to dribble, and could be creative and find out “okay, if I try to go around him on the right, then I could jerk my shoulder a little to show that I go left.” Without being conscious about it, I think you learned those 1-on-1 situations where you could feint an opponent. And I still think it is exciting to foresee, “okay if I do this, then he might do that.” (Ron)

Players argued that creativity both regarded the process of inventing personally novel ways to dangle opponents (e.g., dekes, decoys, or clever puck moves to maneuver past defenders) and later using these in games. Like creative play, this sparkled in children hockey but stifled during junior and especially professional practice, which was more structured and “hockey-focused” (Leo), with team-specific concepts, systems, and positional restrictions. This transition opened yet another modality of creativity. *Self-imposed exploration* regards initiatives to induce variability to repetitive, structured drills by adding extra layers and coming up with customized focus points. For example, when rehearsing movement patterns pre-designed by their coaches, players tried to perform each pass slightly differently or to “challenge yourself with a turn” (Gus).

I would like it if practices were a little more creative. Often, it’s just simple stuff, and in a lot of our drills, there is not much creativity. You have to do it on your own. For example, in 2-on-1 or 2-on-2 drills, there is room to be creative. If you make something completely insane, I don’t think the coach wants to see it, but this is an area where you can work on your game. Let’s say you tend to be too simple out on the ice, then you can try to break that bad habit, by doing things that you

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don't usually do, for example, taking it to the slot area instead of skating to the corner to protect the puck. (Ben)

This helped the players to explore and refine their game within the limits of coaching agendas. In many of their professional clubs, an analogous modality of practice was likely to emerge in skill coach practice (e.g., 30 minutes after team training), which focused on specific individual skills rather than team-tactical aspects. Here, players engaged in *refining technical finesse*s, which involved "geeking with" (Ron) specific skills. This took place in drills designed by skills coaches, or by player initiative (i.e., resembling re-inventive play and self-training experiments).

There is room to be creative, and often it's some simple things and small details. Maybe you stand by the net, and someone shoots pucks from the blue line, and then you have to chip them in. (Ben)
 Sometimes we throw a bucket of pucks on the ice and say, "we need to come down to the goal at almost full speed, but it's up to ourselves to find out what to do". There are many different variants of how to execute it, so it is individual creativity that arises in us. And then you can see the other players do it and think about how you can use some of it in your own way. (Ned)

Related to individual practice, purposeful integration and collaborative *utilization of novel equipment* were reported as a creative modality of practice, which provides alternative ways to become better. As argued by Alen, this was especially evident for the goalie position.

We are quite creative in terms of training aids and tools. We bring a lot of stuff on the ice and my coach likes using it when it serves a purpose. For example, we have a plastic mannequin dressed like a player, that we use to shoot around to challenge the shooting, avoid someone getting hit by accident, and make it harder for goalies to see the puck. (Alen)

Performing

Whereas the above theme covers creative modalities of action from different practice contexts, the following regards in-game creativity. In this regard, *individual and unrestricted decisions* involved independent thinking and finding one's own way to solve the situations on the ice. As implied in the next quote, this especially regarded children and youth hockey contexts.

If coaches keep setting limits and say you can't do this, you can't do that, then there would be no creativity. It requires an open inquiry where you need to find a solution to something. There are no right and wrong answers, but different outcomes [...] I had a coach, who had this rule, "three out

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of five times, you must do as I say, but the last two I don't care what you do". If you did something strange twice, he said, "now you've used yours, do as I say for the rest of the game". (Leo)

A related mode of creative performance, *changeable and spontaneous solutions*, was reported as a basic requirement in hockey regardless of age, which enabled the players to handle the rapid, complex, and unpredictable game, where not everything can be planned. The game situations can be solved differently, but often, quick, and situated decisions are needed to adapt to and solve unexpected events successfully.

Sometimes you need to be creative and just react and find a way to do things. Maybe you fell, the puck might have hit something and gone in another direction than expected, and then you have to come up with something in a split second, to make a new decision. (Alen)

Another modality concerned *disguised and misleading actions* to outsmart opponents across the field. This does not only require a repertoire of deceptive moves but situated decisions to find ways to lure and surprise opponents, making it difficult to read what, when, and where it happens: "You need to look like you do one thing and then suddenly do another" (Alen).

Creativity is about finding a way to handle a challenge. To come out of a situation as the winner, then you have to be creative to find a way to do it. Of course, there are fancy moves and such, but for me, creativity is more about hitting blind passes, having spotted a player a few seconds before, knowing where he might go, and hitting a backhand pass to an area where I expect him to be. (Ron)

Besides handling and creating unpredictable situations, the in-game creative performance also concerns *frisky and risky attempts*, which regard acting on the edge of game concepts by utilizing precarious, difficult, and spectacular solutions to create game-decisive situations. This mostly took place in the offensive zone, where there were fewer consequences of failing.

If you want to create something you need to take some chances, play with smaller marginals and in some smaller areas, and make some plays that quickly can go wrong. It can also be creative to do something technical that looks nice or to create some unexpected skating routes, or some variants that pull opponents out of their sockets, to open the game in that way. (Gus)

The final in-game modality, *co-creative plays*, was described as a collaborative improvisation process. As opposed to designed plays with specific skating and passing patterns, this kind of creative action emerged when two or more players interacted in unrehearsed and original ways

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to solve dynamic and complex game situations. This was especially relevant for centers, who
“act as the spider in the net, to keep track of the four others and bind things together” (Gus):

In sport, you can try to create or destroy something, and to create you need to be creative. I’m good
at finding solutions and getting ideas when the game is ongoing. In my world, that’s to be creative.
That you can open things that are somehow locked and loosen things in interplay with others on
the ice. Like, if he was here, then I could take two steps to the left, and signal to him to go right so
I can do something to play him free. It’s creative to solve the situations in ways you don’t have on
the drawing board. You need to somehow get inside the others’ heads, to think “okay, what is he
doing”. In team sports, you can’t be creative if just thinking within your own box. (Gus)

<i>Themes</i>	<i>Sub-themes</i>	<i>Description</i>
Enjoyment	The joy of invention	Coming up with new challenges enhances passion
	The joy of discovery	Solving novel challenges in successful ways is fun
	The joy of fooling around	Trying playful, foolish, and artistic moves is enjoyable
	The joy of creative self-control	Self-imposed experiments make rigid drills tolerable
	The joy of design and deception	Anticipating and forming the game is satisfactory
	The joy of authentic decisions	Using one’s own thoughts and ideas is more meaningful
Development	Devoting more time	Prevent boredom and exploit poor material conditions
	Maximizing practice output	Improve weaknesses and refine peak competencies
	Challenging habit thinking	Push oneself to avoid choosing easy, low-risk solutions
	Learning from experience	Learn through problem solving and diverse experiments
Achievement	Boosted confidence	Inventing new skills enhances belief in personal qualities
	Enhanced production	Create favorable situations and enhance game impact
	Refined technical qualities	Develop stickhandling and hand-eye coordination
	Expanded solution repertoires	Invent new and exciting solutions transferable to games
	Improved game intelligence	Refined understanding of possible game (inter)actions
Fulfillment	Create career advantages	Gaining an edge in dealing with intrateam competition
	Compile a unique style	Synthesizing elements to a unique and noticeable style
	Develop peak competencies	Utilizing prerequisites to compensate for weaknesses
	Maintain competitiveness	Challenging oneself to stay ahead of competitors
	Become extraordinary	Fortify capacities required to perform creatively

Table 2: Outcomes of creativity in terms of enjoyment (i.e., elicit passion), development (i.e., enhance potential),
achievement (i.e., enrich game-relevant qualifications), and fulfillment (i.e., extend career promotion).

Outcomes of creativity

The overarching theme regarding the players’ perspectives on the value of the various modalities
of creativity was analytically divided into themes of *enjoyment* (i.e., elicit passion), *development*

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(i.e., enhance potential), *achievement* (i.e., enrich game-relevant qualifications), and *fulfillment* (i.e., career promotion).

Enjoyment

Several modalities of creative actions across the play, practice, and performance contexts in the players' careers led to augmented levels of fun: "Creativity is one of the biggest parts that makes hockey fun" (Ned). First, *the joy of invention* relates to designing novel, hockey-related challenges with peers or alone in inventive play and self-training experiments.

Challenging each other shows that you have a passion for hockey. It is just two things that go hand in hand. It was so fun to shoot after old metal cans or something in the backyard, and it just helps you use so much time on it. And when using a lot of time, then you come up with situations you have not seen before and try to solve them and challenge each other. (Alen)

Referring to the variable and explorative process of solving the novel tasks in useful ways to win over themselves or peers, some stressed that the fun part of self- or peer-invented challenges regarded *the joy of discovery*. This involves the satisfaction of creating new skills or solutions.

I think it's interesting and fun to come up with a lot of things, trying to learn different strokes, and trying to be creative in different ways. I never really thought about it before, about what turns me on, but it's actually all these things. It's just what makes it fun and makes you feel like an 8-year-old again. Whether it's to become better, finding out how can I solve this situation, or because you want to make a move that looks nice, or whatever, then it just contributes to making it fun. (Ron)

The joy of fooling around was evident in the players' explanations of how they had engaged in creative play activities, where they came up with a lot of playful and artistic actions that would not make sense in hockey games. These jolly and cheerful activities mostly occurred in impulsive, explorative, and imaginative play, as well as self-training experiments.

Nowadays, it's still fun to be creative. After practice, it's fun to work on difficult small details or skills. You know that you're working on things that you can use and become better at, but it is mostly the fun and joy of feeling like a boy again when you fool around and juggle with the puck and practice some other things, especially when you are an offensive player. (Ned)

Self-imposed exploration was also related to *the joy of creative self-control*. In this regard, the use of self-imposed constraints maintained the players' motivation in banal, structured, and

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repetitive training. As Ron argued, creativity plays a crucial role in “making it to an elite level” since it is “a huge motivation factor”. For example, self-imposed exploration involved reflecting on how to solve the situations and challenging oneself. This maintained player enjoyment.

The first thing that comes to mind when thinking about creativity is that it has somehow contributed to maintaining the joy of playing hockey. And it comes from challenging myself. I think a lot about how I can solve it, even today when we have technical drills. Just to keep it simple, if I skate around a circle, get a pass, and shoot quickly, then I think about where I should have my weight when receiving the pass, and where my legs should be. In that way, I think a lot about how I can be as efficient as possible. So being able to find the solutions have motivated me a lot. (Ron)

Whereas most of the creative modalities that were related to passion originated from play and practice contexts, *the joy of design and deception* involves the satisfaction of anticipating and forming the game using an illusionistic approach, disguised actions, and co-creative plays to set up oneself or teammates in fortunate situations: “some of the most fun and cool is to hit some blind passes. It looks amazing and can open the game” (Ron). Players also reported that reduction of creativity due to rigorous training, authoritative and punitive coaching, and overly structured game concepts make hockey less fun by demolishing in-game creative modalities such as disguised actions, individual decisions, and risky attempts. It was more fun to play in systems allowing creative freedom than in rigid systems, where failed endeavors to do the extraordinary have unfortunate consequences (i.e., reduced ice time). It removed *the joy of authentic decisions*.

Without creativity, it gets too boring, monotonous, and robot-like since everything is decided in advance. It’s much more fun to be allowed to be creative. [Interviewer: *What makes it fun?*] Well, if the coach always says, “when you get in this situation, then pass it to the left every time”. That’s not fun at all, because everyone could do it. If you are not being allowed to use a few of your own thoughts and ideas, but have to do the same all the time, then it’s not fun at all. (Gus)

Development

Several of the modalities of creative action in play, practice, and performance contexts were seen as keys to their progressive development towards a professional level. Especially, the modalities of play helped players *devote more time* to hockey-related activities. For example, imaginative

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play, explorative play, and inventive play helped them avoid boredom and exploit poor material conditions.

Often, and especially for kids, it can get boring because not much happens when playing alone. So there I was creative with my head, by thinking about game situations and mimicking players from NHL and around the world. Because I didn't have much [equipment] in the garden, only a hockey stick, a somewhat flat, non-bouncing tennis ball, and a small hockey net, which was not so exciting, but it was enough for me to practice the different things that have made me better. (Ben)

Related to the issue of time, players linked several modes of creative play and practice with the possibility to *maximize practice output*. For example, self-training experiments involved an explicit motive of development. Inventing and testing new ideas, and exploring how to do things differently, this "extra work" (Ben) was said to be equally efficient as coach-led training.

For me, creativity is about improving one's game through the extra work you do at home, to find a way to work on the things you want to become better at. When you don't have a coach to tell you what to work on you need to be creative to come up with something, small details to improve your technique, shooting, overview, and so on. If you work on these things, you'll live up to the best you can become. But if you are not creative, you won't get as good as you could have been. (Ben)

Further, self-imposed exploration enhanced output by allowing players to meet the situations in explorative ways and attempt different solutions, instead of being sedated by repetitive drills.

Some coaches use the same drills across the whole season, so you can almost go to practice with your eyes closed and without giving it 100 % because you have done it so much don't need to think during practice. You need a mindset where you add an extra pass or an extra turn, so it doesn't end up being the same things you practice day in and day out. Otherwise, you start to be satisfied by just doing this robot-like training instead of challenging yourself. (Ned)

Hence, self-imposed exploration and self-training experiments *challenge habit thinking* and conventional decisions. For example, Ben tried to avoid always choosing the easy, low-risk solution (e.g., dump the puck under pressure), and Gus pushed himself to do alternative and fun things instead of "simply running it on the routines". Further, Ron stressed the developmental benefits of designing unknown drills "where you don't know the answer" during inventive play.

If you have the answers for how to do it and know that you can do it like this and like this, and then set up drills where you succeed with the things you already can, then, in principle, you do not

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develop. It's better to find out, "Okay, now I have to do this," because then I have to find a solution, find the process to succeed with something challenging by solving it in the best way. (Ron)

Another reason why creativity accelerated development is related to *learning from experience*. Hence, players argued that most modalities of play and practice creativity gave them diversified possibilities to learn through individual problem solving, independent decision making, and diversified experiments, which involve learning from mistakes.

We are humans, not robots. We are not programmed to just be told what to do. We have our own thoughts and opinions and that's what creativity is all about, being allowed to develop from within and not from outside. It's healthy to come up with some conclusions on your own about what works and what doesn't work. Being creative and trying one's hand at it helps you do that, so you use your creativity to develop and avoid being walled into a corner regarding what you can do. (Leo)

Achievement

Whereas the above outcomes covered general developmental gains, the following concern how creativity enhances game-relevant qualifications and thereby hockey performance. In this regard, different modalities of creativity led to *boosted confidence* which was highlighted as a key to performing well. For example, inventing novel skills in self-training experiments (i.e., shootout trickshot) and performing these in games provided an extra belief in personal qualities.

At times you are almost too creative and practice things that you'll never use, but anyway you get some confidence in what you do from being creative and fooling around after practice. The more you build up, the more creative you might be in games to do things that others don't do or expect. To be surprising to get past someone or get your shot through, you could turn fast, change the angle, make a body feint, protect the puck in a creative way or something. Doing something unexpected can give you that split second that can make difference on whether he blocks your shot or not. And this comes from working after practice. Half of the time you don't succeed, but you just get that feeling in your body that you have done it before, so you dare to do it in a game. (Ned)

Several modalities of in-game creative performance were coveted because they were involved in *enhancing production* of favorable game situations for themselves or teammates. Optimizing their in-game creativity, players enhanced their impact on the course of the game, for example by misleading opponents, orchestrating the game, or doing the unexpected.

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The creation of chances in the offense also comes from creativity, from finding a way to get around the defense or make yourself a threat. Every moment of the game is kind of a creative thought process you go through to create chances, produce, and be efficient. (Ned)

Players also argued that several modalities of creative play developed the capacity to make changeable and spontaneous solutions, which regards surviving pressure to maintain possession. Whereas in-game creative action modalities served as targets, modalities of play and practice served as means of advancing game performance. For example, these early-career activities led to *refined technical qualities* that were beneficial later in their professional careers. Depending on which kinds of drills were designed and explored during inventive play, for example, these activities refined technical aspects such as “stickhandling” (Ben), “puck-protection” (Ned), and “hand-eye coordination” (Gus). Players also argued that creative modalities such as impulsive play, explorative play, and self-training experiments *expanded solution repertoires*. Although these activities involved “much foolish creativity” (Ned), they also enabled the generation of new and exciting solutions that could potentially be used in hockey games.

Thinking about myself as a player then this is what I am good at, to come up with something new, invent something new and be creative in that way. Maybe you have been practicing a new kind of deke, fake, or a move close to the net that can surprise the goalie or the defense. Of course, you can’t just go out and do it, but situations occur in games, where defenders come in more or less the way you practiced, and then you have it in your back pocket somehow. If it works successfully and leads to a goal, then it has been worth it all. You learn a lot from just fooling around and playing a little on the ice in a creative way since it can be transferred to many moments in the game. (Ned)

Creative play and practice in game-like activities not only led to technical resourcefulness but also *improved game intelligence* or “game understanding” (Gus), which regarded insights for (inter)action in the quick and complex game. For example, using an illusionistic approach and learning from experience, Ron matured personalized principles for co-creative plays (e.g., counting players to foresee open areas; knowing what the defense expects).

I think it’s very hard to become good if all decisions are based on something others have told you, “now you need to do this in this situation.” You need to find out yourself and experience it on your

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own body to see what works, learn to take in the information you see, and try to find a way to solve it. Each time you solve it in a good way, you put it in your backpack for similar situations. (Ron)

I learned to foresee the game because I've put myself in all these situations. Those things I did as a boy in the garden, roller hockey, and different things just help with the small marginals. Dribbling around with a puck or a ball, you know, such things make your hockey brain smarter. (Ben)

Fulfillment

Whereas the above concerns in-game benefits, the present focus on how modalities of creativity impact career promotion. For example, engagement in creative play and practice were vital to *creating career advantages* as opposed to peers. For example, Leo argued that his independent initiatives in self-training experiments gave him an edge in dealing with intrateam competition. Others argued that creativity separated the best from the rest.

We were some players on the same level, who competed to be the best. [...] I took some steps that the others didn't when we were around 15 to 17 years. Somehow, I wanted it more and enjoyed playing more, both on and off the ice. This is where I think creativity comes in. You've just worked on more things over the years. I don't think they used so many hours alone in the garden to improve their stickhandling or shooting. When they played video games, I was creative in the garden with all these things [...] I want to say that you always need to be creative, but I think it's most important from 14 to 18, where you try to make a difference to get possibilities to get into a big club. You need something that separates you from others before the clubs want to use time on you. (Ben)

In this regard, creative modalities associated with individual choices and decisions were seen as critical to withstand authority (e.g., coaches or esteemed teammates, with fixed ideas about best practice) and avoid being limited by acculturation. Hence, creativity played a critical role in *compiling a unique style* through a self-governed process of finding out which player one wants to become, without being controlled by others' views. Alen reported that re-inventive play and self-training experiments contributed to a customized style by synthesizing other players' styles.

It can help to think for yourself and not just do what you are told is the right way to do things, so you take a new route to the goal than others do. That you experiment with different ways and are curious. I handpick from what others do in diverse situations. If I see something I would like to use in my game, I try it out to see if I can make it work, and then I create a hybrid of the players I look a lot at, while of course, still being myself. That's what makes you unique, that you seek out new

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knowledge in different places, and then can be creative in the way you train it and combine it. That you challenge yourself to try it and then see what makes sense and comes naturally. (Alen)

Creativity was accentuated as a key to taking control and ownership of personal development.

In this regard, creativity led to *developing peak competencies* by utilizing personal prerequisites in the best ways. This underlines that there are many ways to excel, and that creative modalities such as inventive play, explorative play, reinventive play, and refining technical finesses may help players identify and develop peak competencies to compensate for weaknesses.

We are all different and hockey is so complex that you need to be able to think creatively to use the things you have in your toolbox to create the best result for yourself. There are so many things you can be good at, that you need to be creative to find a way to succeed. I'm not the fastest skater but found a way to cheat the system so to say. Creativity is to think outside the box to find solutions to tactical aspects. I've been creative by realizing my limits and finding a combination of my tools to succeed at a high level, by destroying others' game in efficient ways. I found out, that if I excel in these things, then I have a chance to fill a role on a team and be a piece in a puzzle. (Leo)

Further, this open-ended nature of the game was important to *maintain competitiveness*, which regards continuing to challenge oneself during one's professional career instead of going into hibernation. As argued by Ned, "there is always something new to learn, something new to come up with", for example, during self-training experiments or self-imposed exploration, which help "finding a way to be a step ahead of one's competitors" (Ron).

When you become professional, players quickly forget to do all the extra work they used to do but those who maintain a high level keep working on small details and finding solutions to get better. Of course, there are practices where I just shoot without using my brain, but I mostly try to find new ways to surprise the goalie. It's something I focus a lot on. (Ben)

Finally, developing modalities of in-game creativity by engaging with the play and practice modalities, played a key role in *becoming extraordinary*. Accordingly, most participants strived to become more creative, since these qualities were associated with the very best hockey players. They worked on improving the technical and mental capacities of creative performances.

The really good players think hockey in a different way than many others, and that's what makes them a notch better and more special, that they have a creative and inventive side. I think this is

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one of the things I am good at, being creative in offensive moments, and I still try to work a lot on it, cheating opponents, inventing new moves, and creating scoring opportunities. (Ned)

In this regard, several players linked creativity with maximizing practice output through extra work (e.g., self-training experiments): “If you are both hardworking and creative, I think that you have a much larger chance of becoming an extraordinarily good player” (Jay).

Discussion

In this study, we addressed the lack of creativity studies encompassing the perspectives of sport participants by exploring professional ice hockey players’ creative experiences. This exploration of novel person-world encounters in the players’ careers materialized as 15 modalities of creative actions in play, practice, and performance. These variants of novel and meaningful (inter)actions entail 20 outcomes related to augmented enjoyment, development, achievement, and fulfillment. Below the study’s unique contributions are discussed in terms of refining 1) the understanding of creativity, 2) its developmental impact, and 3) the role of play and practice.

Athlete perspectives provide a refined understanding of creativity

Accounting for the complexity and uniqueness of creative experiences in athletes’ careers, the findings point toward creativity markers that may help explore and interpret creativity in future studies. The present findings provide in-depth and contextualized insights into creative activities and qualities that are not captured by prevailing methodologies in the research field. Such research measure motor outcome variables such as flexibility, originality (Memmert et al., 2010), fluency, attempts, and versatility (Santos et al., 2017), and assume that improved scores enhance performance. On the contrary, this study offers several alternatives to the performance-oriented definitions in the field, where creativity is a risk of being reserved for the few best offensive players (Rasmussen et al., 2019). Hence, the present results point out that creative processes in sport regard the willingness to engage with the unfamiliar, the capacity to approach the familiar in new and unusual ways, and the possibility to move away from pursuing pre-determined ends. Specifically, the modalities of creative action suggest that markers such as existential courage

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(Maddi, 2004), imagination (Rasmussen, 2019), and playfulness (de Vries, 2021) may serve as principles to grasp creativity in sport. Moreover, several modalities of creative action in play and practice contexts involve curious and inventive experiments where personally new and unusual action possibilities are explored (Rasmussen et al., 2019). Rather than objectively creative products or performances, the players were oriented towards subjective experiences of creating something new or solving something in a new and personally meaningful way (e.g., in terms of having fun or developing) during play or practice activities. Moreover, modalities of creative performance (e.g., changeable and spontaneous solutions, and disguised and misleading actions) resemble less predominant perspectives regarding imaginatively (Campos, 2010) or seductively (Aggerholm et al., 2011) solving challenges in complex games. The fact that ice hockey players from all playing positions were able to portray relevant developmental experiences foregrounds that creativity plays different roles in athletes' diverse career pathways.

Novel insights on the developmental role of creativity

This study provides a nuanced understanding of the role of creativity in developmental pathways towards expertise by providing contextualized insights into different situations, activities, and events across careers that involve different kinds of creative (inter)actions. Several modalities of creative action were recognized as sources of progressive development towards and continuous maintenance of an expert performance level. By employing a rare focus on athletes' creative experiences, the study provides novel insights into the role of creativity across several stages of development. This extends extant findings about creativity at specific career stages. For example, highlighting the implications of creativity in early developmental experiences, Weissensteiner et al. (2009) described the self-challenges and experimentation involved in the creative play of cricket batsmen. Resembling inventive play and explorative play, the batsmen e.g., challenged themselves with alternative bats, balls, and tasks requiring creative actions. These self-organized activities were “fundamental to later sporting success” (p. 282) since they nurtured problem-

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solving, creativity, and adaptability. Since the topic of creativity emerged as part of developing a holistic model of expertise, the study did not explore the role of creativity in other career stages. This was also the case in the study of Durand-Bush and Salmela (2001), who disclosed the role of creativity in the maintenance years. Here, creativity helped two-fold Olympic Champions be innovative and keep an edge over competitors by “developing new tactics and skills” (p. 162). For example, an athlete reported that “the most important thing for me at this level is to try new things, be innovative, and to always go forward” (p. 162). The present findings elaborate on this creative orientation.

Several modalities of creative action are also reflected by a position exchange analysis on the developmental experiences of two-fold National Basketball League (NBA) most valuable player, Steve Nash (Martin & Cox, 2016). The study showed how interpersonal exchanges with peers, parents, and coaches contributed to developing his team-oriented on-court creativity, making him a fivefold NBA assist leader. Reflecting themes such as self-training experiments, these exchanges allowed him to engage in self-instruction, where he methodically, timelessly, and self-critically assessed and challenged certain parts of his game to refine strengths and reduce weaknesses. And like modalities such as disguised and misleading actions, Nash reported that his father created a value system for being creative, seeing things before they happened, tricking people, and being cheeky, which made him more interested in creating chances for others than scoring points.

Moreover, the present findings demonstrate that diverse creative experiences may underscore the development and maintenance of sporting expertise by enabling the players to both play and practice more than others (e.g., devoting more time), and doing so with a higher quality (e.g., self-imposed exploration, maximizing practice output). Virtually all modalities of creative action were linked with enhanced enjoyment. For example, by introducing variation to repetitive drills, self-imposed exploration made structured practice sessions more tolerable and profitable. Hence, as shown by Rasmussen and Østergaard (2016) for recreational soccer players, creative activities

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may be key to supporting sport participants' intrinsic motivation. The finding that diverse modalities of creativity support intrinsic motivation is also an important conceptual contribution to extant models of creativity, both within sport research (Richard et al., 2021) and general creativity research (e.g., Amabile & Pillemer, 2012), where intrinsic motivation is seen as a key to generate new and useful solutions to given set of task constraints.

In terms of enjoyment and intrinsic motivation, the present results demonstrate that creative activities enrich immediate sport experiences, which is important to reach short- and long-term outcomes of youth sport as defined within the personal assets framework (Côté et al., 2014; 2020). For example, the present results indicate that the facilitation of creative sport experiences may be useful to develop sport participants' competence and confidence, as well as support their continued participation, personal development, and long-term performance. Whereas the present study has focused on the outcomes of creativity, future research should generate contextualized accounts of the dynamic elements (i.e., personal engagement in activities, appropriate settings, and quality social relationships) that shape suitable conditions for creativity.

As implied here, creativity is not a panacea for attaining sporting expertise. Yet, with the right mix of personal qualities, psychological skills (Pankow et al., 2021), environmental conditions (e.g., Bendorff et al., 2021), socio-cultural constraints (e.g., Uehara et al., 2020), and characteristics of elite sport developmental systems (Ogden & Edwards, 2016), it may play a significant role. Specifically, creativity supported the endeavor to perform each self- or coach-led practice session at the highest quality level. In this regard, several players dismissed the developmental impact of self-same and repetitive activities (e.g., challenging habit thinking). Hence, it could be argued that several modalities of creativity share characteristics of deliberate practice, which regards practicing the challenging things that help one develop. As Ericsson (1998) argued, "it is *necessary* for expert performers to avoid mindless memorizing and automatization of skilled performance in order to continue improving and increasing their control over their performance" (p. 94). Creativity not only aided these players in inventing challenging

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things to practice (e.g., inventive play; self-training experiments), to overcome their weaknesses and refine their strengths, but also helped them solve these challenges in the best ways.

Based on the present findings, one could speculate that creative experiences play a larger role in developing and maintaining expert performance than recognized in the extant literature. This impression is supported by the idea that creative experiences are not always conceived as creative by the subject (Glăveanu & Beghetto, 2020). Thus, without being prompted, creative experiences might not be articulated in retrospective interviews focusing on developmental activities and environmental conditions throughout the diverse pathways to expert performance in sport. Also, when initiating the interviews, some players admitted that they had never really thought about creativity in this way before, but after being invited, they had started to reflect on its meaning. Also, during interviews, some realized that they had been more creative than thought beforehand (e.g., Gus discovered that his way to come up with new self-challenges was creative). Similarly, researchers might not be familiar with the concept of creativity nor its role in the development of expertise. Therefore, they might not notice athletes' reference to it in retrospective interviews. Based on the present findings, enhancing the awareness of creativity among sport researchers (e.g., through literature and education) is important to illuminate more creative experiences.

While the present exploration provided novel insight into the role of creativity in developing a range of affective, cognitive, and motor qualities deemed important for the development of sporting expertise, it falls short of insights into social and cultural outcomes. Yet, as Glăveanu and Beghetto (2020) argue, creativity does not reside within people, products, or processes. Despite emphasizing creative processes, actions, and person-world encounters, some parts of the findings unintentionally maintain the subjectivist tradition in the field, consequently isolating creativity within the player. Although most analytical themes on the modalities of creative action imply the interactional and social nature of creativity, this is not reflected by the outcome themes. This issue might trace back to the interviews, which focused on the role of creativity in players' careers rather than its impact on their groups, relationships, or environments. For example, when

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750 players described how they challenged each other in *inventive play*, no follow-up questions were
751 asked on the role of creativity in their way of being together. Inspired by the framework of
752 Richard et al. (2021), future investigations of the role of creative experiences may benefit from
753 developing interview guides based on themes such as cultural, social, affective, and cognitive
754 potentials. That being said, future studies should also employ prospective designs to explore the
755 role of creativity not only for individual athletes but especially for groups and communities.

756 Novel insights into the role of play and practice

757 The present study provides novel contextualized insights into the recurring finding that deliberate
758 play, or self-organized sport participation, is more fruitful in developing creative abilities than
759 deliberate practice, or organized sport participation (e.g., Bowers et al., 2014; Memmert et al.,
760 2010; Roca & Ford, 2021). Particularly, the findings enrich the understanding of the impact of
761 sport-specific deliberate play on in-game creativity. Elaborating extant findings (Martin & Cox,
762 2016; Weissensteiner et al., 2009) and supporting key assumptions in creativity-developmental
763 frameworks (e.g., Rasmussen et al., 2019; Santos et al., 2016), this study features that creativity
764 in play (e.g., imaginative play), practice (e.g., illusionistic approach), and performance (e.g.,
765 individual and unrestricted decisions) contexts across children and junior hockey are forerunners
766 to creative game performances in professional hockey (e.g., disguised and misleading actions).

767 Generally, the six modalities of creative action in play contexts were linked with creativity
768 since they enabled the players to explore and invent a wide variety of risky, imaginative, original,
769 and unorthodox actions that were rarely utilized during organized practice (e.g., due to
770 consequences when failing and the need to respect the game concept). As discussed in earlier
771 work, specialized, prescriptive, rigid accounts of deliberate practice may limit creativity (e.g.,
772 Roca & Ford, 2021). In this regard, the lack of focus on creativity in practice contexts is
773 illuminated by the modality of self-imposed exploration, where players crafted their own

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constraints. Similarly, most practice modalities were not directly encouraged by coaches but originated from player motives.

Taking a critical stance toward the latter points it should be stressed that the modalities of creative actions were divided into themes resembling three types of activities investigated by retrospective questionnaires in previous research (e.g., Roca & Ford, 2021). Such designs define practice as structured and effortful coach-supervised activities intended to enhance performance, play as informal games set up and supervised by players to have fun, and competition as league games oriented towards winning. Such categorization has been criticized for being too broad and simplistic and failing to precisely describe the tasks accomplished by players during the diverse activities (Fardilha & Allen, 2020). The modalities of creativity transcend the usual categories, by outlining play activities oriented towards improvement, several in-game actions performed to enjoy, and even a self-directed practice modality oriented towards enjoyment and improvement (i.e., self-imposed exploration). And whereas some modes of in-game creative performance were oriented towards development (e.g., individual and unrestricted decisions), some modalities of play and practice were highly competitive, e.g., with intentions to win over peers or themselves. As such, findings portray the multidimensional nature of athlete development (Macnamara et al., 2016), by providing in-depth knowledge about a diversity of “play” and “practice” activities (not claiming to cover all) responsible for affording creative actions and enhancing creative abilities. Hence, matching the advice posed by Hendry et al. (2018), the findings provide some insights into the underlying components of diverse kinds of playing and practicing (and competing) to understand and distinguish their impact on the development of sport-specific skills such as game intelligence and creativity. To enrich the understanding of diverse kinds of (self)organized activities further, future studies need to apply prospective designs to explore situated creative experiences of sport participants at different levels and in different socio-cultural contexts. In this regard, concepts from the general literature on play could serve to reconceptualize its meaning in sport (de Vries, 2021).

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Conclusion

Addressing the lack of knowledge about sport participants' perspectives on creativity, this study explored professional ice hockey players' creative experiences throughout their developmental pathway. Based on the results, it is evident that creativity does not only regard performative end products, but plays significant roles across different play, practice, and performance contexts. Moreover, both the modalities of creative action engaged in by the players and the outcomes associated with these, shifted as players progressed in their careers. Hence, the study shows that a diversity of creative (inter)actions was considered crucial for a variety of developmental purposes on the journey towards sporting expertise. These purposes regard the enhancement of creativity-related features (i.e., modalities of creative performance) and hockey-related elements conceived as keys to promote passion, personal development, performance, and career progression.

Representing diverse markers of creative (inter)action that are rarely encompassed by existing research, the findings may implicate how future research is framed and designed to explore or enrich means in sport. Besides enriching and broadening the meaning and evaluation of creativity in team invasion games such as ice hockey, the findings also transverse the typical categorization of play, practice, and performance, and thereby nuance the understanding of the developmental activities underscoring the development of in-game modalities of creative (inter)action.

Adopting a more dynamic and encompassing view of sporting creativity, this study focused on what the athletes created, how they did it, and what it meant to their sporting life, recognizing the varied role of their encounters with other athletes and/or the different environments. Further, this conceptual shift may empower practitioners and researchers alike to come up with a wider range of principles and conditions that should be established to nurture – not only measure – novel and meaningful (inter)actions in sport. In this regard, the practical implications of this study are threefold. First, sport practitioners need to recognize the various kinds of creation that

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may be important in sport; that sport participants can be creative in different ways and that creativity may play several roles throughout all development stages.

Elaborating recent findings advocating the design and implementation of sport programs and practice activities encompassing key elements of play (Fardilha, 2021; Roca & Ford, 2021), the second is that coaches could operationalize the diverse modalities of creativity into day-to-day practices. Considering the technological distractions and societal changes taking children's time away from spare-time outdoor play, it would be timely to transfer the modalities of creative play to creative practice, as suggested by Machado et al. (2019). We can already imagine principles that may guide the crafting of creative experiences in practice and beyond, such as "what-if" and "as-if" scenarios, making the known unknown and player-led design of competitive challenges. Further, the design of such activities may be inspired by principles of extant approaches such as the Creativity Developmental Framework (Santos et al., 2016), The Creative Soccer Platform (Rasmussen & Østergaard, 2016), and the Creative Potential System (Richard et al., 2021).

Third, adults should avoid rigidly standardizing the remaining play activities while preferably promoting imagination and exploration by inspiring young players to invent their own tasks. Showcasing a diversity of lived experiences on the role of creativity in the thriving, improvement, and success of athletes, this study may inspire sport participants at all levels to invest more time in inventing unusual ways to do things and exercise creative control over their life no matter if they continue to progress in their sport or not. As argued by one of the players, "Creativity has no limits, so I don't think we have seen its full potential." (Leo)

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