The Qualitative Report

Volume 28 | Number 4 Article 7

4-2-2023

The Co-Regulatory Coaching Interface Model: A Case Study of a Figure Skating Dyad

Lisa Bain
University of Ottawa, lbain016@uottawa.ca

Bradley W. Young
University of Ottawa

Bettina Callary
Cape Breton University

Lindsay McCardle
University of Ottawa

Follow this and additional works at: https://nsuworks.nova.edu/tqr

 Part of the Other Psychology Commons, Social Psychology and Interaction Commons, and the Sports Studies Commons

Recommended APA Citation

Bain, L., Young, B. W., Callary, B., & McCardle, L. (2023). The Co-Regulatory Coaching Interface Model: A Case Study of a Figure Skating Dyad. *The Qualitative Report*, *28*(4), 1038-1069. https://doi.org/10.46743/2160-3715/2023.5876

This Article is brought to you for free and open access by the The Qualitative Report at NSUWorks. It has been accepted for inclusion in The Qualitative Report by an authorized administrator of NSUWorks. For more information, please contact nsuworks@nova.edu.

The Co-Regulatory Coaching Interface Model: A Case Study of a Figure Skating Dyad

Abstract

Very little research has investigated co-regulated learning (CRL; Hadwin et al., 2011) in the context of sport coaching for skill acquisition. Although research indicates self-regulated learning (SRL) helps elite competitive athletes optimize their skill acquisition (McCardle et al., 2019), coaching literature has yet to examine how co-regulated learning experiences in joint work between a coach and athlete are associated with SRL competencies in an athlete. Thus, the objective of this instrumental case study was to describe the nature of joint work between an experienced female coach (aged 53, national level) and a male figure skater (aged 15, provincial level) in a naturalistic environment. Season-long data collection involved analysis of recorded dialogue at 16 practices and three interviews with each participant. Using inductive reflexive thematic analysis, we developed higher-order themes related to macro- and micro-levels of CRL, and implications of the coach's progression on the development of SRL. The Co-regulatory Coaching Interface Model, representing micro CRL interactions, outlines contributions from each member and dialogue processes facilitating skill acquisition. SRL was both an expected contributor to, and a consequence of interface interactions. We discuss coach-athlete dyadic processes, what they mean for athletes' self-practice time, and how the model contributes a new perspective on collaborative work between coaches and athletes that has not been emphasized in the coaching science on talent development.

Keywords

coach-athlete dialogue, co-regulated learning, self-regulated learning, self-regulation of sport practice, skill acquisition, instrumental case study, thematic analysis

Creative Commons License

This work is licensed under a Creative Commons Attribution-Noncommercial-Share Alike 4.0 International License.

This article is available in The Qualitative Report: https://nsuworks.nova.edu/tqr/vol28/iss4/7

The Qualitative Report 2023 Volume 28, Number 4, 1038-1069
https://doi.org/10.46743/2160-3715/2023.5876

The Co-Regulatory Coaching Interface Model: A Case Study of a Figure Skating Dyad

Lisa Bain[1], Bradley W. Young[1], Bettina Callary[2], and Lindsay McCardle[1]
[1]School of Human Kinetics, University of Ottawa, Ottawa, ON, Canada
[2]Experiential Studies in Community and Sport, Cape Breton University, Sydney, NS, Canada

Very little research has investigated co-regulated learning (CRL; Hadwin et al., 2011) in the context of sport coaching for skill acquisition. Although research indicates self-regulated learning (SRL) helps elite competitive athletes optimize their skill acquisition (McCardle et al., 2019), coaching literature has yet to examine how co-regulated learning experiences in joint work between a coach and athlete are associated with SRL competencies in an athlete. Thus, the objective of this instrumental case study was to describe the nature of joint work between an experienced female coach (aged 53, national level) and a male figure skater (aged 15, provincial level) in a naturalistic environment. Season-long data collection involved analysis of recorded dialogue at 16 practices and three interviews with each participant. Using inductive reflexive thematic analysis, we developed higher-order themes related to macro- and micro-levels of CRL, and implications of the coach's progression on the development of SRL. The Co-regulatory Coaching Interface Model, representing micro CRL interactions, outlines contributions from each member and dialogue processes facilitating skill acquisition. SRL was both an expected contributor to, and a consequence of interface interactions. We discuss coach-athlete dyadic processes, what they mean for athletes' self-practice time, and how the model contributes a new perspective on collaborative work between coaches and athletes that has not been emphasized in the coaching science on talent development.

Keywords: coach-athlete dialogue, co-regulated learning, self-regulated learning, self-regulation of sport practice, skill acquisition, instrumental case study, thematic analysis

Introduction

Coaching models have examined the ways in which coaches control the organization of practice contexts, deliver knowledge, and direct their planning to their athletes (e.g., Côté et al., 1995). Coach-athlete (C-A) interactions have also more recently been studied through the lens of interdependence (e.g., Jowett, 2007), describing co-orientation and relationship facets, but without detailing effects in skill development. Whereas contemporary coaching literature emphasizes coaching for wholistic athlete development (Potrac et al., 2013), with increasing attention to how a coach's influence may be integrated by athletes outside of sport (e.g., Camiré et al., 2012), little investigation is granted to the coach's role in engendering the self-managed practice habits of athletes to optimize skill development. This is an important area of inquiry, considering that elite athletes from both individual and team sports believe they have large ownership of their training wherein they can apply self-managed competencies – on average, they believe that 57% of their activity is self-designed and -initiated without supervision by a coach (Bain et al., 2020). Moreover, given the centrality of high-quality practice as the

mechanism of expert talent development, it is integral for coaches, coaching researchers, and skill acquisition specialists to understand the experiences of a coach and an athlete regarding shared responsibilities during practice in efforts to optimize skill-based sport competencies.

For scholars in the field of sport expertise, it is important to understand conditions that foster skill acquisition. There is much interest in this field on the value of athletes self-regulating aspects of their sport practice as part of their talent development experience (McCardle et al., 2019), and in the coach's role in supporting athletes' efforts in quality deliberate practice (Ericsson, 2020). Although there is recent empirical work on the role of athletes' self-regulated learning (SRL) in facilitating skill development (Wilson et al., 2021; Young et al., in press), there are no investigations of the coach's role in establishing athletes' self-regulatory practice habits. SRL, which includes metacognitive (e.g., planning, self-monitoring, evaluation, reflection) and motivational self-processes oriented towards learning activities has been implicated in optimal practice conditions (McCardle et al., 2019). Prevalent sport coaching models do not consider possible complexities of athletes' self-regulated practice as they relate to joint work with a coach for the foremost purpose of skill acquisition. Although they have yet to be studied, the potential advantages of such complex joint work have been insinuated in prior scholarship. For example, when an athlete solicits information from a coach in a timely and strategic way, this might represent effective SRL (Zimmerman & Moylan, 2009) if it does not promote overreliance on the coach. Further, a self-regulated athlete might favorably improve their skills on their own, however, they may also communicate their self-learnings to their coach, which may enhance their activity with the coach (Young & Medic, 2008).

The topic of collaborative work has been considered in educational psychology, where scholars commonly consider how teachers go about sharing responsibilities for learning, and how joint work between a teacher and a learner may result in students who are empowered in their own learning (see Panadero & Järvelä, 2015). Work in this area is aligned with the social interactionist notion that students learn to self-regulate by internalizing cognitive processes that have been first modeled by others, e.g., an instructor (Vygotsky, 1978). This literature stipulates that credible teachers first model and direct desired learning outcomes to a student (other-regulation), and then adopt approaches where they co-regulate learning activities *with* a student, which helps to transfer responsibilities to the student (McCaslin, 2009).

Co-regulation, or *co-regulated learning* (CRL), has been invoked to explain the transitional processes towards SRL in educational psychology (Hadwin et al., 2011; Panadero & Järvelä, 2015). CRL refers to when a teacher and a student co-act during learning situations, cooperating to define goals, monitor and evaluate progress, and adjust strategies to improve student learning. CRL assumes joint work in which a teacher and learner work in concert, although such work may be "unbalanced" (Panadero & Järvelä, 2015, p. 199) at times due to power dynamics associated with teacher and student roles. To understand the relationship between CRL and SRL, McCaslin and Hickey (2001) emphasized examining the manifestation of emergent interactions between a teacher and student within a zone of proximal development in specific pedagogical situations. They also called for studies of how other-regulation (i.e., teacher-direction), modeling by teachers, and teacher scaffolding change over time to support the transfer of learning responsibilities.

In sport, there exists no research that has located coaching as a co-regulated role for enhancing skill acquisition. There is a pertinent topic in education, scaffolding (Wood et al., 1976), which explains the nature of support an instructor gives a learner for them to achieve a goal, carry out a task, or solve a problem initially beyond their capacity, while also progressively decreasing the reliance of the learner. The application of scaffolding is expected to facilitate a process whereby learning evolves from being predominantly teacher-managed, to become co-managed between teacher and learner, with ever increasing instances of learner

self-direction and less reliance on the instructor (Hadwin et al., 2005). When the student is failing, the teacher adds more support/control. Conversely, the teacher may fade that support over time commensurate with a learner's progress. Findings in education support the interplay of scaffolding characteristics (contingency, fading) in the transfer of learning responsibilities to the student.

Educational studies have focused on classroom-based outcomes resulting from scaffolding between teachers and graduate students (e.g., Hadwin et al., 2005) or school-aged students (e.g., van de Pol & Elbers, 2013). Researchers studying CRL and scaffolding tended to use early versus late observation time points in a school year, yet these studies were somewhat limited because they lacked consistent tracking throughout the year to effectively infer developmental aspects associated with learners' enhanced self-regulation. Given the application of CRL and scaffolding is pertinent in C-A dyadic interactions in sport, we extended these concepts to sport. Notably, we addressed research gaps by exploring the complexities between CRL and SRL in a naturalistic setting, and investigating their interplay over time (i.e., across most of a sport season).

Although we know of no evidentiary findings relating to CRL or scaffolding in sport coaching, a lone work by Jones and Thomas (2015) introspected on how scaffolding might be constructed by sport coaches. Theirs was a rhetorical exercise to present a metaphor for the complexities of coaching while noting the absence of coaching literature that considers scaffolding and co-regulation of skill acquisition. They speculated that the athlete experience in a scaffolded environment is unique from more formal student learning and posited that fading in sport coaching might happen in a manner that defies progressing linearly from highly frequent support to little support on a skill over time. Laboratory-based motor learning studies on feedback scheduling (Winstein & Schmidt, 1990) support the notion of fading. Specifically, feedback after practice trials is found to benefit and improve learning if given relatively frequently at the beginning of skill acquisition trials and then gradually reduced. Coaching manuals (Vickers, 1999) attest that faded feedback across trials is needed for optimal learning because it facilitates athletes' independence from external support and encourages them to attend to kinesthetic sensations. However, the applicability of findings from controlled laboratory studies are not a given in a naturalistic setting, particularly coaches' use of faded feedback within emergent C-A interactions.

In sum, no existing research describes the nature and complexities between CRL and SRL within dyadic C-A interactions in a sport practice context, and how these evolve. Thus, this study aimed to describe aspects of co-managed training between a coach and athlete over a season. We sought to model the complexities between CRL and SRL, to understand these phenomena over a season, and to determine whether roles and responsibilities in co-management scenarios could be attributed to the athlete and the coach. In describing these phenomena, we tried to unpack various communication competencies of a coach that faithfully represented her roles in optimizing skill acquisition and supporting the athlete's agency in self-practice efforts.

Method

We adopted a social constructivist epistemology in which reality is socially constructed, resulting in multiple subjective realities (Sparkes & Smith, 2014). A relativist ontology meant our results were co-created by the participants' perspectives and our own historically- and culturally-affected interpretations (Crotty, 2015). Thus, we reflected on our values and beliefs and adopted a responsive relational ethic (Palmer, 2016) by granting the participants a voice of authority throughout, being cognizant that our research was an opportunity to listen to them share their insights and recognizing that our prior experiences influenced our participation. The

principal investigator (PI) came to invest in this study as part of her thesis work because of her academic interest in coaching and talent development. She was a youth competitive soccer coach and a former competitive soccer player. She conceded that her background might not have wholly prepared her to understand the fine-grained intricacies of coaching competitive skating, meaning she stayed open to understanding through the participants' lens (Palmer, 2016). All co-authors were supervisory members of the PI's thesis work. The second author had a lengthy background as a researcher in coaching science and self-regulated learning in sport, who was formerly a university distance running coach and presently an adolescent Nordic ski coach. The third author was a highly published researcher in coaching education, presently working as a coach developer/educator with Canada's National Coach Certification Program and as an active alpine ski coach. The final author worked in the areas of self-regulated and co-regulated learning in educational psychology and in sport. As a research team, we were cognizant of our backgrounds and how they could frame and constrain our interpretations and reflected on these possibilities throughout analyses and interpretation. Finally, in keeping with a responsible relational ethic, we remained sensitive to exposing vulnerabilities of the coach/skater in the presentation of findings.

Participants

This *instrumental case study* (Stake, 2005) examined a figure skating dyad. In figure skating, a skater has a primary coach, with whom they work over several months in a season, towards the development of new, complex "pieces," which the skater delivers at a culminating competition. The instrumental aspect was reflected in our choice of skating because typical practice sessions comprise dedicated, *intensive C-A time*, and substantial *self-practice time*. Ice rental sessions last about 100 minutes. A coach interacts with three to five skaters per session. Each skater has their own dedicated, intensive one-on-one time with their coach (i.e., dyadic time where the focus is on skill acquisition), typically in a 15-20-minute window at some point during the session. For the rest of the session (before/after), the skater engages in self-practice, unattended by the coach.

All procedures had institutional ethics approval. We aimed to recruit a coach with a matching skater who together met our inclusion criteria. We assumed having a more experienced dyad would allow us to explore CRL within a figure-skating context more clearly. Therefore, the coach had to be a certified high-performance coach with substantial experience. The skater had to (a) have prospective growth in the sport, (b) have been with their coach for a few years, and (c) be participating at a competitive level while learning a new short program. Following screening of several candidates, we selected the dyad that best fit these criteria from those available. The coach was a 53-year-old female, certified National Level coach, with over 30 years of skate coaching experience. She had coached skaters up to the Novice and Gold level, equivalent to high-level Learn to Compete and Train to Compete in Canada's Long Term Athlete Development model. She was a technical specialist for singles skaters and a judge. The skater was a 15-year-old male who had competed for six years. He had four practices weekly (ten total hours weekly on-ice, of which two were with the coach) in preparation for Provincial Championships in singles skating. They had spent six years together.

Data Collection

The PI conducted the interviews with both participants and collected audio-recordings of C-A dialogue from October 2018 to the end of competition season (Provincial championships in December) and continued until the off-season (March 2019; see Supplementary Appendix A). Thus, data collection tracked the build-up to the competitive peak

followed by the intensive time of technical preparation and refinement, which commonly occurs in the months after competitive peak. The PI attended 16 practices, taking field notes and recording all dialogue on the coach's lapel microphone. Notes pertained to non-verbal C-A communications, time stamps for pertinent communications, and descriptions of the skater's trials on various performance elements (and notations on successes). Though they were not used as data, the notes contextualized the dyadic communications and informed interview probes, heightening credibility (Rubin & Rubin, 2012). The PI conducted semi-structured interviews separately with the coach and the skater (see Supplementary Appendix B & C for guides, respectively) at three time points. Recorded dialogue from practices and interviews was transcribed (117 single-spaced pages in total).

Data Analysis

Interview data were analyzed by the PI and second author using Braun and Clarke's (2021) reflexive thematic analysis process. After the first interviews, we coded inductively, analyzing the coach's transcript followed by the skater's transcript. An inductive process was enacted again after interviews two and three. For each set of interviews, we read and re-read transcripts to familiarize ourselves with the data. Notes were written in the margins to generate ideas, and similar codes were collated together, while continually contrasting new codes to ensure distinctness. This process resulted in seven themes across all interviews, which we grouped into two higher-order themes pertaining to *macro-level* and *micro-level co-regulation*. The micro-level theme related to the intensive, dedicated work that the coach and athlete did in and around practice repetitions on the ice (within their 15–20-minute window), on any particular training day. The macro-level theme was broader in context, meaning that it included all co-regulatory interactions/exchanges between coach and athlete over time and outside of the dialogue that occurred in and around practice repetitions within the intensive coach-athlete practice window. After the inductive analyses of the first set of interviews, we reflected on the developing themes, noting the centrality of communication. From this point onward, we took steps to corroborate what we were interpreting from the interviews with poignant excerpts of exchanges in practice transcripts. In this manner, the audio transcripts of C-A exchanges during their dedicated intensive C-A time were used to contextualize the analyses and to understand situated examples of developing themes.

Following the third set of interviews, we reflected upon the state of interpretation relating to development of SRL and elected to revisit the analysis to note progressive elements that changed across the season, specifically related to the coach's comments on change or on the skater's development. Based on this abductive analytic step (Sparkes & Smith, 2014), we created a third higher-order theme – implications of the coach's progression on development of SRL. This theme was populated with codes we had tagged as relating to changes over the season, or development, including corresponding changes in the skater's SRL attributes. We returned to the transcripts to extract excerpts of C-A exchanges exemplifying this theme. Finally, we returned to the data contextualized by the observational field notes to interpret how micro and macro interactions fit together over time. Thus, the final analyses resulted in three higher-order themes and eight sub-themes: macro-level co-regulation (with four sub-themes), micro-level co-regulation (with three sub-themes), and implications of the coach's progression on development of SRL (with one sub-theme).

Rigor

The PI spent significant time collecting data and in the field with the participants (Tracy, 2010). She observed 16.5 hours of C-A on-ice training which, along with

commensurate field notes, helped identify poignant situations to more credibly discuss specific instances within the interviews. The field notes contextualized transcript excerpts and non-verbal communications, providing a holistic understanding of interactions. Transcribing the data and reading the extensive C-A dialogue transcripts improved the reliability of interviewing and the data coding process. The PI met throughout with the second author, her critical friend (Smith & McGannon, 2018), with respect to interpretation and refinement of themes, relationships and resolutions between themes, and vetting of quotes/excerpts. The third and fourth authors contributed to clarification and refinement of methods, coherency of write-up, and vetted the selected excerpts.

Results

Co-regulated learning happened concurrently at macro- and micro-levels, with influences across levels. The results begin with a brief outline of macro-level co-regulation and the sub-themes associated with that broader landscape of training beyond the C-A interactions surrounding skill acquisition. We then focus on the micro-level co-regulation and its associated sub-themes because these are important interactions during the C-A intensive training time. Next, we explain the implications of the coach's overall progression on the athlete's development of SRL. The macro and micro levels give context to the types of C-A interactions, as well as evidence of relationships between CRL and SRL.

Macro-Level Co-Regulation

The macro-level was identified as the coach and athlete engaging in co-management or joint work in the broader landscape of training. Macro-level co-regulation was characterized by the following sub-themes: conversations that created a *shared mentality* going into training; exchanges that informed *co-planning and co-assessment;* and contextual aspects relating to artistic *choreography* which invited co-regulatory opportunities. Macro-level co-regulation was also associated with the *coach's philosophy on feedback.* Within the macro-level, the coach and skater co-assessed, co-planned, and co-choreographed, with these processes manifesting in over-arching conversations tethered together in the skater's and coach's observations/efforts over time. Macro conversations were important for the coach to lead the skater where she thought he could go, while allowing the skater to have a voice and to learn how to assess and address issues going forward.

Shared Mentality

A shared mentality was the skater's mindset adopted from and shared with the coach around work ethic in practice. The skater and coach described how working together for six years had allowed them to develop a shared mentality. This could be seen when the skater stated, "our motto for sessions is quality over quantity," which he adopted from a quote his coach commonly recited in practice: "no session is good enough if we don't accomplish something" [SI-2]. He identified with this motto, used it when he had setbacks, and pronounced it using "we." In reference to a lethargic day, he invoked this mentality:

> I try to push on. Sometimes that doesn't work and, like, our mentality, we say this a lot, is "if you can do it tired, then you can do it well when you're not." We kind of focus around that mentality, so like when I'm tired, we work really hard on things. Sometimes I don't like it but, I will still try my hardest on whatever we're doing [SI-3].

Both participants noted the importance of sharing the same mentality in that it optimized their joint work during practice time; otherwise, they risked disagreements that could result in inefficient joint work.

Co-Planning and Co-Assessment

The skater and coach engaged in co-planning when they arrived at practice sessions, in which they together prioritized their time. The skater described co-planning as a negotiation:

> We both have different views on what we want to accomplish, or like, a competition is coming up, what do we really want to work on? So it's like, "I feel like this element needs a little bit more work," and then, she mentions, "This other element also needs a little bit more work," so how do we manage that time? [SI-3].

Importantly, the skater had a say in decision making. Co-planning was evidenced when the skater arrived at practice. For example, they would briefly check in to discuss a plan for the entire 100 minutes on ice, with the skater querying the coach on what "she wanted to focus on [during our dedicated intensive C-A time]?" [SI-2]. Taking the coach's answer under advisement (e.g., work on flexibility), he would then decide how he wanted to allocate his self-practice ice time to obtain "equal timing" [SI-2] or pace out the different things he wanted to work on, in the 80-85 minutes on-ice when he was not working specifically with the coach.

When they came together after the skater's preliminary ice-time (i.e., before the dedicated C-A intensive practice window of 15-20 minutes), they would engage in co-assessment together to determine what to do next. For example, to see what the skater would now like to work on with her, she stated, "you've been on your own for ½ hour, what would you like to work on? Would you like to work on something you were having trouble with, or are you good, do we just move on to something totally new?" [CI-1]. Here, the coach was giving the skater options to see if he needed help, but also was acknowledging the skater's expectation to divulge information to improve their co-regulated planning and at the same time reinforcing the skater's SRL responsibilities. Thus, at a macro-level, the coach and skater contributed information to each other from the broader landscape of practice time that had implications for the quality of their joint work during their 15-20 minutes of dedicated interactive time together.

Coach's Philosophy on Giving Feedback

The coach's philosophy on giving feedback focused on providing the skater positive feedback on increasingly demanding tasks rather than altering the frequency of feedback over time. This philosophy lent itself to co-regulatory processes with the skater: she believed she was attuned to how the skater was progressing in an element when giving feedback over consecutive practices. Further, she explained how different technical elements at different levels do not require the same amount of effort from the skater. Thus, philosophically, she found greatest value in reinforcing when he successfully performed a harder element that demanded much effort or reinforcing him when he performed an element that was the culmination of many efforts. She stated,

> Because his elements become harder, when he does achieve that new jump, it's a big deal. If I don't make a big deal of it, he will be kind of like, well, what did I do all that work for? [CI-1].

This philosophy on giving feedback in response to what she monitored in her skater over time influenced how she approached her joint work with the skater.

Sharing Choreography

The coach shared the choreography work with the skater since she knew the skater's keen interest in being a composer. She found opportunities to allow him to have a say artistically, trying out new elements and having him contribute his perspectives on choreographing them into his program. She said,

> Normally, I would listen to music with a skater and go, "This is what I would like you to skate to." With him, it's more him saying "I really like the sound of this and the beat here, and the flavor." So he's coming up with that [composition for his program] [CI-1].

She facilitated his autonomy by allowing "him more choices in the music, more maturity, to suit his personality and style" [CI-3]. Their interactions took on co-regulatory features that facilitated his expression of creativity.

Micro-Level Co-Regulation

Micro-level co-regulation was characterized by exchanges during the dedicated intensive C-A time when the coach and athlete focused on skill acquisition, when they worked on repeated trials on motor tasks. It was implicated in cycles through technical skills/elements in a 15–20-minute window of joint work. It was evidenced when the skater approached his coach alongside the rink after executing repetitions of a skill, or when the coach would interact with him at mid-ice after a trial. The first subtheme was *the interface*, which refers to the co-regulatory dialogue discussion that occurred after performance of a trial. Both the coach and the skater could initiate communication processes in this interface. Additional subthemes related to the interface, specifically: the *contributions* each member expected to fulfill with respect to the interface and the *shared expectations* that underpinned effective co-regulation in the interface.

Micro-level co-regulation was nested within macro-level co-regulation. Recalling from the last section, macro conversations were important for co-planning and for the coach to lead the skater where she thought he could go. These macro conversations also contextualized what the coach and skater specifically collaborated on in each practice during micro-level co-regulation. For example, the skater might reflect on a weakness he identified at a recent competition and feed it forward to self-practice time at the start of the next session (macro), which he would bring up to the coach during the interface later in the same session (micro). The coach also identified things that arose in the interface (i.e., micro) and would share them with the skater at the very end of an on-ice session as a form of co-planning for future practice efforts (macro).

The Interface

The interface refers to the back-and-forth discussion that occurred after performance of a trial. It was characterized by appraisals, counter appraisals, elaborations, forming or countering solutions, confirming/validating, questioning, and providing positive sustaining information. The coach and the athlete tested and negotiated their perspectives and integrated

information to come up with solutions (and exit plans from the interface), thereby optimizing subsequent trials. It did not matter who initiated the dialogue. For instance, when asked whether it was more important for the coach or the skater to appraise performance first, he responded:

> Both are great, because [when I do it], I know what I'm doing wrong. So then I know how to correct it myself. Though, with her helping [giving her appraisal], like, I know kind of how I'm feeling, so next time I know what that feeling is when it goes wrong, so I can fix that myself [SI-2].

She said, "it doesn't matter to me [who initiates]" [CI-3]. More important was the "mixing" of information in which each member took turns contributing.

Coach-Initiated Processes. When the coach initiated, she said, "I try and give [feedback] as quickly as possible," "as instantly as possible" [CI-1] after performance of a skill. For example, after a practice trial, the coach (C) initiated with an *appraisal*, and then strategically used *questioning for clarification* for the skater (S):

> C: So, *that rocker turn is better,* but it was still a bit of a skid though. (Coach appraisal)
> S: I fell a little bit back on my skate. (Skater appraisal)[1].
> C: *So, you're too far back, maybe when you're going faster, you're further back?* (Questioning for clarification)
> S: Yeah.
> C: So, try and rock forward, just before the turn. [Skater initiates simulated rocking, in front of the coach, along the boards]
> C: That was nice and clean, really clean. So, whatever you're doing there, try and do that, but it's going to be more difficult when you're going faster.
> S: Yeah.
> C: That's the whole point, right? Like, we give you more marks, when you're doing something faster because we realize it's harder. [Skater laughs] So, try again.

Thus, what ensued was a three-turn interface sequence – coach appraisal, skater appraisal, followed by the coach's acknowledgment of his appraisal coupled with a question. She asked this question to gauge his understanding so she could provide further support. This back and forth also shows an attempt on each member's part to integrate information prior to the next trial.

Sometimes, the coach provided a *counter-appraisal* if she believed his first appraisal of an element was not entirely correct or was insufficient:

> C: That triple salchow [jump] was much better in the air. (Coach appraisal). There's still a little bit of over-rotation. But you were able to correct it. When we're working to get to the quadruple salchow, we have got to fix that, right?
> S: Yeah. (Skater offers a tentative but insufficient appraisal). Um, to correct over-rotations should I just, lay off of the…? Like, not…?
> C: *No, I liked how quick it was.* (Coach counter appraisal)
> S: Ok.
> C: (Coach begins to offer solution) I would more try and control –
> S: [Skater tries to finish the coach's sentence] Just at the end.

[1] To identify important communication processes embedded within the dialogue excerpts, we have embedded the name of the process within round parentheses. These same processes are indicated in Figure 1 in bullets in the interface.

C: …the ending of the jump.
S: Alright.
C: And get more over top of that right side. Do that little in-turn of your big toe to tighten up and pull your hips back, making it easier for you to get your shoulders back. *Right?*

CRL was evidenced as he made an effort to quizzically form a solution and trail off his sentence; this prompted her to respond with a firmer counter appraisal. As the coach subsequently offered a solution, the skater effectively made it a joint solution by completing her phrase. This also conveyed to her that he understood the corrective solution she had offered. Only after knowing that they were on the same page, could she finish with another solution to correct the mistake.

Sometimes, the athlete's appraisal was misaligned with the coach's initial appraisal. For example, they were discussing his height in the air after cycling through two trials of a double axel jump:

C: (Coach appraisal) The second was much better, you fixed it, you were much more over your skate in the air. You kind of bounced out of the landing [intonation up]. There wasn't quite the same check and core control on the landing of the second, I think because you went "Oooooooo, that one was really nice in the air" [suggesting he had been admiring his jump].
S: [Makes utterance indicating uncertainty]
C: You didn't feel the second one was nice in the air? (Coach questions, prompting counter-appraisal)
S: I felt it was more like, get as high as possible and as quick as possible, so it kind of was just everywhere in my mind, like, "oh, this is messy and I have no idea how I'm going to end the jump."
C: No, your second double axel was much tidier than the first.
S: Oh good.
C: Yep. So. Alright, so let's try this again, ok.

She responded to the possible misalignment with questioning to engage the skater. Only after getting his appraisal could she understand the incongruency; she then sought to recalibrate his appraisal. It was always important that both members contributed their point of view so they could determine the appropriate corrections prior to the next trial.

The coach commonly initiated the interface with a positive appraisal, then inserted critical appraisal, before providing *positive sustaining information on the exit from the interface*. For example, after he erred on a double axel, she still acknowledged improvements over a prior attempt, sandwiched in her technical solution to correct the mistake, and ended the dialogue sequence with "Yes, keep your right shoulder back. You did that just now on this walk through [intonation up]. So focus on that when you do two double axels." She wanted the skater not to feel discouraged while she provided him with technical corrective feedback.

Skater-Initiated Processes. When he initiated, it was often by articulating his kinesthetic *appraisal* of a just-performed element:

S: *I over-rotated it* … (Skater appraises his jump) … but …
C: (Coach elaboration on skater's appraisal) … A little bit, a little bit in your upper body, but actually not much.
S: No? (Skater questions, prompting more information)

C: No, you're much more aware of it [your body during the rotation]. (Coach counters skater's initial appraisal)
S: Good. [relieved laugh] (Skater validation of counter-appraisal)
C: So, you were not happy with that landing, but it was good. You know, four months ago that would have been an awesome landing. [Skater laughs] *Right?* So, now our expectations are higher for you, you're getting stronger and stronger. Alright, do you want to do the axel again? (Coach exits with sustaining information)
S: Yes. [chuckle]

In this sequence, he tests his appraisal, and by trailing off his sentence, invited the coach to elaborate, validate, or counter it. After she assures him his appraisal was partly correct, a four-turn interface sequence ensued – skater questioning, coach counter appraisal, skater validation of this counter appraisal, followed by coach's positive sustaining information on exit.

He acknowledged that "other times, I just kind of black out [when performing an element] because a jump or a spin is very quick" [SI-2]. He explained he could not give a reliable appraisal and used the interface to seek his coach's visual analysis/appraisal of the element. She was responsive, especially when technical margins for error were slim, "because he can't feel it, and the motion is 'this much,' like 2 degrees will throw it off" [CI-2].

He sometimes initiated with an utterance reflecting a partial appraisal:

S: [After falling on a triple toe loop, he approaches her] *Oh my*. [Uneasy utterance, laughing]
C: (Coach questions, seeking more information) Yeah, what happened? [Both laugh] I can tell you physically what happened, I want to know mentally what happened?
S: I think, even though I'm trying not to, it may be even a force of habit. I'm just trying to get it over with. Just something didn't quite go right, and so, I was trying to figure out exactly what's happening in the jump and what's going wrong, and my nerves were distracting me. (Skater elaborates on self-appraisal, but is uncertain)
C: And, trying to fix it on the fly, right? (Coach questions, seeking confirmation)
S: Yeah. (Skater confirmation)
C: So, physically what happened was, as you went to pick, you arched. (Coach appraisal)
S: OK. (Skater confirmation of appraisal)
C: So, you want to keep yourself in that nice line coming through. Do a couple more of those walk-throughs [simulated trials] like that. (Coach solution)

Here, the skater's initiation with impartial information prompted her response. In response to his uneasiness, she used strategies to gauge his understanding so she could adjust her support. This included attending to his emotional reaction and affording him the chance to explain his point of view before offering her appraisal. Only after he confirmed this appraisal did she move to provide a solution.

Contributions to the Interface

The next subtheme of micro-level co-regulation was represented by the specific coach expectations and skater expectations for what they would need to contribute to communications in the interface.

Coach. The coach expected that she could capably provide him with feedback after trials. She said, "It's hard [for him] to figure it out. He can feel the result. He can't always feel what caused the result. And that's why [he] needs me focusing just on him and watching just him, to see" [CI-2]. She also expected to adjust support based on the skater's knowledge and progression in a skill. When asked about feedback, she liked "to try and give it in a positive way. But, we are trying to correct technical skills, so often, I have to tell him what his position was and what was incorrect for him to realize how to correct it" [CI-1].

The coach also expected to contribute solutions and remedial tasks verbally and through demonstration (e.g., demonstrating footwork). Referring to different types of communication, she stated: "When he was younger and shorter, I could take his shoulders and rotate them. I could say, 'ok, this is how you rotate your shoulders' but it's less about technique teaching now. It's more refining the technique he knows" [CI-2]. She now expected to contribute less verbal communication to him when conveying an appraisal/solution because they had developed shared understandings of their work together. She noted she sometimes anticipated delaying her input to "wait and see if he can recognize [what went wrong] and say it on his own" [CI-2].

Skater. The skater expected after each trial to immediately self-analyze to bring information back to the coach. After completing a double axel trial, he said, "Well, I'm more thinking of, what are the things that went right and what are the things that went wrong, what can I fix, um, [it's] mainly element focused" [SI-2]. He expected his kinesthetic information and her visual analysis would be combined in interface dialogue, in service of solutions.

Shared Expectations

The final subtheme at the micro-level was described by the prerequisites that the coach and athlete expected to share to enhance communications in the interface. They included a shared language using proper technical terminology and a shared understanding of sport-specific conventions. They both expected that the skater would self-analyze and organize points verbally. She noted:

> Skaters need to become accustomed to the "balance point," the "sweet spot on the blade," your "free leg" as opposed to your "skating leg." With a younger newer skater, it takes adjusting to get that… he gets them right away [CI-2].

Both also expected to match each other's level of engagement, which was evident when they were each discussing a practice when the skater had "low energy". She highlighted: "As long as he's trying, putting the effort in, then, I'm not going to be a grouch that an element wasn't necessarily successful. If he's the not putting the effort in, then I'm going to get hard on him" [CI-2]. He similarly stated, "Putting my full effort into everything, try and not like slack off, which, I don't. Yeah, just trying to put 100% to try to come out with something accomplished" [SI-1]. When not aligned, she expected to respond to his arousal level: "It's hard for him to put the effort in when it's not working. [In those situations], it's more me being a cheerleader, me pushing him." [CI-2]. Thus, she expected to cue him differently depending on how she observed his efforts; when his energy level was lagging, she added more feedback to sustain his motivation.

Implications of the Coach's Progression on Development of SRL

This theme represented the coach's description of how she anticipated having to change the nature of her feedback over time, which gave order to progression with the skater, and also described how the changing nature of feedback influenced the development of his SRL. In particular, the coach described how regulatory processes shifted to the skater in progression on an element throughout multiple practices spanning the course of the season. Within this progression, he increasingly worked on an element on his own, exercising his SRL processes as the coach changed the nature of her feedback.

The coach anticipated changing the nature of her feedback over time. She would initially focus the early cycles of practice repetitions on *teaching* the basics of an element by breaking it into manageable parts. As he progressed in the element, she transitioned to *correcting/refining* the technique to make it "competition ready." This was evident as he acquired a new element (e.g., a single axel) and progressed through different levels of it (double axel, triple axel) within the season. She explained her change from teaching to correcting:

> It's a gradual process… I'm changing what I'm saying to him, from technique, to refining and positions. Now he's got his balance and knows what to do, I want to change how he's doing it, a little bit, I want it to look nicer [CI-2].

Her coaching progression trended toward increasingly smaller refinements on body positioning, as well as adjustments to the aesthetic expression or timing of the element. She longitudinally applied teaching first, then correcting transitions to every element, but emphasized that the progression from teaching to correcting was not linear: "It's back and forth – it will sometimes be two steps forward, one step back. Sometimes, one step forward, two steps back, and then three steps forward. There's no exact science, it's an art" [CI-2]. She deviated from her anticipated teaching to correcting progression if she saw that previously mastered aspects of an element were suddenly not going well; in this case, she could return to a teaching role.

When asked why it was important to switch from teaching to correcting, she stated, "as the skater gets more mature, you want him to be more self-directed" [CI-2], adding "so he'll feel more ownership on things and know that 'Ok I understand the technique … I'm closer to the goal'" [CI-2]. She believed her role in transitioning from teaching to correcting marshalled the skater to higher skill levels, while allowing him to understand what was going on and be able to work on it by himself.

Increasing evidence of SRL was noted by the skater as he progressed in an element. In interview two, he related to taking on more responsibility for correcting his mistakes:

> At the beginning of the season, when I was first learning the salchow [jump], I didn't know the feeling, but as the time progressed, as the feeling got to me, it was like, "Ok I know what I can do on my own because I've felt it before." So, I could start working alone where I wouldn't have to be worried about injuries, mistakes or anything [SI-2].

He described some reluctance to contribute to the dialogue when she was in a teaching role early in the season, but noted more confidence in self-regulating as the season advanced:

> For the interactions, at the start [when we first began working on an element together], I wouldn't yell what I felt about the just completed element so much, because I didn't really know what was going on. But when the time came, I'm

> like, "Ok, I don't need to go back to coach, I'm just going to try and fix it again" [SI-2].

He became motivated to try to refine the element on his own and acknowledged his application of error detection and correction mechanisms during his own cycles of self-regulated practice.

SRL Competencies and Expectations

This subtheme represented the reciprocal positioning of SRL as both athlete competencies that were a developmental outcome of repeated interface exchanges, and as expectancies whereby SRL became input (i.e., an expected skater contribution) for further interface exchanges. Both members believed that engaging in interface exchanges resulted in the skater developing a SRL skill set. He understood that, after engaging during the interface, he was expected to be able to take information to work on elements without supervision. He expected opportunities to exercise his independence, to experiment in resolving frustrations related to technical elements, on his own: "It's just a trial-and-error thing. It takes some practice. We'll practice it in our session [the interface], but afterwards [in self-practice time] I'll keep on working on it" [SI-1]. He said, "I like working on my own as well 'cause I like being my own boss" [SI-2]. Still, he liked to return to get help from his coach.

Once he learned in the interface what the jump should feel like, he gained increasing confidence to practice the jump on his own: "I know that feeling [of how it should feel when landed correctly], so then next time I know what that feeling is when it goes wrong so I can fix that myself" [SI-2]. He described how he enacted SRL competencies during self-practice time:

> Every time I first nail an element, I usually take a step back and visualize every single step I've done going into the jump, how the air position felt, how the entry felt, how the landing felt. I remember all that, and then go back and do it again [SI-1].

He was therefore metacognitively monitoring how the element felt, evaluating it, reflecting, and rehearsing (visualizing) to store this representation as a future standard for his performance.

Reciprocally, these self-regulated competencies were expected to generate learnings that would benefit efforts in the interface. Not only did he anticipate bringing what he had worked on alone back into the interface, she expected him to do this. When the interface time occurred late in a practice session, she probed him, "you've been on your own for ½ hour, what would you like to work on? Something you were having trouble with, or are you good? Do we just move on to something totally new?" [CI-1]. She sought information from his self-practice time to enhance the interface, asking him what he had worked on, struggled with, or acquired during that time.

Discussion

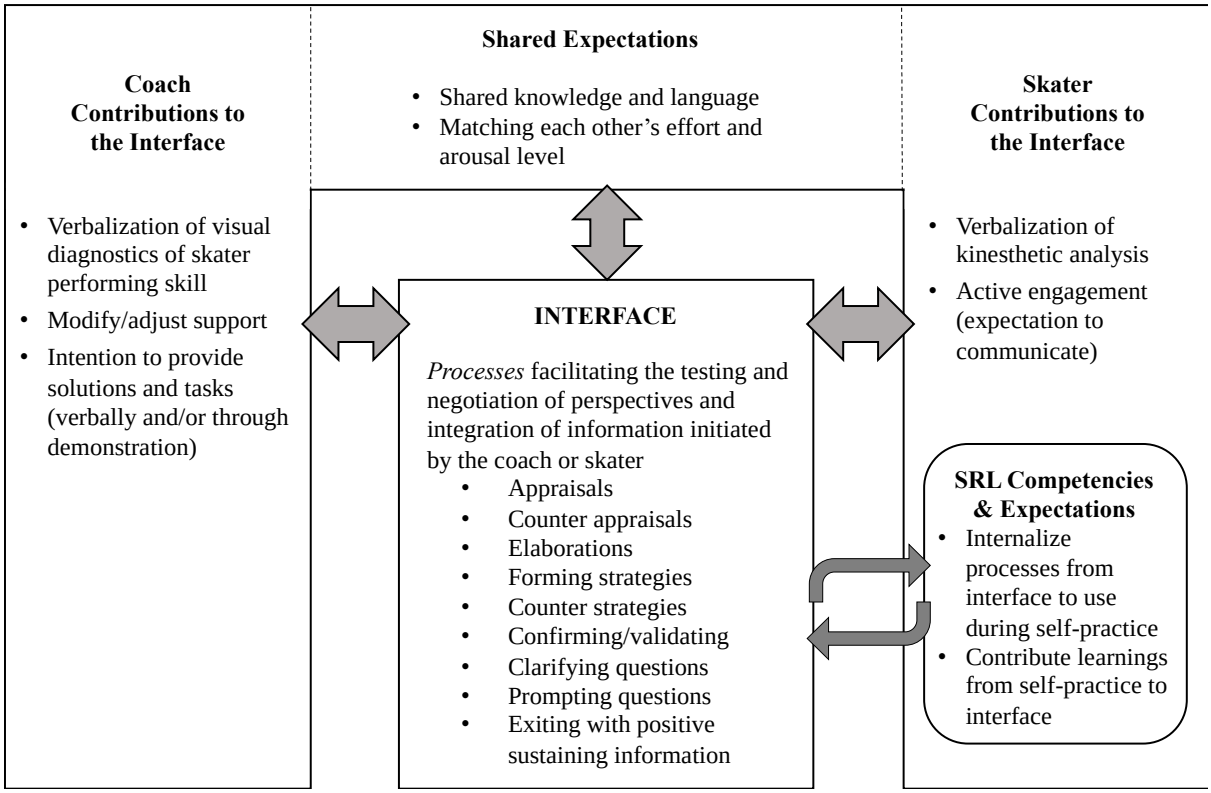
Our case study instrumentally described C-A processes serving skill acquisition in figure skating. Results indicated complexities in associations between CRL and SRL and how joint work was associated with self-responsibility on the part of the skater for optimizing practice. The dynamics of coach and skater are as parallel actors – dynamic in the sense they repeatedly came together in post-trial intervals, each time acting on expected contributions for giving input, seeking to exchange, integrate, revisit information, and work on a skill, figuring out solutions that could be applied to subsequent trials. They engaged in processes that

facilitated the "mixing" of information and the "sharing" of perspectives (even if the same perspective was not always "shared").

As in education, the CRL dialogue was characterized by "turns" or sequences of alternating contributions (van de Pol & Elbers, 2013) attributed to each member. Like Vygotsky (1978, cited in Jones & Thomas, 2015, p. 71) who "considered the greatest mediator to be language," our findings illustrated the importance of dialogue processes. In academic settings, essential teacher communication processes include questioning (Engin, 2013), elaborations and reformulations (Mercer, 1995), and elicitation and recapping (Hammond & Gibbons, 2005). We identified similar processes in the interface that facilitate CRL work in sport: appraisals, counter-appraisals, elaborations, solutions, counter-solutions, questioning, confirming, and exiting with sustaining information. While some of these communicative processes can represent coach directedness, they were understood within a narrative that was meant to engage the athlete collaboratively. In this sense, our findings are aligned with andragogy in sport coaching practices, such as inviting and respecting two-way communication, framing learning for athletes as challenges to be solved, posing questions to prompt discussion, and not overbearing the athlete with information but allowing them to figure things out for themselves (Callary et al., 2021).

Figure 1

The Co-Regulatory Coaching Interface Model



From our findings, we can visually represent the micro-level co-regulatory processes, how these interact in the C-A interface, and have implications for SRL. Built from the findings of this case study, *the Co-Regulatory Coaching Interface Model* (CCIM; Figure 1) is a heuristic that indicates important inputs that a coach may expect to contribute to post-trial exchanges and, similarly, what they might encourage an athlete to contribute to exchanges. It denotes several co-regulatory processes that can be initiated by both coach and skater and emphasizes shared prerequisites in enhancing skill acquisition. It centers on audible exchanges and as such

has not considered non-verbal elements of task and environmental scaffolding by a coach which can also influence skill acquisition (Davids et al., 2013). While the CCIM may not be generalizable to all C-A interactions, using the CCIM allows for discussion around associations and transitions between CRL and SRL, which provides a novel contribution to the literature.

Associations between CRL and SRL

As seen in the CCIM, skater SRL was connected to CRL in the interface. What the skater learned in the interface, he would later act upon during his self-regulated activities outside the auspices of his coach. During his self-practice time, he exhibited many SRL attributes (e.g., giving effort, valuing self-correction) and processes (metacognitive monitoring of practice strategies), and self-comparisons of his own feedback to an internal standard, which he had previously developed in joint work with his coach. Further, after applying his SRL competencies during self-practice time, the skater would later bring learnings from these efforts back to the interface (in CRL). This portrayal of circular associations between CRL and SRL can be seen as a unique feature of the CCIM. Most research in education has focused on delineating types of regulation (i.e., SRL, CRL, and socially shared regulation of learning; Hadwin et al., 2011) with less consideration for how the relationships between regulation types develop and associate. Our findings indicate SRL and CRL traverse both joint work and self-practice time, and what a self-regulated athlete does in their own activities can be brought back to effectively influence CRL with an instructor.

Accounting for Developmental Transitions between CRL and SRL

Overall, our data showed greater evidence of the skater's SRL over the course of the season. This is developed through the list of strategies suggested in the interface of the CCIM. Indeed, the coach anticipated a gradual progression from teaching to correcting roles. We noted asymmetrical CRL (Panadero & Järvelä, 2015) early in a progression, favoring more coach initiations/contributions and reluctance on the skater's part. This asymmetry early in their co-regulatory progression could have been due to assumptions about the coach's prior coaching knowledge and experience, associated with her status, to which he deferred. The asynchrony favoring coach-direction may also reflect a purposeful coach approach to skill acquisition to get more out of their time together, especially earlier in the season. The joint work became more balanced as the dyad advanced through an element and across the season, with more back and forth turns between members, and more integration in the interface.

Although scaffolding literature supports linear fading strategies to reduce *frequency* of feedback (van de Pol et al., 2010; Winstein & Schmidt, 1990), the coach in this study focused on the *nature* of feedback and how she began to integrate it more responsively to what the athlete shared in the interface. This experience coincided with her coaching philosophy on giving feedback, which was a macro-level variable that influenced their joint work. In education, the contingency tenet of scaffolding posits that teachers should provide more support following a learner's miscues or failures (van de Pol & Elbers, 2013). While the coach responded following failures or inadequacies by the skater, she gave feedback in some form after the majority of all trials, not just miscues. Generally, as they progressed on a skill across the season, this meant she gave more simple correctives rather than verbal explanations, and it meant that her correctives could equally be in response to his initiation/appraisal, as much as they were by her own initiation.

Notably, co-regulation did not appear to be a straightforward linear portal from coach-directed learning to SRL. Jones and Thomas (2015) presented sport coaching scaffolding as a phenomenon they figured would happen in a non-linear manner, with coaches never really

fading feedback but leaving a framework enabling them to return to more basic approaches to a skill when there are recurring mistakes. Our empirical work confirms this, which is an important distinction from educational literature, where it is assumed that the learning process for a skill is complete once the learner is able to perform it on their own, and there is less dialogue on how teachers revisit earlier teaching roles on a skill (Jones & Thomas, 2015). We found the skater had a role in informing the return to an earlier phase of progression, which would invite more teaching and verbalization from the coach. An athlete who is self-regulating their practice trials and discovering insufficiencies can interact with their coach to prompt a return to higher levels of coach support on a skill. This finding acknowledges that strategic help-seeking is an adaptive form of SRL (Zimmerman & Moylan, 2009) – our case study showed this process to be far from transactional, and indeed mutually collaborative within a dyad. In terms of the skater's enhanced SRL across the season, we saw the cyclical repetition of C-A interfacing that formed non-linear progressions in the development of increased athlete agency.

A Heuristic Model for Coaching: How Does the CCIM Compare with Extant Literature?

The CCIM differs from other C-A models, adding to the literature specifically on behaviours that influence athletic skill development. For example, Jowett's 3C+1C model is grounded in relational interdependence (Callary et al., 2020; Jowett & Shanmugam, 2016), where affect and commitment are shared between coach and athlete (Jowett, 2007), and relationship qualities are more important in understanding C-A co-orientation than behavioral responsiveness to each other. There are indeed relationship aspects to our findings – readers will note elements of socio-emotional support, motivation, and empathy. This said, we believe we have faithfully interpreted these aspects in the CCIM as we saw them; specifically, in service and secondary to co-regulatory practice transactions, communications and collaborations, rather than at the fore. While the 3C+1C model addresses complementarity, there is a lack of detail on the specific exchanges that espouse such dyadic responsiveness, particularly in the practice setting. The merit of the CCIM is that such C-A exchanges have been positioned centrally. Moreover, our study details the consequences of the dyadic C-A relationship on talent development, and enhanced skill acquisition specifically, expanding the work that explores complementarity of C-A dyads (e.g., Jowett & Nezlek, 2012; McGee & DeFreese, 2019).

Our findings also expand notions of coaching as contextualized within the sport expertise domain, focusing on using practice time efficiently and effectively to develop technical, tactical, and performance skills. Thus, while other studies conceptualize self-regulation as a life skill that transfers beyond sport (Barker et al., 2016; Rathwell & Young, 2017), our study (and the development of the CCIM) adds to literature on coaching supports for how "coaches can apply expertise theory and deliberate practice" (Huber, 2013, p. 215). Notably, SRL discussions in sport expertise relate to how athletes can take ownership within their massive amounts of practice time to develop their competitive talent (McCardle et al., 2019). The CCIM specifies the complexities between C-A joint work and SRL so that athletes can integrate self-regulated competencies and use them in more effective investment in training. Thus, SRL is characterized in the CCIM as a consequence of optimal co-regulatory work, which helps an athlete develop SRL, and which they can use to *invest/reinvest in training*. Therefore, the CCIM fills a gap on C-A interactions by portraying the transactional aspects of communications and collaborations in pursuit of competence development and skill acquisition.

Limitations and Future Research

The CCIM is derived from this case study, thus, CRL could be different in another skating dyad, and in other sports. The structure of skating practice enables athletes to have intensive one-on-one time with their coaches, which then leads into alone on-ice practice time, which was instrumental in exploring complexities between CRL and SRL. Future work could assess if CRL is seen in a sport where interaction time between coaches and athletes is not as well delineated. The CCIM may look different in sports where less practice time focuses on technical/aesthetically oriented elements. Its pertinence depends on whether other coaches also see meaning in the current interpretations and are motivated to translate it to their own craft.

Although we formatively adapted our guide ahead of interviews two and three (see Supplementary Appendix B & C) to probe interactions around the progression in specific skills (e.g., lutz jump), it would be helpful to uncover more information about the athlete's progression on a specific skill and developmental transitions in co-regulatory exchanges as they occur in a more *in situ* manner. Our transcript analyses focused on the C-A communications at various snapshots across the season, which were useful for illustrating collaborations and how co-regulation unfolded but had limits for making specific conclusions about how CRL enhanced SRL. Future research could assess the interactions surrounding how the coach and athlete progress on one skill element from conception to the most difficult version within a season (e.g., single lutz to a triple lutz located in a routine), with efforts to triangulate practice data (observations, communications) with examples that participants describe in interviews. Our study was confined to C-A interactions in the present season. In keeping with a prospective approach, our study was unique in examining complexities between CRL and SRL over time in a naturalistic environment. Still, we cannot adequately comment on how interactions in this season and within-season development were predicated upon shared experiences between the coach and the skater, socially and historically, in prior years. Future work could adopt a retrospective approach on dyadic relationships to address this question.

These findings and the resultant CCIM organize various co-regulatory considerations, including the building of a shared knowledge base and specific communication processes during skill acquisition segments of practice. While the findings provided an indication of various interface processes, coach and skater contributions, and shared expectations, these elements are not exhaustive and may differ with other C-A dyads. Still, the CCIM may provide a visual of how a coach can communicate to help an athlete comprehend and be able to express how they feel kinesthetically. To facilitate an athlete's contribution, a coach might employ questioning, invite athlete-initiated appraisals and solutions, and be open to athlete counter-solutions. To enhance SRL, a coach might facilitate opportunities where an athlete works more autonomously on trials, before reporting back to the interface. With such efforts sustained over time, our findings suggest that an athlete may become motivated and comfortable mixing their perspectives with information from their coach, all the while developing greater input expectancies. Thus, the CCIM indicates how an athlete may take learnings from the interface to apply to their own self-regulated practice, and circularly, how learnings from self-regulated activities become inputs to the co-regulatory interface.

References

Bain, L., Young, B. W., Wilson, S. G., Hoar, S., & Baker, J. (2020, October). *Athletes' self-organized practice activities: Describing how athletes structure their own practice time*. Presented at the annual SPIN conference. Canada.

Barker, B., Halsall, T. G., Forneris, T., & Fortier, M. (2016). Bridging a gap in the Canadian physical activity guidelines through the development of youth self-regulation. *PHEnex*

Journal, *8*(2). Retrievable at: https://ojs.acadiau.ca/index.php/phenex/article/view/1643

Braun, V., & Clarke, V. (2021). One size fits all? What counts as quality practice in (reflexive) thematic analysis? *Qualitative Research in Psychology, 18*(3), 328-352. https://doi.org/10.1080/14780887.2020.1769238

Callary, B., Currie, C., & Young, B. W. (2020). Insights into the importance of relational coaching for masters sport. *International Sport Coaching Journal, 7*(3), 390-397. https://doi.org/10.1123/iscj.2019-0021

Callary, B., Young, B. W., & Rathwell, S. (Eds). (2021*). Coaching masters athletes: Advancing research and practice in adult sport*. Taylor & Francis. https://doi.org/10.4324/9781003025368

Camiré, M., Trudel, P., & Forneris, T. (2012). Coaching and transferring life skills: Philosophies and strategies used by model high school coaches. *The Sport Psychologist, 26*(2), 243-260. https://doi.org/10.1123/tsp.26.2.243

Côté, J., Salmela, J., Trudel, P., Baria, A., & Russell, S. (1995). The coaching model: A grounded assessment of expert gymnastic coaches' knowledge. *Journal of Sport & Exercise Psychology, 17*(1), 1-17. https://doi.org/10.1123/jsep.17.1.1

Crotty, M. (2015). *The foundations of social research.* SAGE.

Davids, K., Araújo, D., Vilar, L., Renshaw, I., & Pinder, R. (2013). An ecological dynamics approach to skill acquisition: Implications for development of talent in sport. *Talent Development & Excellenc*e, *5*(1), 21-34.

Engin, M. (2013). Questioning to scaffold: An exploration of questions in pre-service teacher training feedback sessions. *European Journal of Teacher Education, 36*(1), 39-54. https://doi.org/10.1080/02619768.2012.678485

Ericsson, K. A. (2020). Towards a science of the acquisition of expert performance in sports: Clarifying the differences between deliberate practice and other types of practice. *Journal of Sports Sciences, 38*(2), 159-176. https://doi.org/10.1080/02640414.2019.1688618

Hadwin, A. F., Järvelä, S., & Miller, M. (2011). Self-regulated, co-regulated, and socially shared regulation of learning. In B. J. Zimmerman & D. Schunk (Eds.), *Handbook of self-regulation of learning and performance* (pp. 65-84). Routledge.

Hadwin, A. F., Wozney, L., & Pontin, O. (2005). Scaffolding the appropriation of self-regulatory activity: A socio-cultural analysis of changes in teacher-student discourse about a graduate research portfolio. *Instructional Science, 33*, 413-450. https://doi.org/10.1007/s11251-005-1274-7

Hammond, J., & Gibbons, P. (2005). Putting scaffolding to work. The contribution to scaffolding in articulating ESL education. *Prospect, 20*(1), 6-30.

Huber, J. J. (2013). *Applying educational psychology in coaching athletes*. Human Kinetics.

Jones, R. L., & Thomas, G. L. (2015). Coaching as 'scaffolded' practice: Further insights into sport pedagogy. *Sports Coaching Review, 4*(2), 65-79. https://doi.org/10.1080/21640629.2016.1157321

Jowett, S. (2007). Interdependence analysis and the 3+1C's in the coach-athlete relationship. In S. Jowett & D. Lavallee (Eds.), *Social psychology in sport* (pp. 15-28). Human Kinetics.

Jowett, S., & Nezlek, J. (2012). Relationship interdependence and satisfaction with important outcomes in coach–athlete dyads. *Journal of Social & Personal Relationships, 29*(3), 287-301. https://doi.org/10.1177/0265407511420980

Jowett, S., & Shanmugam, V. (2016). Relational coaching in sport: Its psychological underpinnings and practical effectiveness. In R. Schinke, K. R. McGannon, & B. Smith (Eds.), *Routledge international handbook of sport psychology* (pp. 471-484).

Routledge.

McCardle, L., Young, B. W., & Baker, J. (2019). Self-regulated learning and expertise development in sport: Current status, challenges, and future opportunities. *International Review of Sport & Exercise Psychology, 12*(1), 112-138. https://doi.org/10.1080/1750984X.2017.1381141

McCaslin, M. (2009). Co-regulation of student motivation and emergent identity. *Educational Psychologist, 44*(2), 137-146. https://doi.org/10.1080/00461520902832384

McCaslin, M., & Hickey, D. T. (2001). Self-regulated learning and academic achievement: A Vygotskian view. In B. Zimmerman & D. Schunk (Eds.), *Self-regulated learning and academic achievement: Theoretical perspectives* (pp.227-252). Erlbaum.

McGee, V., & DeFreese, J. D. (2019). The coach-athlete relationship and athlete psychological outcomes. *Journal of Clinical Sport Psychology, 13*(1), 152-174. https://doi.org/10.1123/jcsp.2018-0010

Mercer, N. (1995). *The guided construction of knowledge. Talk amongst teachers and learners.* Multilingual Matters.

Palmer, C. (2016). Ethics in sport and exercise research: From research ethics committees to ethics in the field. In B. Smith & A. C. Sparkes (Eds.), *Routledge handbook of qualitative research methods in sport and exercise* (pp. 316–329). Routledge.

Panadero, E., & Järvelä, S. (2015). Socially shared regulation of learning; A review. *European Psychologist, 20*(3), 190-203. https://doi.org/10.1027/1016-9040/a000226

Potrac, P., Gilbert, W., & Denison, J. (Eds.). (2013). *The Routledge handbook of sports coaching*. Routledge.

Rathwell, S., & Young, B. W. (2017). Describing aspects of self and social agency related to Canadian university athletes' life skill development. *PHEnex Journal, 8*(3). Retrievable at http://ojs.acadiau.ca/index.php/phenex/article/view/1654/1392

Rubin, H. J., & Rubin, I. S. (2012). *Qualitative interviewing: The art of hearing data*. SAGE.

Smith, B., & McGannon, K. R. (2018). Developing rigor in qualitative research: Problems and opportunities within sport and exercise psychology. *International Review of Sport & Exercise Psychology, 11*(1), 101-121. https://doi.org/10.1080/1750984X.2017.1317357

Sparkes, A. C., & Smith, B. (2014). *Qualitative research methods in sport, exercise and health: From process to product.* Routledge. https://doi.org/10.4324/9780203852187

Stake, R. E. (2005). Qualitative case studies. In N. K. Denzin & Y. S. Lincoln (Eds.), *The SAGE handbook of qualitative research* (pp. 443-466). SAGE.

Tracy, S. J. (2010). Qualitative quality: Eight "big-tent" criteria for excellent qualitative research. *Qualitative Inquiry, 16*(10), 837-851. https://doi.org/10.1177/1077800410383121

van de Pol, J., & Elbers, E. (2013). Scaffolding student learning: A micro-analysis of teacher-student interaction. *Learning, Culture & Social Interaction, 2*(1), 32-41. https://doi.org/10.1016/j.lcsi.2012.12.001

van de Pol, J., Volman, M., & Beishuizen, J. (2010). Scaffolding in teacher-student interaction: A decade of research. *Educational Psychology Review, 22,* 271-296. https://doi.org/10.1007/s10648-010-9127-6

Vickers, J. (1999). *Decision training: A new approach to coaching*. Coaches Association of BC.

Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes.* Harvard University Press.

Wilson, S., Young, B. W., Hoar, S., & Baker, J. (2021). Further evidence for the validity of a survey for self-regulated learning in sport practice. *Psychology of Sport & Exercise, 56*, 101975. Advance online publication. https://doi.org/10.1016/j.psychsport.2021.101975

Winstein, C. J., & Schmidt, R. A. (1990). Reduced frequency of knowledge of results enhances motor skill learning. *Journal of Experimental Psychology: Learning, Memory, & Cognition, 16*(4), 677-691. https://doi.org/10.1037/0278-7393.16.4.677

Wood, D., Bruner, J. S., & Ross, G. (1976). The role of tutoring in problem solving. *Journal of Child Psychology and Psychiatry and Allied Disciplines, 17*(2), 89-100. https://doi.org/10.1111/j.1469-7610.1976.tb00381.x

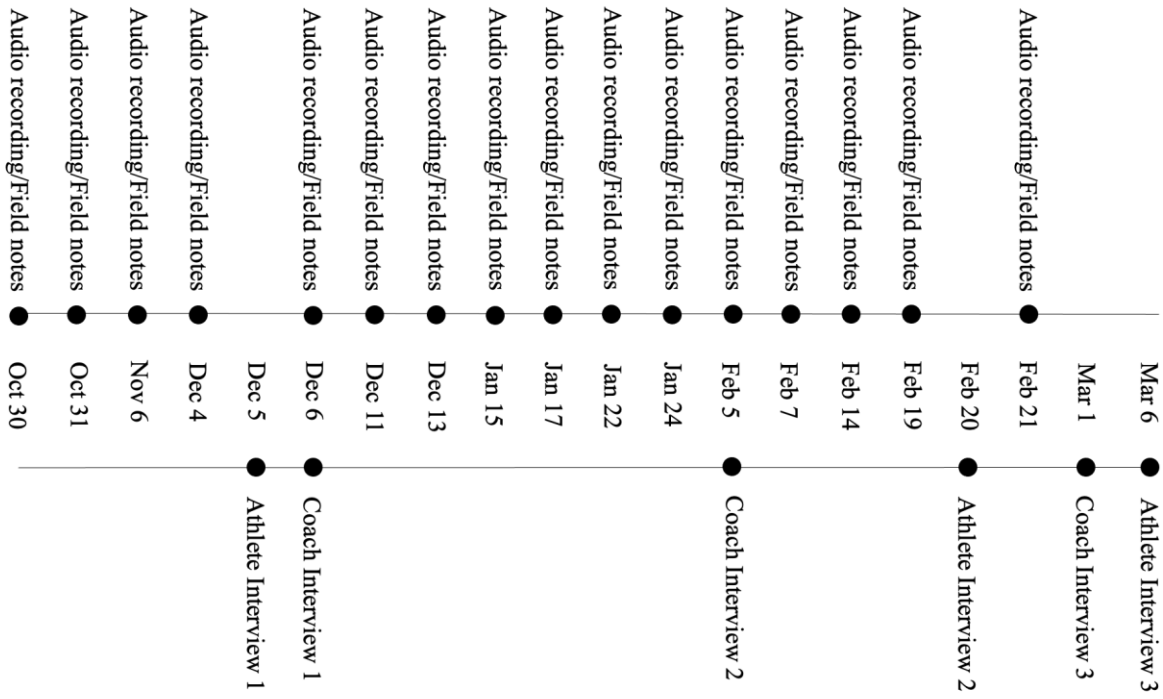
Young, B. W., & Medic, N. (2008). The motivation to become an expert athlete: How coaches can promote long-term commitment. In D. Farrow, J. Baker, & C. MacMahon (Eds.), *Developing elite sports performers: Lessons from theory and practice* (pp. 43-59). Routledge.

Young, B. W., Wilson, S. G., Hoar, S., Bain, L., Siekańska, M., & Baker, J. (in press). On the self-regulation of sport practice: Moving the narrative from theory and assessment towards practice. *Frontiers in Psychology: Movement Science & Sport Psychology*.

Zimmerman, B. J., & Moylan, A. R. (2009). Self-regulation: Where metacognition and motivation intersect. In D. J. Hacker, J. Dunlosky, & A. C. Grasser (Eds.), *Handbook of Metacognition in Education* (pp. 299-315). Routledge.

Supplementary Appendix A

Timeline of the Study Showing Observations and Recording of Practices and Interviews



Supplementary Appendix B

Athlete Interview 1

Hi, my name is XXXXX and I am a XXXXXXXX from XXXXXX doing research in sport psychology on optimal training habits, so I'm just here to get your perspective and to see how a high level athlete and their coach practice together. Thank you again for participating in this study and taking the time to sit down with me today. I will be audio-recording our discussion

and will be taking notes throughout the interview. If you are uncomfortable at any time or do not want to answer a question, please let me know and we can move on to the next question or stop the interview altogether. I will not judge you based on your answers and will not disclose your information to anyone else including your parents and other athletes.

1. Pretend like I don't know anything about figure skating and that I haven't been out to some of your practices. Can you describe to me what your average practice is like, right from when you arrive at the arena until you leave?
2. What are your favorite parts of practice?
3. How long have you been with your current coach?
4. Do you think your coach makes you a better athlete during practice? How?
    a. Are there any other ways? What is she doing exactly?
5. Is there a lot of interaction between you and your coach during practice? When I say interaction, I mean back and forth in terms of him/her showing you things, talking with you, stuff like that. [follow up with next question if they don't understand] Do you and your coach talk a lot?
    a. Does this happen the whole time during practice? Only at certain times? At more times than others?
    b. When does it happen?
    c. Where does it happen? Does it happen at a certain place?
    d. How often does this type of interaction happen?
    e. Is it always talking? Talking about/showing demos?
6. Does your coach interact with you after every time you perform an element? Again, when I say interaction I mean like back and forth in terms of him/her showing you things, talking with you, stuff like that. What happens?
    a. Is there times when the coach doesn't interact with you?
7. Is it easy to tell when you "nail" an element or make a mistake in practice?

For these next set of questions, I would like you to think about a recent example of when you made a mistake or the grade of execution on an element was poor.

8. Can you talk about or describe the example you've chosen and what happened when your execution of an element was poor? *(Based on their response, ask the questions in the appropriate column. Once finished the questions in that column, ask the questions in the other column).*

i. How can you tell when you've slipped up? ii. When you realized this, what was going through your head? iii. What did you do next? a. Can you give a specific example? b. What did that look like?	i. Does your coach respond in any way? ii. What does your coach do when you do something wrong? a. Can you give a specific example? iii. * Does your coach leave it to you or let you work on mistakes and frustrations on your own? * a. How do you know what to work on during that period?

(after going through this table, try to get a second example at least)

For these next set of questions, I would like you to think about a recent example in practice when you nailed something or performed something very well.

9. Can you talk about or describe the example you've chosen for when you nailed something or performed something very well in practice? *(Based on their response, ask the questions in the appropriate column. Once finished the questions in that column, ask the questions in the other column).*

i. How could you tell you were successful? ii. What was going through your head? What tells you, you were successful? a. Can you give a specific example? iii. What did you do next? iv. What happens after you're successful?	i. Does your coach respond in any way? ii. What does the coach do when you are successful in a task? a. Can you give a specific example? iii. * Does your coach leave it to you or let you figure out where you are successful during practice? * a. Was there a time when you were successful and you didn't need your coach to tell you?

10. What are your responsibilities, roles, and duties at home?

Ok, now I want you to think about this as a figure skater at practice.

11. What are your responsibilities, roles, duties for being a "good figure skater" during practice this season? *(Based on their response, ask the questions in the appropriate column. Once finished the questions in that column, ask the questions in the other column).*

i. (Repeat back the responsibilities that they said) Do you expect yourself to be good at all of these responsibilities? a. Can you give me a specific example? b. How did you figure out these expectations? ii. What do you expect from your coach in terms of being an amazing coach in practice? a. Can you give me a specific example? iii. * Are there any times where one of your responsibilities is to go away by yourself and practice on your own without the coach monitoring you? *	i. Does your coach have expectations for you in terms of how you go about practice? a. How do you know this?

12. Do you have a goal when you practice on your own?
    a. Can you give me an example?
13. Is it important for you to practice on your own without a coach?
14. Do you ever have a chance to talk to your coach about what you want to do in practice?
    a. How often would you say does this happen?

    b. Can you give me an example?
15. Does your coach ever give you choices in practice?
    a. Can you give me an example?
16. Is there anything else you would like to add?

Athlete Interview 2

Last interview when I asked if you could describe what your average practice is like, you mentioned that you liked to set a plan at the beginning.

- Is planning important the moment you arrive?
- Who initiates ideas and planning on what needs to be worked on, fixed?
- Who sets the plan? Do coaches set the plan and then confirm it with you? Do the coaches make most of the plan and then ask if there is anything you'd like to add? Are all of you equal and plan together?
- Are you relying on what the coach says to start working? Do you sometimes? When?
- How do you set things you want to accomplish each day?

Last interview I asked if you ever have a chance to talk to your coach about what you want to do in practice, and you said "Umm, if I ever, like, ok I'm sore today, lets maybe work on stretching or ok, at competition this program really didn't go well, I practically fell everywhere, I really want to fix this, I'm going to work on that tonight."

- How do you tell her or let her know you want to work on those things, or do you ask her?

What happens when you find something you want to or have to work on?

- How do you know this element is something you have to work on?
- Does your coach ask if there's something you want to work on?
- Do you initiate the conversation, so you approach the coach to see if you can work on it?

You mentioned last interview that you can tell you did something right because it felt easy. Is there ever a time where an element felt "easy" but it was still "incorrect" or "wrong"?

- How did you know? How did you find out?
- Are you expected to be an independent skater? When I say independent I mean working things out on your own, practicing on your own, taking initiative.
- Are you an independent skater?
- So you'll go over an element a few times while the coach is there, but then it is your responsibility or you take it upon yourself to work on it by yourself when you are alone?
- (Do you think that the fact that you interact less with this is because you identify yourself as an independent worker and she expects you to do this?)
- Is the coach aware of the things you do on your own? How do you make the coach aware of what you worked on on your own?
- Can you explain what happens when you're in session right after you perform an element? What's going through your head? (maybe an example when he was successful and when he caught himself)
- What happens as you approach your coach on the boards?
    - What does she do/say?
    - Does she ever pause to let you talk first about what went wrong or what needs to be fixed?

  - Does she ever ask you what happened or what went wrong?
  - When does the coach make the first comment after you perform an element, when does she take the lead?
  - Does she always let you try and fix it yourself before she makes a comment?

What do you think the role of the coach is in practice?

- What makes her a good coach?
- Do you find she has more of a teaching or a correcting role? Is this the same at the beginning of the season compared to the end of the season?
- Do you need your coach to tell you in practice when something might be off?
- Does your coach need you to tell her when it might be off?
- Which is more important to you? For your improvement? (when she tells you when something is off vs. when you tell her)

Try to think about a time in practice where everything seemed to be going wrong. You get on the ice, you don't land your jumps, your spins aren't what they usually are.

- How do you try to "bounce back" from these setbacks/errors/bad program?
- What do you do to try and make it a better practice where you do land your jumps?
- Where or how did you learn that this works for you?

Last interview when I asked what was going through your head when you realized something wasn't quite right when you made a mistake or your grade of execution on an element was poor, you mentioned that you try and make the next one better and try not to leave that mistake on your mind. So, it was just a simple mistake, forget it, and continue on.

- Is this something that you learned from your coach or that you have learned to do over the years by yourself?

(How are priorities for learning and working on stuff established?)

You mentioned that through experience you know how to fix your own mistakes.

- Can you tell me about the experience by which you've learned to fix your own mistakes?
- Is there any point in your career where you suddenly took a greater role in fixing your mistakes?
- How do you notice that you have a greater role in fixing your own mistakes now? Have you asked for that?
- When did you start fixing your own mistakes?
- How was experience developed?
- Can you give an example relating to one element where it is still developing?

What is a new element that you started at the beginning of this previous season? OR I would like you to think of an element what you worked on this season or started at the beginning of the previous season. Ok, I would like you to keep this element in your mind.
Is there anything that the coach was doing with you, or the dialogue you were having with your coach over the course of things you were working on this year, where you felt more responsibility for making yourself better on that element?

- How? Can you walk me through that element?
- What's changed with how you interact with your coach?
- Has the nature of dialogue changed?

Athlete Interview 3

- Last interview you mentioned negotiating with regards to who sets the plan at practice, what did you mean by negotiation? What does that look like?
- I would like you to think about a jump and the progression from the single to the double to the triple. Does the frequency of interactions change, or just the content becomes more refined/tighter depending on the higher level of the jump?
- When do you keep working on something if it isn't going right and when do you leave it until another time?
    - Is this negotiated with the coach?
    - How does she support this?
- When the coach asks what went wrong, is she asking to help her figure out how she can help you, or to bring your awareness to it, or both?
- What is the nature of dialogue when you are having a lethargic day in training vs energetic day?
    - Does this change depending on how much effort you are giving?
- When working on an element, how would the coach ever know that an element is feeling lighter, easier? If no, how do you convey this information, or do you keep it to yourself?
    - How does the coach understand what you "feel"?
- Can you tell me if how much you like an element vs elements you don't like factor in to how much you practice an element?
- Was there a time this season, since I've been collecting data, where you found a new element on your own to work on and asked the coach to work on it with you?
    - What was it?
    - How did this happen?
    - How did you feel about this?
- Do you see demands in training change over the course of a season? If so, how do you respond to those changing demands?
- Would you say you are mature with respect to training/how you learn at practice? Does your coach do anything in practice to help or increase your maturity?
- Did you seek out a sport psychologist, was she recommended, or did your coach provide you with one?

Supplementary Appendix C

Coach Interview 1

Hi, my name is XXXXX and I am a XXXXXX from XXXXX doing research in sport psychology on optimal training habits, so I'm just here to get your perspective and to see how a high level athlete and their coach practice together. I think being in school you kind of get caught up in the theory of things and there's a loss of connection between the theory and what actually goes on in real life, so I'd really like to learn about the lived experiences of practitioners and hopefully find a way where research can benefit the both of us. Thank you again for participating in this study and taking the time to sit down with me today. I will be audio-recording our discussion and will be taking notes throughout the interview. If you are uncomfortable at any time or do not want to answer a question, please let me know and we can move on to the next question or stop the interview altogether. I will not judge you based on

your answers and will not disclose your information to anyone else including your athletes' parents and other athletes.

1. How long have you been coaching at the (insert the chosen athlete's level here) level?
2. How long have you been coaching (insert chosen athlete's name)?
3. Can you describe a typical week for your athlete?
4. Do you have a plan each time you go into a practice?
5. How do you set up your practices?
6. How much interaction is there between you and your athlete during practice?
    a. Is it consistent during practice? At more times than others?
    b. What does this depend on?

[Contingency, (Support/Feedback)]
For this next set of questions, I would like you to think about what happens <u>within any one practice session</u>.

7. Can you tell me a little bit about your philosophy on giving feedback to your athletes? (sharing of information, conveying information to athlete at different instances in practice, could be how they are doing)
8. What types of things do you like to give feedback on?
9. How often do you give feedback?
    a. Is there a pattern to how you give feedback during a practice?
    b. What does this depend on?
10. How do you support your athlete when they try things in practice?

Feedback depends on degree of success, clear successes or clear failures
Does your philosophy vary based on their degree of success in practice?

11. Is your philosophy the same for giving feedback after successes as it is for when your athlete is less successful?
12. Is this something you intentionally set out to do during a practice?
    a. Can you give me specific instances, situations, or scenarios?

[Fading]
For this next set of questions, I would like you to think about what happens <u>across multiple practices over the course of a season</u>.

13. You said earlier on your philosophy on giving feedback that you… What is your philosophy on whether how you give feedback should change over time? Such as types of feedback, how you give feedback, and when you give feedback?
14. Do the types of things you like to give feedback on change over time?
15. When you consider how often you give feedback to your athletes, does this change over time, across practices in a season?
    a. Is there a pattern to how often you give feedback over the course of the season? Are the changes, more or less, in terms of the feedback and support you give?
    b. What does this depend on?
16. When your athletes try things in practice, does your support change over time?
    a. Does it increase or decrease?
    b. What does this depend on?
17. You said "(Insert the answer they provided for the question "Is your philosophy the same for giving feedback after successes as it is for when your athlete is less successful?" here)", does this change over time?

   a. More or less?
18. Is this something you intentionally set out to do over the course of the season?
   a. Is this something that you intentionally try to change over the course of the season? Are the changes more or less?
   b. What does this depend on?

[Transfer of Responsibility]

19. Do you have expectations for your athletes with regards to responsibilities, roles, and duties for being a "good athlete" during practice?
   a. What are some of those responsibilities? In what areas of practice?

Again, talking about responsibilities, roles and duties…

20. Do you have expectations for your athlete with regards to their "own development, for optimizing their learning and skill improvement", during practice?
21. How do these roles and responsibilities get figured out?
22. a) Are there any roles or responsibilities that they learn from you? OR Do you have a role in the athlete learning these roles and responsibilities?
   a. Can you give me a specific example?
   b. Is this something that you set out to do?

b) Does the athlete have a role in figuring out these roles and responsibilities?

   c. How are they picking up good training habits to help themselves?
   d. How does the athlete figure these roles and responsibilities out?
   e. Can you give me a specific example?
   f. Is this something that you set out to do, that is, intentionally supporting the athletes when they are figuring out their roles and responsibilities?
23. What is your philosophy on letting athletes work on skills or mistakes on their own?
24. Is it important for you that your athlete learns to do things on their own?
   a. What sort of things?
   b. What does this depend on?
25. Do you have a role in your athletes' learning to do things on their own?
   a. In what aspects? Can you give me an example?
   b. Can you speak about the nature of any changes in the athletes' learning to do this over multiple practices?
   c. Is this something you intentionally set out to do as a coach, that is, intentionally supporting the athletes so they learn how to do things on their own?
   d. Do you think this will change over the course of the season?
26. Is there anything else you would like to add?

Again, thank you for taking the time and talking with me today. I will type up this interview and forward it to you to make sure everything is correct, and you can make slight changes if need be. I look forward to doing the second interview with you later on in the season, and I will see you at next practice.

Optional questions if they come up from discussion from the coach

- Do you talk to your athlete after every time you perform a skill?
- Can you tell when your athlete is frustrated? How?
- Does your athlete practice on their own during practice?
- Does your athlete have a say in what they want to do in practice?

Coach Interview 2

Today I would like to talk about some of your quotes from the last interview. I would you're your opinion and more information on them.

The last time we talked, during the interview, you mentioned that this is the time of year where you start working with [the athlete] on skills he needs to improve on or learn how to do.

- Right now I would like you to think about skills where [the athlete] has a lot of work to do on them, where YOU are going to work with him to make improvements on those skills, so this could be triples, certain types of triple, something that you can identify for me. What are those skills you have in mind? (try to categorize them)

With the skills you just mentioned (list them), I would like you to keep those in mind and I will come back and prompt you on them in different parts of the interview.

Last interview you mentioned that you switch from teaching the athletes new things to more of a correcting role.

- Does this happen in a season? Can this happen in a season?
- Can you give me an example of an exchange between you and [the athlete] that would occur when you are teaching? (use one of the examples given up there)
- Can you give me an example of an exchange between you and [the athlete] that would occur when you are correcting?
- Last interview you mentioned the progression from teaching to correcting. Why is it important for you to switch from teaching to correcting?
- Why is it important for the skater, for [the athlete], for you to switch from teaching to correcting?
- How do you know when to switch from teaching to correcting?
    - Is there a specific time or marker you look for?
    - Is there something you look for from the skater?
- You also mentioned that you get more demanding as the season progresses, what are you demanding from the athlete at the beginning of the season? What are you demanding from the athlete at the end of the season?
    - How do the demands change?
    - What does this look like in practice?
    - How does your athlete respond to these demands?

I would like you to think of a time, maybe recently, when [the athlete] caught himself from falling. So he was doing a jump, didn't quite land it, but was still able to catch himself and not land on the ice. (use an example provided)

- What happens when [the athlete] skates back to the boards after performing that element or program?
    - Do you jump in and start talking about what happened/what went wrong?
    - Do you pause to let him talk first about what went wrong/what needs to be fixed?
    - Do you ever ask him what happened/what went wrong?
    - What is the ratio between all of those?
    - Does this change over time?
    - How do you determine which strategy to use?
    - Do you think it's important to give the athlete feedback right away? Do you ever delay your feedback?

Last interview you mentioned that [the athlete] was an ideal student and that interactions with him are easy.

- What makes [the athlete] an ideal student? What are some characteristics that make him an ideal student?
    - What makes [the athlete] an ideal student when, for example, you interact with him around a skill, errors, challenges?
    - Does he adopt your instruction well?
    - Does he try and figure things out for himself?
    - Does he ask good questions of you?
    - Does he respond well to your questions?
    - Is this evidence that [the athlete] is taking responsibility for his training?
- You mentioned that "He's really easy to work with, and that makes the interaction easy", can you give me an example of when the interactions are easy?
- Are there times when the interactions are hard? Can you give me an example?
- Do you think hard interactions sometimes are necessary for your athlete to progress in this sport?
- (Are there any times during "hard practice" when your interactions with your athlete make it easier?)

It sounds like you tailor your sessions around what the athlete's energy is like that day.

- What are your interactions like when the athlete has low energy during a session?
    - Can you give me an example of an exchange between you and the athlete?
    - Is there a lot of interaction, a little interaction?
    - Does this change based on successes or errors made by the athlete?
- What are your interactions like when the athlete has high energy during a session?
    - Can you give me an example of an exchange between you and the athlete?
    - Is there a lot of interaction, a little interaction?
    - Does this change based on successes or errors made by the athlete?

Coach Interview 3

- Do you see [the athlete] as having a role in planning and how time is managed at practice?
- Does [the athlete] ever negotiate what he wants to work on at practice?
- When you are asking the athlete what happened or what went wrong after they perform an element, are you asking to help yourself figure out how you can help him, or to bring his awareness to it, or both?
- Does it matter who initiates the conversation after a practice rep when he approaches the boards?
    - (During practice, do you take [the athlete]'s silence or pregnant pause as a sign that you should initiate conversation?)

- Last interview you mentioned a shared language between you and [the athlete].
    - What is this shared language? How would you describe it?
    - How did he learn this?
    - Is this shared language still being developed?
- I would like you to think about a jump and the progression from the single to the double to the triple. Does the frequency of interactions change, or just the content becomes more refined/tighter depending on the higher level of the jump?

- Last interview you mentioned that you like to give feedback right away, but you sometimes like to delay the feedback. When would it be useful to delay your feedback? When would it be useful to give your feedback right away?
- Last interview when I asked "And do you ever, instead of letting him know exactly what went wrong, is there a time where you ask him what happened or what went wrong, to kind of see his response from it?" you mentioned "I have to keep reminding myself of that. I need to step back and let them drive it, guide it, and not just always correct". How do you think you step back and let him drive it? Can you give me an example?
- In what conditions is it better to tell the athlete how to correct their mistakes versus allowing them to try to figure it out themselves?
- You mentioned that "Maybe I still teach technique as well, but it's, more them directing me in what technique I'm teaching?". Is there a specific example of this from [the athlete] from this past season, since I have been collecting data?
- Do you find that when an athlete gets older, so for example [the athlete]'s age, the practice is formed on the way the athlete feels performing an element and a coach's second set of eyes?
- Last interview you mentioned for the progression from teaching to correcting, that "the progression is not just about they understand the technique, they understand the language, they're more mature they understand the concepts". When you say mature, what do you mean? What is maturity?
- Do you strategically try to facilitate greater maturity in [the athlete] as a skater in practice? What do you try and do?

Author Note

Lisa Bain is a PhD candidate in the School of Human Kinetics at the University of Ottawa. Her research is in sport psychology, with an interest in how coach-athlete interactions in practice relate to an athlete's ability to self-regulate their learning. Her current work examines how coaches help regulate individual athletes in group settings, and how athletes help regulate one another to promote optimal practice conditions and expertise development. Please direct correspondence to lbain016@uottawa.ca.

Bradley W. Young is a full professor in the School of Human Kinetics at the University of Ottawa. His research focuses on sport expertise and the psychology of practice as it relates to talent development and optimal skill acquisition. He also investigates effective coaching practices in competitive sport and non-linear pedagogies in sport coaching.

Dr. Bettina Callary is the Canada Research Chair in Sport Coaching and Adult Learning and an Associate Professor in the Department of Experiential Studies in Community and Sport at Cape Breton University in Nova Scotia, Canada. She researches coach education and development strategies, coach developers, and psychosocial understandings of inclusive coaching (e.g., coaching masters athletes, women coaches, or Indigenous coaches).

Lindsay McCardle is applying her background in educational psychology to her role as a Senior Manager, User Experience Research at D2L. She leads a team of user experience researchers who conduct qualitative and quantitative research with learners, instructors, and administrators. Research findings are used to inform improvements to D2L's learning management system.

Copyright 2023: Lisa Bain, Bradley W. Young, Bettina Callary, Lindsay McCardle, and Nova Southeastern University.

Article Citation

Bain, L., Young, B. W., Callary, B., & McCardle, L. (2023). The co-regulatory coaching interface model: A case study of a figure skating dyad. *The Qualitative Report*, *28*(4), 1038-1069. https://doi.org/10.46743/2160-3715/2023.5876