Université de Montréal

# Le développement de vignettes théoriques basées sur les expériences des entraîneurs de hockey sur glace pour jeunes en matière de commotions cérébrales liées au sport

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Mémoire présenté en vue de l'obtention du grade Maîtrise ès sciences en sciences de l'activité physique

September 2023



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*Ce mémoire intitulé*

**Le développement de vignettes théoriques basées sur les expériences des entraîneurs de hockey sur glace pour jeunes en matière de commotions cérébrales liées au sport**

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**Résumé**

Une stratégie utilisée auprès des entraîneurs pour rendre le hockey sur glace plus sécuritaire est l'éducation sur les commotions cérébrales liées au sport (CCS). Cependant, l'apport de connaissances aux entraîneurs n'est pas associé à une modification des comportements liés aux CCS. L'objectif de cette étude était d'utiliser la Behaviour Change Wheel (BCW) pour élaborer des vignettes axées sur les aspects clés de cette théorie et basées sur les expériences d'entraîneurs de hockey sur glace avec la CCS. Douze entraîneurs de hockey sur glace ($n$ = 2 femmes, $n$ = 10 hommes) d'équipes AA et AAA du Canada ont parlé de leurs expériences avec les CCS de leurs athlètes dans le cadre d'entrevues semi-structurées ($M$ = 69,25 minutes). Les données ont été analysées en deux phases. Tout d'abord, nous avons effectué une analyse de contenu dirigée en utilisant trois thèmes dérivés du BCW (c.-à-d. capacité, opportunité et motivation). Ensuite, nous avons suivi les suggestions pour « creative non-fiction », menant à la création de deux vignettes. La première vignette dépeint un entraîneur expérimenté dans une situation de commotion complexe, où iel prend la décision de retirer un joueur vedette soupçonné de CCS, contre l'avis des parents d'autres joueurs. À l'inverse, la deuxième vignette met en scène un bénévole qui débute comme entraîneur de hockey sur glace. En se remémorant sa première saison, iel frémit de la façon dont il a géré la CCS d'une athlète et décrit comment iel aurait aimé gérer cette situation. Prises ensemble, ces deux vignettes constituent une nouvelle stratégie de diffusion pour l'enseignement des CCs. Ces résultats suggèrent qu'il est nécessaire de traduire l'information sur les CCS de manière efficace pour faciliter la formation d'entraîneurs de hockey sur glace sur les CCS.

***Mots-clés:*** Commotion cérébrale liée au sport, théorie psychologique, théorie du changement de comportement, la non-fiction créative, hockey sur glace, entraîneurs sportifs

**Abstract**

Sport-related concussion (SRC) education is one strategy that has been used to make ice hockey safer, and coaches have been seen as key members of the sport environment who influence athlete safety. Unfortunately, providing coaches with knowledge has not been associated with changing SRC management behaviors. The objective of this study was to use the Behaviour Change Wheel (BCW) to develop theory-driven vignettes based on ice hockey coaches experiences with SRC. Twelve youth ice hockey coaches ($n$ = 2 females, $n$ = 10 males) of AA and AAA teams across Canada talked about their experiences dealing with their athletes SRCs through semi-structured interviews ($M$ = 69.25 minutes). The data were analyzed as part of a two phase process. First, we conducted a directed content analysis using three themes directly derived from the BCW (i.e., capability, opportunity and motivation). Second, we followed recommendations for creative non-fiction writing, leading to the creation of two vignettes. Coach Jodie's vignette depicts an experienced coach in a complex SRC situation, whereby they made the decision to sit out a star athlete suspected of concussion against the wishes of other players' parents. Coach Ollie's vignette depicts a volunteer who is new to coaching ice hockey. In reflecting back on their first season as a coach, Ollie shudders at the way they managed one athlete's concussion and describes how they wish they would have handled that situation. Taken together, these two vignettes are a new dissemination strategy for SRC education. Results of the present study suggest a need to translate information on SRCs in a more efficient manner through the use of more captivating methods, such as theory based vignettes, to facilitate the education of ice hockey coaches on SRCs.

***Keywords:*** Sport-related concussions, psychological theory, behavior change theory, creative non-fiction, ice hockey, sport coaches

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## Liste des sigles et des abréviations

Dans l'ordre qu'ils apparaissent dans le texte:

CCS : Commotion cérébrale liée au sport

BCW : Behaviour Change Wheel

COM-B model : Capability, Opportunity, Motivation-Behaviour model

SRC : Sport-related concussion

TPB: Theory of planned behavior

GD: Gabriel Delage, 1st author

JC: Dr. Jeffrey G. Caron, 2nd author

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## Dédicace

Ce mémoire est dédié à tous ceux/celles qui ont vécu avec les répercussions des commotions cérébrales. Que ce soit pour les athlètes ou les entraîneurs, j'espère que la présente pourra avoir une influence quelconque sur la façon dont on gère les commotions cérébrales. Je souhaite aussi que ce mémoire nous aidera à mieux comprendre les expériences vécues de gestion de commotion cérébrale des entraîneurs de hockey sur glace et que cela nous mènera à mieux les entourrer. Finalement, ce mémoire est dédié à mes parents, amis, et tous ceux/celles qui m'ont soutenu lors de mon parcours académique.

**Remerciements**

J'aimerais remercier ceux/celles qui m'ont appuyé à travers ce cheminement, autant académique que personnel. Vos mots d'encouragements et votre présence m'ont aider à grandir, non seulement comme chercheur, mais aussi en tant qu'individu. Vos conseils m'ont motivé à toujours en apprendre plus et repousser mes limites. Je tiens à vous et je suis reconnaissant de vous avoir à mes côtés.

Premièrement, à mon supperviseur Dr Jeff Caron, merci de m'avoir donné une chance. Je dois dire, je me suis lancer dans le domaine de la recherche les yeux complètement bandés. Ta patience ainsi que ta passion pour ton domaine d'étude ont su m'inspirer et me motiver lors des deux dernières années. Même si je ne me sentait pas confortable avec le processus de recherche lors de mes débuts dans le laboratoire, nos rencontres hebdomadaires, tes nombreux conseils ainsi que ta capacité à t'adapter à chacun de tes étudiants ont su me donner confiance et ont grandement contribué à ma croissance en tant que chercheur et en tant qu'individu. Je n'aurais j'amais cru aimer le domaine de la recherche, par contre, ton mentorat m'a donné la chance d'embarquer dans une nouvelle aventure, et je ne pourrai jamais assez t'en remercier. Jeff, ce fut un plaisir de pouvoir te côtoyer!

Aux Dr Ross Wadey et Dr Ahmed Jérôme Romain, merci de vos conseils à travers ce projet ainsi que votre support constant, jusqu'à la ligne d'arrivée.

Au Dr Pierre Frémont, je tient à vous remercier d'avoir pris de votre temps pour évaluer ce mémoire. Vos conseils ainsi que votre expertise dans le domaine des commotions cérébrales seront d'un immense aide pour ce projet d'étude.

Au Dr Fabien Dal Maso, merci d'avoir accepter le rôle de président rapporteur pour l'évaluation de ce mémoire. Votre contribution au projet est grandement appréciée.

À mes compagnions de laboratoire, Max, Béa, Lo, MTL Gab, Erin, Cam, merci pour tout. Clairement, vos conseils et votre éthique de travail m'ont grandement aider à paufiner mes habiletés scolaires. Toutefois, il est important pour moi de mentionner que vous m'avez offert beaucoup plus que cela. Votre joie de vivre a fait en sorte que chaque intéraction et chaque rencontre était hyper plaisante. Je me souviendrai toujours des nombreuses sorties et des fou-rires que l'Alpine lab m'ont offert. J'espère fortement vous garder dans ma vie.

À mes meilleurs amis, Pat et John, merci d'avoir resté à mes côté lors des moments plus difficile. On niaise souvent ensemble, mais votre amitié est, et sera toujours, immesurable pour moi. Je me compte chanceux de vous avoir à mes côtés.

Finalement, à ma famille : maman, papa, Simon, merci. Je vous dit simplement merci puisqu'aucun mot serait suffisant pour vous faire parvenir ma grattitude. Votre support et votre confiance en moi m'ont propulsé tout le long de ma vie. Même si je ne le dit sûrement pas assez, je vous aime et je suis reconnaissant d'avoir une famille comme vous derrière moi. Ce mémoire n'aurais pas été possible sans vous.

## Avant-propos

Ce mémoire comprend trois chapitres. Le premier chapitre contient une revue sur les commotions cérébrales liées aux sports avec une emphase sur les entraîneurs de sport pour les jeunes. Ce chapitre contient d'autant plus une revue des modalités d'éducation sur les commotions cérébrales existante et une revue de l'utilisation de théorie psychologique dans ces modalités d'éducation. Le chapitre deux est un manuscrit et il aborde l'objectif, les méthodes, les résultats, la discussion, les limites et les orientations futures de cette étude de recherche. Finalement, le chapitre trois offre un sommaire ainsi que l'importance de cette étude dans le domaine des commotions cérébrales liées aux sports.

## Chapitre 1

## Introduction et revue de la littérature

Le chapitre un comprend quatre sections principales. La première section décrit les commotions cérébrales liées au sport (CCS), y compris la prévalence de cette blessure chez les jeunes athlètes. Dans la section suivante, nous discuterons de la littérature sur les CCS dans les sports de contact et de collision, en mettant l'accent sur le hockey sur glace. La troisième section présente les entraîneurs sportifs et leur rôle face aux CCS, ainsi qu'un aperçu des initiatives existantes en matière d'éducation sur les CCS. De plus, cette section mettra de l'avant les lacunes qui sont attribuées dans la littérature aux initiatives d'éducation sur les CCS. La quatrième dernière partie aborde les théories psychologiques. Plus précisément, nous discuterons de la façon dont les théories psychologiques ont été utilisées dans la littérature sur les CCS.

L'activité physique, y compris la participation à des sports, a été associée à de nombreux avantages tels que l'amélioration de la santé physique et mentale ainsi que du bien-être général (Nystoriak & Bhatnagar, 2018; Ruegsegger & Booth, 2018). Selon l'Institut canadien de la recherche sur la condition physique et le mode de vie, 74 % des jeunes Canadiens [1] (c'est-à-dire âgés de 18 ans et moins) pratiquent un sport (Canadian Fitness and Lifestyle Research Institute, s. d.). Bien que la pratique du sport chez les jeunes ait été associée à de nombreux résultats positifs (p.ex., l'expérience du plaisir, le développement physique et le développement social; Merkel, 2013; Pringle et al., 2017), la pratique du sport comporte également plusieurs risques. Un de ces risques est celui des blessures (G. R. Anderson et al., 2019; Emery & Pasanen, 2019; Plancher & Minnich, 1996). En effet, les chercheurs ont déterminé que la plupart des blessures

[1] Dans ce mémoire, l'expression "jeune" est utilisé pour décrire les personnes âgées de moins de 18 ans.

subies par les jeunes se produisent dans le contexte du sport (Bijur et al., 1995). Les commotions cérébrales constituent l'un des types de blessures liées au sport qui ont récemment fait l'objet d'une attention accrue.

**Commotions cérébrales liées au sport**

Une commotion cérébrale liée au sport est une lésion cérébrale traumatique provoquée par un coup direct ou indirect à la tête (Silverberg, Iverson, et al., 2021). Les signes courants de la CCS sont l'incoordination motrice et la désorientation, tandis que les symptômes les plus fréquents de la CCS sont les maux de tête, les étourdissements, la fatigue et les difficultés de concentration (Eagle et al., 2020). Les chercheurs ont constaté qu'un certain nombre de facteurs tels que l'âge, le sexe et les antécédents de la blessure, peuvent avoir une influence sur les trajectoires de récupération des personnes atteintes de CCS (Ellis et al., 2018; Koerte et al., 2020; Ledoux et al., 2019; Neidecker et al., 2017; Putukian et al., 2023; Tamura et al., 2020; Zemek et al., 2016b). La résolution clinique des symptômes de la CCS se produit généralement dans un délai de quatres semaines suivant la blessure (Patricios et al., 2023) chez les adultes et les jeunes (Kostyun & Hafeez, 2015; Morgan et al., 2015; Putukian et al., 2023; Zemek et al., 2016a). Cependant, les données suggèrent que 20 à 40 % des jeunes présentent des symptômes persistants de commotion cérébrale jusqu'à trois mois après la blessure (Barlow et al., 2010; Kerr et al., 2016; Patricios et al., 2023).

On estime qu'entre 1,1 million et 1,9 million de CCS surviennent chaque année chez les jeunes (Bryan et al., 2016). Ces statistiques sont particulièrement préoccupantes chez cette population en raison des changements physiques et cognitifs qui se produisent dans le cerveau en développement (Purcell, 2019). Des examens neuropsychologiques ont montré que les individus de moins de 18 ans vivent à travers des développements cognitifs rapides (Klausmeier & Allen,

2014), ce qui peut entraîner des déficits neurologiques plus importants pour les jeunes qui ont subi une CCS (Carman et al., 2015). Des chercheurs ont constaté que le dysfonctionnement de la mémoire semble être plus gravement affecté par la CCS chez les jeunes athlètes que chez les athlètes universitaires (Fazio et al., 2007; Field et al., 2003; McClincy et al., 2006; Sim et al., 2008; R. M. Williams et al., 2015). Williams et ses collègues (2015) ont réalisé une méta-analyse comprenant six études comparant des évaluations cognitives avant et après la saison d'athlètes du secondaire et universitaire (temps de réaction, traitement de l'information, mémoire, etc.) Les résultats de l'étude de Williams et de ses collègues montrent que les athlètes du secondaire déclaraient avoir récupéré de leurs symptômes de CCS au bout de 15 jours, soit plus du double du temps (6 jours) rapporté par les athlètes du universitaire. Les auteurs expliquent que cette différence peut être due à plusieurs facteurs, autant intrinsèque à l'athlète (physiopathologique) qu'extrinsèque à l'athlète (gestion des CC aux différents niveaux de sport, sous déclaration de symptômes des athlètes plus élevés, etc.) Dans l'ensemble, les données suggèrent que les CCS représentent un risque important (et peut-être plus important) pour les jeunes par rapport aux populations d'athlètes plus âgés.

À la suite d'une CCS, les jeunes ont également un risque accru d'effets psychologiques, tels que des troubles mentaux, des difficultés d'apprentissage, des troubles de la parole et du langage, des problèmes de sommeil et des difficultés de traitement de l'information à long terme (V. Anderson et al., 2012; Barlow et al., 2010; Fulton et al., 2012; Guskiewicz et al., 2007; Ilie et al., 2014; Taylor et al., 2010). Mrazik et ses collègues (2016) ont observés des étudiants-athlètes (âgés de 12 à 17 ans) ayant des antécédents de CCS et ont constaté qu'ils éprouvaient des difficultés psychologiques plus importantes (isolement, anxiété, symptômes de dépression, etc.) et que leur rétablissement était plus long que celui des athlètes n'ayant subi qu'une seule CCS.

Les chercheurs ont également constaté que les CCS peuvent avoir un impact social sur les jeunes athlètes (Purcell, 2019). Plus précisément, les jeunes atteints de CCS peuvent connaître une diminution des interactions sociales, un sentiment d'isolement et un soutien inadéquat (Karlin, 2011; Paniccia & Reed, 2017; Valovich McLeod et al., 2017). Par exemple, les jeunes athlètes peuvent éprouver un sentiment de perte en raison d'un manque d'implication avec leurs pairs et de l'absence d'un programme structuré pendant la période de rétablissement de la CCS (MacPherson et al., 2016; Turner et al., 2017), ce qui crée une source d'inquiétude car un manque d'interaction sociale dans cette population peut compliquer la récupération et avoir un effet sur le développement personnel (MacPherson et al., 2016; Sandel et al., 2017). En résumé, les jeunes sportifs atteints de CCS peuvent subir des conséquences neurocognitives, psychologiques et sociales néfastes.

**Sports de contact et de collision**

Des chercheurs ont constaté que la participation à des sports de contact et de collision comporte un risque élevé de CCS (Harmon et al., 2013). Dans les sports de contact (basket-ball, soccer), les athlètes entrent continuellement en contact les uns avec les autres ou avec des objets sur le terrain de jeu. En revanche, les sports de collision (p. ex., football américain, hockey sur glace et rugby) impliquent des situations où les athlètes entrent délibérément en collision avec d'autres joueurs à des vitesses élevées (Rice, 1988). Les données suggèrent que les athlètes pratiquant des sports de collision présentent des risques plus élevés de CCS (Van Pelt et al., 2021). Dans leur revue systématique et leur méta-analyse, Van Pelt et ses collègues (2021) ont élaboré une classification des risques de CCS fondée sur des données et basée sur le type de sport pratiqué. Les auteurs ont constaté que les sports présentant les taux d'incidence les plus élevés de CCS étaient tous des sports de collision, notamment le hockey sur glace, le rugby et le

football américain (Van Pelt et al., 2021). Un ensemble de preuves a démontré que le hockey sur glace possède l'un des taux d'incidence de CCS  les plus élevés parmi tous les sports de collision (A. M. Black, Sergio, et al., 2017; Harmon et al., 2013; Koh et al., 2003; Pfister et al., 2016; Zuckerman et al., 2015). Plus précisément, Van Pelt et ses collègues (2021) ont constaté que le hockey sur glace avait un taux d'incidence de 7,87 CCS pour 10 000 expositions d'athlètes, soit plus du double de celui des sports de contact comme le soccer (3,71) et le basket-ball (2,92).

***Hockey sur glace***

Le hockey sur glace est l'un des sports les plus populaires au Canada, avec plus de 600 000 participants inscrits chaque année (*Hockey Canada 2020*, s. d.). Le hockey sur glace est un sport à grande vitesse, où les collisions avec les adversaires et la surface de jeu (p. ex., les bandes de la patinoire, la surface de la glace) sont fréquentes. En outre, à certains niveaux de compétition, les collisions (c'est-à-dire les mises en échec) et les altercations sur la glace (c'est-à-dire les combats) sont autorisées et, à l'occasion, encouragées (N. Smith et al., 2017). Des chercheurs notent que le style de jeu et le niveau élevé de contact sont des facteurs qui exposent les athlètes du hockey sur glace à un risque plus élevé de CCS (Harmon et al., 2013).

Des facteurs socioculturels peuvent également accroître le risque de CCS chez les athlètes de hockey sur glace, car il existe une culture bien ancrée dans ce sport qui prône l'agressivité et la robustesse (Alsarve, 2021; Silverwood, 2015). Silverwood (2015) note que la violence organisée existe au hockey sur glace et qu'il règne un code de conduite non écrit mis en œuvre par les participants (p. ex. le recours à des comportements agressifs ou à la bagarre pour faire preuve de robustesse ou protéger ses coéquipiers). De plus, il existe une culture au sein du hockey sur glace qui encourage à jouer malgré la douleur - une caractéristique qui est louée et renforcée dès le plus jeune âge. Alsarve (2021) a constaté que le fait de minimiser les blessures

et de sacrifier son corps pour le bien de l'équipe (par exemple, bloquer des tirs pour empêcher des occasions de marquer) est souvent encouragé, en particulier aux niveaux de compétition les plus élevés. Ainsi, les facteurs socioculturels au sein du hockey sur glace exposent les athlètes à des risques de blessures, notamment de CCS, ainsi qu'à une mauvaise gestion de celles-ci. Par conséquent, compte tenu de la nature collisionnelle de ce sport et des influences socioculturelles qui encouragent la violence et la dureté, il semble nécessaire d'examiner les protocoles mis en place pour assurer la sécurité des joueurs de hockey sur glace.

**Stratégies d'éducation sur les commotions cérébrales**

Étant donné que les CCS peuvent avoir un impact négatif sur la santé des jeunes athlètes, les chercheurs souligne l'importance de l'éducation et de la prévention. Ces chercheurs ont conceptualisé trois niveaux de prévention : (a) primaire : prévention de la CCS grâce à des changements de règles, à l'entraînement et à un équipement approprié (b) secondaire : réduction de l'impact de la blessure grâce à une identification précoce (par exemple, éducation, législation, etc.) et (c) tertiaire : rétablissement et prévention d'une deuxième occurrence (par exemple, protocoles de retour au jeu, rééducation oculaire, etc.) (Emery & Pasanen, 2019). Bien que la prévention primaire reste la stratégie à prioriser, comme en témoigne l'efficacité des changements de règles pour prévenir les CCS dans le hockey sur glace canadien (A. M. Black et al., 2016; A. M. Black, Hagel, et al., 2017; Houghton et al., 2012; Patricios et al., 2023) des chercheurs ont également défendu l'importance de la prévention secondaire, telle que l'éducation des CCS, pour rendre le sport plus sécuritaire et contribuer aux efforts de prévention (Kroshus & Chrisman, 2019; Patricios et al., 2023) puisque l'utilisation des trois types de prévention de manière complémentaire augmente l'efficacité de la prévention des CCS (A. Black, Eliason, et al., 2017).

L'éducation en matière de CCS est principalement diffusée sous trois formes différentes. D'une part, il existe le matériel éducatif imprimé tel des brochures, des affiches et des documents à distribuer (L'institut national d'excellence en santé et en services sociaux [Dépliant], 2018). D'autre part, l'éducation peut être diffusé à travers les plateformes en ligne tel les sites web et les sites de réseaux sociaux (Fremont et al., 2020). Finalement, l'éducation en matière de CCS a aussi été distribuée à l'aide d'interventions éducatives. Il a été montré que les documents imprimés sont rentables et facilement transmissibles à une grande variété de membres de la communauté sportive (Sarmiento et al., 2014). Cependant, l'impact des documents imprimés sur les connaissances, les attitudes et les comportements reste incertain (Caron, 2019). Les plateformes basées sur le Web, telles que les sites Web et les sites de réseaux sociaux (p.ex., Facebook, Instagram et Youtube), offrent aux chercheurs la possibilité d'interagir avec les membres de la communauté sportive. Certaines platedformes basées sur le Web qui sont régis par le gouvernement ou des intitutions Universitaires présentent du contenu riche en information et interactif, ayant montré l'amélioration de connaissances de leurs utilisateurs (S. Adams et al., 2021). Malheureusement, lors de l'évaluation des plateformes Web qui distribuent l'éducation sur les CCS, des chercheurs ont constaté des divergences dans les informations présentées par rapport aux lignes directrices des experts (Ahmed et al., 2012; D. Williams et al., 2014).

Les interventions éducatives sont une autre forme d'éducation sur les CCS. Elles peuvent être conceptualisées comme des stratégies qui vont au-delà du matériel passif et visent à enseigner davantage aux individus sur les CCS (Caron, Bloom, Falcão, et al., 2015). Parmi les exemples d'interventions éducatives, on peut citer le programme " Heads Up " du Center for Disease Control and Prevention, le programme Sports Legacy Institute Community Educators (Bagley et al., 2012), le programme Parachute™ Concussion Awareness for Players (Macartney

et al., 2019), la formation en ligne ouvert à tous sur les commotions cérébrales (S. Adams et al., 2021; Fremont et al., 2020; *MOOC - Formation en ligne ouverte à tous*, 2019), et l'outil de formation sur la sensibilisation aux commotions cérébrales (*CATT Online – Concussion Awareness Training Tool*, s. d.). En 2015, Caron et ses collègues ont réalisé une étude exploratoire incluant neuf interventions éducatives sur les CCS. Ces interventions comprenaient des présentations orales interactives (par exemple, Sports Legacy Institute Community Educators ;(Bagley et al., 2012), des vidéos éducatives (par exemple, Smart Hockey : More Safety, More Fun ; (Cusimano et al., 2014) et des programmes d'apprentissage informatisés (par exemple, Athletic Concussion Training using Interactive Video Education ; (Glang et al., 2010).

Dans l'ensemble, les neuf interventions éducatives sur les CCS comprises dans l'étude de Caron et al. (2015) ont été administrées à un seul moment. L'enseignement diffusé dans le cadre de ces interventions était axé sur les connaissances relatives à la blessure, telles que les stratégies de gestion, la reconnaissance de la blessure (par exemple, les signes et les symptômes), les séquelles à long terme et le protocole de retour au jeu. Parmi les résultats, les participants ont montré des amélioration au niveau de leurs connaissances à court terme après avoir suivi un programme éducatif sur les CCS. Les résultats concernant les avantages à long terme des programmes, tels que les changements dans les connaissances et les comportements des CCS, étaient ambigus. Caron (2019) a mis à jour la revue quatre ans plus tard et a trouvé trois études supplémentaires portant sur les mêmes types d'interventions. Les interventions portaient sur le même contenu et, une fois de plus, elles ont fait état de répercussions limitées sur les attitudes et les comportements liés aux CCS (Caron, 2019).

Par conséquent, malgré les preuves suggérant que l'éducation à la CCS a eu des effets positifs sur les connaissances en matière de CCS (R. S. Feiss et al., 2020), des chercheurs ont

également remis en question sa capacité à avoir un impact sur les comportements des contributeurs (c.-à-d. les athlètes et les entraîneurs) en ce qui concerne les CCS (Caron, 2019). Kroshus et Chrisman (2019) ont identifié quatre lacunes dans les approches existantes en matière d'éducation sur les CCS : (1) Elles supposent qu'un athlète blessé peut prendre des décisions délibérées ; (2) les interventions visent des individus plutôt que des systèmes sociaux ; (3) l'éducation a lieu une fois pendant la présaison et est oubliée ; (4) les défis liés à la diffusion exacerbent les inégalités en matière de santé. Les prochaines sections se concentreront sur la description du rôle des entraîneurs sportifs et de la théorie psychologique en tant que stratégies possibles pour combler les deux premières lacunes identifiées par Kroshus et Chrisman (2019).

## Entraîneurs sportifs

Les entraîneurs sportifs sont des acteurs importants au sein de la communauté sportive, car ils fournissent un soutien primordial, essentiel à l'existence des programmes sportifs pour les jeunes (Wiersma & Sherman, 2013). Les personnes qui assument une telle responsabilité mettent à contribution leurs propres ressources (temps, argent, etc.) pour assurer le succès des athlètes, des équipes et du système sportif dans son ensemble. Le sport organisé pour les jeunes est presque entièrement géré par des bénévoles (Griffiths & Armour, 2014). Le rôle d'un entraîneur sportif pour les jeunes va au-delà de la simple conception de tactiques pour gagner un match, car ses attitudes et ses comportements peuvent avoir un impact significatif sur le plaisir d'un athlète (Diffley et al., 2021), la motivation (Smith et al., 2017), l'image de soi (Kim & Park, 2020), la socialisation (Cranmer, 2018) et, directement ou indirectement, la santé et la sécurité des athlètes (Caron, Bloom, & Bennie, 2015).

### *Rôles des entraîneurs auprès des CCS*

Caron et al. (2015) ont utilisé une méthodologie qualitative, l'étude de cas, pour recueillir les points de vue et les perceptions de huit entraîneurs d'écoles secondaires canadiennes à propos des CCS. Des huit entraîneurs, trois évoluait dans des sports de collisions et cinq dans des sports de contacts. Les entraîneurs ont notamment mis l'accent sur leur rôle auprès des athlètes ayant subi une commotion cérébrale et sur la façon dont ils ont acquis leurs connaissances sur la blessure. L'importance d'enseigner aux athlètes des techniques de mise en échec pour assurer leur sécurité, ou de communiquer continuellement avec eux pour développer une relation de confiance, sont quelques-uns des rôles que les entraîneurs ont jugé importants en ce qui concerne les CCS. Il est intéressant de noter que, bien que les entraîneurs aient déclaré avoir un rôle important à jouer dans la sécurité des athlètes, sept des huit (87,5%) entraîneurs interrogés dans le cadre de l'étude avaient acquis leurs connaissances sur les CCS de manière informelle (c'est-à-dire par le biais de leur expérience passée en tant qu'athlètes, entraîneurs ou parents).

Kroshus et Chrisman (2019) ont identifié plusieurs limites dans la littérature sur l'éducation à la CCS. La première d'entre elles est que les chercheurs ont principalement ciblé les athlètes par opposition aux membres de leur système social dans l'éducation à la CCS. Parmi les multiples membres possibles du système social d'un athlète, les entraîneurs sont des membres clés car ils jouent un rôle important dans le développement et le bien-être de leurs athlètes (Jones, 2011). Ainsi, sensibiliser les entraîneurs aux CCS pourrait être un moyen de combler une lacune dans l'enseignement de la CCS (Kroshus & Chrisman, 2019). Premièrement, les entraîneurs pourraient être impliqués dans une tentative de cibler les membres du système social d'un athlète. Deuxièmement, les entraîneurs pourraient servir à réduire le fardeau de la divulgation de la CCS qui repose sur les épaules des athlètes pendant les matchs et les situations

émotionnellement chargées. Ce processus pourrait être facilité par le fait que les entraîneurs prennent les décisions pour les athlètes potentiellement commotionnés.

Les avantages de l'intégration des entraîneurs dans le processus d'éducation aux CCS ne s'arrêtent pas à ces deux points. Dans le sport pour les jeunes, le rôle des entraîneurs dans l'identification des CCS (c'est-à-dire l'identification directe et le retrait du jeu des athlètes présentant des CCS potentiels en vue d'une évaluation médicale plus approfondie) est de la plus haute importance, car il n'y a souvent pas de personnel médical présent lors des matchs et des entraînements. Auparavant, les athlètes ont manifesté leur intérêt pour que leurs entraîneurs participent au processus d'apprentissage des CCS (Kroshus & Baugh, 2016). Enfin, les entraîneurs ont également été considérés comme jouant un rôle important dans l'instauration d'une culture sécuritaire au sein d'une équipe. En fait, les entraîneurs qui en connaissent davantage sur les CCS et qui ont des attitudes plus fortes en faveur de la sécurité des CCS ont plus de chances de communiquer leur soutien à leurs athlètes (Baugh et al., 2014).

Bien qu'il existe des exemples d'initiatives d'éducation sur les CCS pour les entraîneurs dans la littérature (Daugherty et al., 2019 ; Kerr et al., 2018 ; Parker et al., 2015 ; Rivara et al., 2014), l’emphase de ces initiatives a été mis sur la diffusion de connaissances sur les CCS aux entraîneurs (Feiss et al., 2020). Malheureusement, il a été démontré que le simple fait de fournir aux entraîneurs des informations sur les CCS ne leur permet pas toujours de gérer efficacement les scénarios de CCS (Black et al., 2020). Dans leur étude, Black et al. (2020) ont interrogé 786 parents et entraîneurs (n = 649 avaient reçu une formation sur les CCS) au début de la saison sportive à l'aide du Concussion Knowledge, Beliefs and Behavior Questionnaire (questionnaire sur les connaissances, les croyances et le comportement en matière de CCS). Après avoir analysé les données dérivées du questionnaire, les auteurs ont constaté que bien que le fait de transmettre

aux entraîneurs de l'informations sur les CCS ait eu des effets positifs sur les connaissances des entraîneurs à l'égard des CCS, cela n'a pas été associé à un changement de leurs croyances ou de leurs comportements à l'égard de la gestion des CCS.

**Théories psychologiques**

Kroshus et Chrisman (2019) ont identifié une deuxième limite dans la littérature sur l'éducation à la CRS : l'hypothèse selon laquelle les athlètes blessés sont capables de prendre des décisions délibératives une fois qu'ils ont reçu de l'information sur les CCS. En effet, la plupart des initiatives d'éducation sur les CCS supposent qu'une fois qu'une personne est dotée de connaissances suffisantes, elle adoptera les comportements appropriés (dans le cas des entraîneurs, cela voudrait dire qu'elle retirera du jeu les athlètes soupçonnés d'être atteints de CRS). Des chercheurs ont déjà suggéré utiliser la théorie psychologique dans les interventions d'éducation sur les CCS pour aider à combler l'écart qui existe entre les connaissances et les comportements (Caron, 2019 ; Kroshus & Chrisman, 2019).

Les théories psychologiques tentent d'expliquer le pourquoi, le quand et le comment d'un phénomène particulier (Davis et al., 2015). En ce qui concerne les CCS, les théories psychologiques pourraient aider les chercheurs à comprendre les comportements liés aux CCS (par exemple, pourquoi un entraîneur peut choisir de retirer un athlète ayant une CCS), ce qui pourrait s'avérer particulièrement utile pour concevoir une éducation efficace aux CCS.

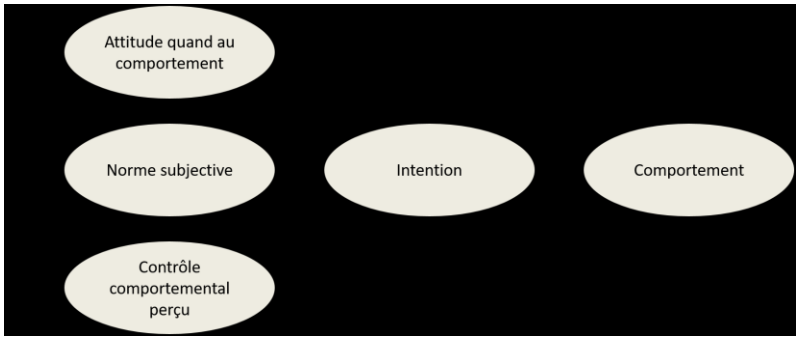
Michalovic et al. (2019) ont noté qu'un certain nombre de théories psychologiques ont été utilisées dans la littérature sur les CCS, notamment la théorie du comportement planifié (Schmidt et al., 2020; Sullivan et al., 2018), la théorie de la trace floue (Fuzzy Trace Theory ; Garavito et al., 2021) et la théorie cognitive sociale (Hunt et al., 2017; Kroshus, Garnett, Hawrilenko, et al., 2015). La plus courante de ces théories est sans aucun doute la théorie du comportement planifié

du professeur Icek Ajzen (1991) vu à la figure 1. Ajzen postule que les attitudes, les normes subjectives et le contrôle comportemental perçu déterminent les intentions d'un individu, ou sa volonté d'adopter un comportement (Ajzen, 1991). Selon la théorie d'Ajzen, l'intention d'un individu de prendre part à un certain comportement est considérée comme le meilleur prédicteur de ce comportement.

Schmidt et ses collègues (2020) ont cherché à utiliser la théorie du comportement planifié pour développer du matériel éducatif sur les CCS afin d'encourager les étudiants-athlètes à rapporter leurs CCS. Les auteurs ont procédé à une analyse de la littérature ainsi qu'à des sondages préalables à l'intervention portant sur les intentions et les comportements en matière de signalement des commotions/symptômes chez 520 étudiants-athlètes de niveau collégial.

**Figure 1**

*Théorie du comportement planifié*




« Théorie du comportement planifié » par Yves Roy, sous licence Creative Commons – Partage dans les Mêmes Conditions 4.0 International (CC BY-SA 4.0), via Wikimedia Commons.

Ensuite, ils ont créé une intervention basée sur la théorie du comportement planifié. Étant donné que les auteurs ont constaté que l'auto-efficacité était le prédicteur le plus fort et le plus cohérent des intentions et des comportements de déclaration de CCS, leur intervention a ciblé la confiance des athlètes étudiants dans leur capacité à déclarer une commotion cérébrale (c.-à-d.

leur auto-efficacité). L'intervention se présentait sous la forme d'une vidéo interactive dans laquelle les participants visionnaient un scénario de CCS et devaient décider s'ils allaient ou non rapporter la blessure. Une fois le programme créé, les chercheurs ont testé l'efficacité grâce à un essai contrôlé randomisé. Dans l'ensemble, l'intervention théorique a permis d'améliorer les intentions de déclaration de la CCS, mais n'a eu que peu d'effet sur les comportements réels.

La théorie du comportement planifié est l'approche théorique dominante depuis des décennies dans divers contextes de santé (Michalovic et al., 2019; F. F. Sniehotta et al., 2014). Cependant, certains ont également critiqué la théorie, y compris en demandant son "retrait" (F. F. Sniehotta et al., 2014). Sniehotta et al. (2014) notent que la théorie des comportements planifiés est excessivement simple lorsqu'il s'agit d'expliquer le comportement, car elle se concentre exclusivement sur le raisonnement rationnel et exclut l'influence des pensées inconscientes. En outre, les auteurs soulignent la validité prédictive limitée de la théorie, mise en évidence par le fait que les tests expérimentaux n'ont pas soutenu la théorie du comportement planifié (Chatzisarantis & Hagger, 2005; F. Sniehotta, 2009), Pour faire avancer le domaine de la recherche en changement de comportements, Sniehotta et ses collègues (2014) suggèrent que les chercheurs commencent à intégrer de nouvelles théories qui englobent un plus large éventail d'approches théoriques dans leurs recherches.

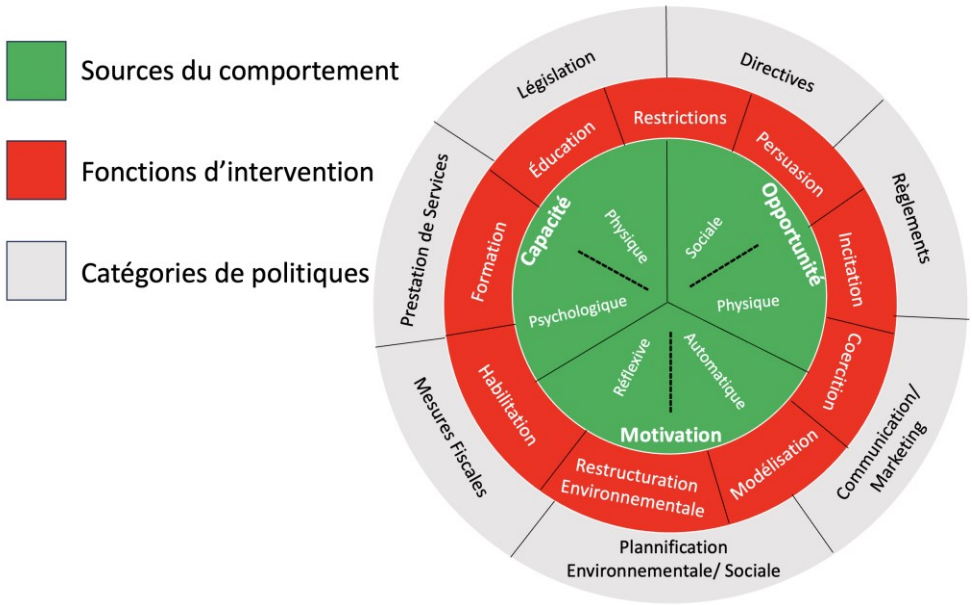
***Behaviour Change Wheel***

La « Behaviour Change Wheel » (Michie et al., 2011) est une fusion de 19 cadres de changement de comportement existants (MINDSPACE, PSI framework, PETeR, etc.), et vise à fournir aux chercheurs un cadre complet pour réaliser des interventions fondées sur la théorie (voir en Figure 2). Le BCW est composé de trois anneaux. L'anneau le plus central est le modèle de la capacité, de l'opportunité, de la motivation et du comportement (COM-B). Ce modèle

reconnaît que les comportements sont influencés par une variété d'obstacles et de facilitateurs, ce qui en fait un élément essentiel des interventions car il garantit que les comportements acquis sont durables. Le deuxième anneau présente neuf fonctions d'intervention (par exemple, la formation, l'éducation, etc.) qui peuvent être utilisées pour générer un changement de comportement. Plus précisément, chaque fonction d'intervention a la capacité d'affecter un ou plusieurs des facteurs sous-jacents (capacité, opportunité, motivation) du comportement ciblé. Le troisième anneau, le plus externe, est composé de sept catégories de politiques publiques (par exemple, lignes directrices, législation) (Michie et al., 2011). Chaque catégorie de politique de ce troisième anneau a la capacité de soutenir une ou plusieurs des fonctions d'intervention et vise à développer des interventions de changement de comportement à grande échelle.

**Figure 2**

*Behaviour Change Wheel (version française)*




Adapté et traduit de : Michie, S., van Stralen, M.M. & West, R. The behaviour change wheel: A new method for characterising and designing behaviour change interventions. *Implementation Sci* **6**, 42 (2011). https://doi.org/10.1186/1748-5908-6-42

Le modèle COM-B, l'anneau le plus central du BCW, peut être considéré comme un modèle dynamique qui explique comment différents facteurs interagissent pour influer sur les comportements (Michie et al., 2011). Le modèle postule que la capacité, l'opportunité et la motivation sont trois facteurs clés qui influencent le fait qu'un individu adopte ou non un certain comportement (Michie et al., 2014). Le modèle COM-B suggère qu'un comportement souhaité ne se produira pas si l'une de ces trois sections n'exerce pas une influence positive. Voir l'annexe D pour les définitions de la capacité, de l'opportunité et de la motivation.

Le modèle COM-B a déjà été utilisé pour étudier divers comportements liés à la santé, tels que le tabagisme (Kumar et al., 2021;  Smith et al., 2019), les comportements sexuels (Cassidy et al., 2018) et même les comportements liés à la santé physique (Carney et al., 2016). Smith et al. (2019) ont étudié les comportements des professionnels de la santé mentale lorsqu'ils abordent la question d'une politique anti-tabac. Cinq groupes de discussion ont été organisés avec 36 professionnels de la santé mentale, des guides semi-structurés ont été utilisés pour diriger la discussion, et les réponses ont été codées à l'aide d'une analyse thématique avec des composants du modèle COM-B comme thèmes. De multiples obstacles à la lutte contre le tabagisme ont été identifiés à travers toutes les composantes du modèle COM-B, ce qui a permis aux chercheurs d'identifier les facteurs comportementaux qui affectent la pratique des professionnels de la santé mentale.

Cassidy et ses collègues (2018) ont cherché à comprendre les points de vue des étudiants de premier cycle à l'université concernant les obstacles et les facilitateurs à l'utilisation des services de santé sexuelle. Les données ont été collectées à l'aide de groupes de discussion semi-structurés avec 56 étudiants universitaires ainsi que des entretiens avec sept prestataires de soins de santé considérés comme des informateurs clés. Les données ont été analysées à l'aide d'une

analyse de contenu dirigée avec les composantes du modèle COM-B comme thèmes, suivie d'une analyse thématique inductive. Dans l'étude, les chercheurs ont affirmé que le modèle COM-B permettait une analyse théorique complète des composantes comportementales des étudiants universitaires et de la manière dont ces composantes influençaient leurs comportements en matière de santé sexuelle, ce qui atteste de l'utilité du modèle COM-B (Cassidy et al., 2018).

Le modèle COM-B n'a pas encore été utilisé dans la recherche sur les CCS (Michalovic et al., 2019). Pourtant, il pourrait être utile pour identifier et modifier les comportements liés aux CCS vu son efficacité dans d’autres domaines. Ainsi, l'objectif de la présente étude était d'utiliser le modèle COM-B pour développer du matériel éducatif sur les CCS axé sur la théorie pour les entraîneurs de hockey sur glace. Plus précisément, nous avons utilisé le modèle COM-B pour développer des vignettes d'entraîneurs de hockey sur glace surmontant des obstacles pour prendre part à des comportements sécuritaires liés aux CCS.

**Chapitre 2**

**Présentation du manuscrit**

# The development of theory-driven vignettes based on youth ice hockey coaches' experiences with sport-related concussions

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September 2023

**Abstract**

Ice hockey coaches can have an important role in influencing athlete safety. However, there is evidence suggesting that providing coaches solely with knowledge of sport-related concussion (SRC) has a limited impact on changing their attitudes of or behaviours toward the injury. As such, researchers have suggested that psychological theories could be incorporated into SRC education to improve—and perhaps even change—attitudes and behaviours. We used the Behaviour Change Wheel (BCW) to develop theory-driven vignettes based on ice hockey coaches experiences with SRC. Twelve Canadian youth ice hockey coaches ($n$ = 2 females, $n$ = 10 males) of AA and AAA teams talked about their experiences dealing with their athletes' SRCs through semi-structured interviews ($M$ = 69.25 minutes). Data analysis occurred in two phases. First, we conducted a directed content analysis using the BCW (i.e., capability, opportunity and motivation) to identify participant's quotes related to their experiences with SRC that aligned with the BCW, to help us create compelling vignettes. Second, we followed recommendations for creative non-fiction analysis to develop two vignettes. Coach Jodie's vignette depicts an experienced coach in a complex SRC situation, where they decide to sit out a star athlete suspected of concussion against the wishes of the other players' parents. Coach Ollie reflects on their first season as a volunteer ice hockey coach, where they mismanaged an athlete's concussion. This study proposes theory-driven vignettes as another method to disseminate SRC education, which could ideally serve as a strategy that could complement large-scale existing educational initiatives.

*Keywords:* Sport-related concussions, psychological theory, behavior change theory, creative non-fiction, ice hockey, sport coaches

## The development of theory-driven vignettes based on youth ice hockey coaches' experiences with sport-related concussions

A sport-related concussion (SRC) is defined as a mild traumatic brain injury caused by the transfer of by biomechanical forces to the brain, ultimately altering the brain's physiology. (Silverberg, Iverson, et al., 2021). There are many ways SRC can occur, including being hit to the head by an object, hitting a hard object or surface with the head, experiencing acceleration or deceleration without direct contact between the head and an object or surface, and being subjected to force generated by an explosion or blast. As a result of these forces being transmitted, cellular and vascular changes occur within the brain (Silverberg, Lange, et al., 2021). Each year, an estimated 1.6 to 3.8 million SRCs occur in the United States (Langlois et al., 2006). SRCs can be characterized by signs such as motor incoordination and disorientation, whereas symptoms include headaches, dizziness, fatigue and difficulty concentrating (Eagle et al., 2020). In most cases, symptoms of SRCs resolve within four weeks among adults and youth (Patricios et al., 2023).

SRCs are common in the pediatric population (Purcell, 2019), with approximately 70% of SRCs occurring in youth participants (Browne & Lam, 2006; Harris et al., 2012; Meehan & Mannix, 2010). Given that youth athletes are in the process of experiencing rapid cognitive developments (Klausmeier & Allen, 2014), they are at risk for significant neurological deficits when suffering from SRC (Carman et al., 2015). There is a body of research suggesting that youth athletes are particularly susceptible to psychological (i.e., psychiatric illness, learning difficulties, speech/language disorders, sleep difficulties, long-term processing difficulties) and social effects (i.e., decrease in social interactions, feelings of social isolation, shortfall in social support) of SRC (V. Anderson et al., 2012; Barlow et al., 2010; Fulton et al., 2012; Guskiewicz

et al., 2007; Ilie et al., 2014; Karlin, 2011; Paniccia & Reed, 2017; Taylor et al., 2010; Valovich McLeod et al., 2017).

Evidence suggests that participation in contact or collision sports is associated with a higher risk of SRC (O'Connor et al., 2017; Van Pelt et al., 2021; Zuckerman et al., 2015). Ice hockey is one such sport that is particularly popular in Canada. Ice hockey is a fast-paced sport, with players reaching top speeds of 40 kilometers per hour, and there is frequent contact and collisions between opponents and with the playing surface (A. M. Smith et al., 2017). A meta-analysis determined that the rate of SRCs among youth ice hockey players is of 1.2 SRCs per 1000 athlete exposures (Pfister et al., 2016), placing ice hockey in the top three sports with the highest rates of SRCs. Considering that more than 600,000 Canadians participate in ice hockey each year (i.e., (*Hockey Canada 2020*, s. d.), and the high risk of SRC in contact and collision sports, it is important to evaluate the protocols that are in place to ensure a safe sporting environment.

Researchers have noted that there are three tiers of injury prevention that contribute to a safe sport environment (Emery et al., 2017; Patricios et al., 2023). Primary prevention focuses on preventing the initial occurrence of SRCs (e.g., rule changes and equipment mandates). Secondary prevention aims to reduce the impact of the injury through early identification and with the use of tools such as education and legislation. Tertiary prevention attempts to improve recovery by preventing a second occurrence through return to play schedules and various rehabilitation strategies. Although primary prevention remains the gold standard to ensure a safe sport environment (A. M. Black et al., 2016; A. M. Black, Hagel, et al., 2017; Eliason et al., 2023; Houghton et al., 2012), secondary prevention methods, such as SRC education, are an

important part of making sport safer and limiting the consequences of SRCs (Kroshus & Chrisman, 2019; Patricios et al., 2023).

SRC education efforts can be broadly conceptualized into three categories: printed educational materials (e.g., pamphlets, posters, handouts), web-based platforms (e.g., websites, social networking sites) and targeted interventions (Caron, Bloom, Falcão, et al., 2015; Mrazik et al., 2015). Although SRC education has been recognized as having some positive effects on SRC knowledge (R. Feiss et al., 2020), evidence is equivocal on its impact on athlete and coach attitudes and behaviours (Caron, 2019). Notably, Kroshus and Chrisman (2019) identified several gaps pertaining to existing SRC education.

A first limitation is that educational materials have been primarily developed for athletes rather than members of their social system (Kroshus & Chrisman, 2019). Intervention protocols involving the athlete's social system have the support of many researchers as interpersonal interactions have shown to result in positive behaviors related to SRC safety (Baugh et al., 2014; Kroshus et al., 2014; Kroshus, Garnett, Hawrilenko, et al., 2015; Kroshus et al., 2016; J. K. Register-Mihalik et al., 2013). At the youth level, organized sport is widely led by volunteer coaches (Griffiths & Armour, 2014). Although the primary role of youth sport coaches is to teach athletes sport-specific skills and tactics, youth sport coaches also play an important role in facilitating athletes' enjoyment (Diffley et al., 2021), motivation (N. Smith et al., 2017), and health/safety (Caron, Bloom, & Bennie, 2015). Thus, sport coaches are a key member of an athlete's social system. Although some researchers have included coaches in SRC education (Bramley et al., 2012; Glang et al., 2010; White et al., 2014), evidence suggests that coaches who are knowledgeable about the injury may still having difficulty making the right decision when they are faced with a concussion (A. M. Black et al., 2020).

A second limitation identified by Kroshus and Chrisman (2019) is that most SRC education focuses exclusively on providing information about the injury, recognition, and management procedures, which inherently assumes that athletes and coaches will make the correct decision (i.e., remove an athlete from play who is suspected of concussion) when the encounter a situation. Unfortunately, an individual's intention to engage in a behavior is not always predictive of their actual behaviors (Hagger & Hamilton, 2023; F. F. Sniehotta et al., 2014). Thus, as a strategy to mitigate this second limitation, researchers have suggested grounding SRC education in psychological theory (A. M. Black et al., 2020; Michalovic et al., 2019).

A number of psychological theories have previously been used in SRC research (see Michalovic et al., 2019 for a review), but never specifically SRC education (Bloom et al., 2022). The most common psychology theory that has been used in SRC research is the theory of planned behavior (TPB; Kroshus et al., 2014; Register-Mihalik et al., 2013). Ajzen's TPB stipulates that attitudes, subjective norms, and perceived behavioral control are the factors that determine whether or not someone will enact a behavior (Ajzen, 1991). In essence, TPB suggests that the best predictor of a behavior is an individual's intention to engage in it. Although TPB is an intuitively appealing theory to conceptualize intended behavior (Abraham & Michie, 2008; Bartholomew Eldredge et al., 2016), researchers have argued that it is limited to focusing solely on rational reasoning (Hagger & Hamilton, 2023; F. F. Sniehotta et al., 2014) and that it has limited predictive validity (Chatzisarantis & Hagger, 2005; Hagger & Hamilton, 2023; F. Sniehotta, 2009). For these reasons, SRC researchers have been encouraged to investigate other psychological theories that consider a wider range of theoretical approaches (Bloom et al., 2022; Michalovic et al., 2019).

The Behavior Change Wheel (BCW; Michie et al., 2011) is thought to be a more complete psychological theory, as it amalgamates 19 behavior change frameworks. Comprised of three concentric rings, the BCW strives to provision researchers with a model for theory-driven interventions (Castro et al., 2021). The innermost ring of the BCW posits that *capability*, *opportunity* and *motivation* are the underpinnings of *behavior* change (i.e., the COM-B model), and that interventions targeting these components are more likely to generate behavior change (Michie et al., 2011). In this sense, the COM-B model serves as a behavioral model and can be used to design interventions dedicated to changing specific behaviors (West & Michie, 2020).

The COM-B model has been used to learn more on numerous health related behaviors such as smoking (Kumar et al., 2021; C. A. Smith et al., 2019) and physical health behaviors (Carney et al., 2016). For example, Kumar et al. (2021) used the COM-B model to investigate healthcare providers' perspectives on administering smoking cessation care to pregnant women. The analysis generated insights on healthcare providers' perceived barriers to administering smoking cessation care. Although the COM-B model has been applied in other health-related behavior contexts, it has not yet been used to study SRC (Michalovic et al., 2019).

To help address limitations in SRC education identified by Kroshus and Chrisman (2019), such as including members of an athletes social system and the integration of psychological theory, the purpose of this study was to develop theory-driven vignettes—using the COM-B model of the BCW (Michie et al., 2011)—based on ice hockey coaches' experiences with SRCs. As such, this study attempts to develop a new and captivating SRC educational modality for ice hockey coaches by providing relatable stories of their peers overcoming barriers or challenges to engage in safe concussion-related behaviors. Ideally, the vignettes generated in this study will reconate with ice hockey coaches and lead to uptake of safe SRC behaviors.

## Methodology and Methods

### Philosophical Positioning

Researchers' philosophical positions can be explained by their ontological and epistemological assumptions, which offer a lense through which the reader can assess how the researcher sees and explores the world they live in (Guba & Lincoln, 1994; Sparkes & Smith, 2013). For this study, we adhered to a relativist ontology and a subjective/transactional epistemology. Ontologically, in accordance with Poucher et al. (2020), our positioning is such that we, the researchers, believe in the existence of multiple realities and that individuals can construct their own interpretations of the world. Epistemologically, in accordance with Poucher et al.(2020), our positioning is such that we, the researchers, were actively involved in the co-creation of knowledge during the data gathering and data analysis phases .

### Methodology

For qualitative researchers, the term methodology refers to “the principles and procedures that define how the research is approached” (Cristancho et al., 2018, p. 623), whereas the term methods refer to the techniques that are used to gather and analyze information (Harding, 1987). Some common qualitative methodologies used in research are grounded theory, phenomenology, ethnography and narrative methodology (Chen & Teherani, 2016). Creative non-fiction methodology (Rees Cheney, 2001), which can be conceptualized to reside within the family of narrative methodologies, is an approach that allows researchers to develop vignettes that are grounded in research and based on real life events and people (Cheney, 2001). In this study, we developed ‘composite’ creative non-fiction stories that incorporated the perspectives of several coaches into stories about their experiences with SRCs.

### Participants and Sampling

We used criterion purposeful sampling (Moser & Korstjens, 2018) to identify and recruit ice hockey coaches for this study. We included coaches in this study if they: (a) coached AA or AAA youth ice hockey teams (i.e., male or female athletes between 12 and 18 years of age), (b) had experienced or witnessed a situation, as a coach, in which an athlete had suffered a concussion, and (c) were 18 years of age or older at the time of the recruitment.

We chose to focus on competitive (i.e., AA or AAA) youth ice hockey for a few reasons. First, there is a high risk of SRC in youth ice hockey (Pfister et al., 2016). Further, in competitive youth ice hockey, physical contact (i.e., body contact or body checking) is permitted. Additionally, we chose youth ice hockey because coaches at this level often must assist in managing concussions—unlike coaches at semi-professional and professional levels—who often have staff members who manage athlete health and well-being (e.g., athletic and physical therapists, etc.; Echemendia et al., 2021; Kroshus et al., 2017). Lastly, Gabriel Delage (GD), the lead researcher and interviewer for this study, has been involved in ice hockey for more than 18 years as an athlete and a coach (see the sub-section Researcher for more information about GD). Thus, we viewed GD's insider perspective an asset to build rapport and gather rich information from participants as well as develop realistic and authentic vignettes of youth ice hockey coaches.

After receiving approval from our university ethics council, we recruited participants using GD's publicly accessible social media accounts (Facebook, Twitter, and Instagram). Considering GD's involvement in the sport, this recruitment method allowed us to reach a large pool of potential participants due to his contacts and ongoing relationships with ice hockey coaches.

Sixteen ice hockey coaches initially responded to the recruitment posts, and we determined that 12 met the eligibility criteria (see Table 1 below).

**Table 1**
*Participant demographics*

| Pseudonym | Sex | Age | Coaching experience (years) | Ethnicity | Current level(s) coached | Coach of Male or Female teams | Previous concussion education training |
|---|---|---|---|---|---|---|---|
| Donovan | M | 18 | 2 | Caucasian | U13 AAA | M | No |
| Milan | M | 31 | 9 | Caucasian | U15 AAA | M | No |
| Kent | M | 22 | 8 | Caucasian | U18 AAA & U13 AA | F & M | No |
| Lucy | F | 25 | 3 | Caucasian | U18 AA | F | No |
| Aiden | M | 32 | 12 | Caucasian | U15 AAA | M | No |
| Tristan | M | 33 | 11 | Caucasian | U15 AAA | M | No |
| Kevin | M | 54 | 12 | Caucasian | U16 AAA | M | No |
| Anthony | M | 39 | 16 | Black | U18 AAA | M | No |
| Johnny | M | 27 | 4 | Caucasian | U13AAA | M | No |
| Jodie | M | 58 | 32 | Caucasian | U18 AAA | M | No |
| Steven | M | 25 | 2 | Caucasian | U15 AA | M | No |
| Jessie | F | 22 | 6 | Caucasian | U18 AAA | F | No |

Data saturation is one method used by qualitative researchers to determine if they have collected sufficient information to address their research question (Braun & Clarke, 2021). A systematic review investigating data saturation in 23 qualitative studies determined that between nine and 17 interviews were needed to attain data saturation (Hennink & Kaiser, 2022). Data saturation is not necessarily linked to a specific number of participants, but rather the depth and the richness of the information gathered (Burmeister & Aitken, 2012). We are confident that 12

participants was a sufficient sample size to address the research question for this study for two reasons. First, our sample size is consistent with previous researchers that used similar methods of data collection and analysis (Cavallerio et al., 2017; Everard et al., 2021; Ryba et al., 2017). Second, GD did not feel as though he was obtaining new information or ideas in the final 2-3 interviews (Guest et al., 2006).

**Data Collection**

Participants were each sent an information and consent form via e-mail before the first meeting. Each participant was given the opportunity to meet in person or via videoconference, depending on their preference. Of the 12 interviews, ten were conducted via videoconference, whereas only two were in person. At the beginning of each meeting, GD reviewed the consent form with the participants. Following the explanation, each participant was given the opportunity to ask questions or clarify any concerns about their involvement in this research.

Each coach participated in one semi-structured interview with GD. In sport and exercise science, interviews have become one of the most commonly used methods to collect qualitative data (Jachyra et al., 2014; B. Smith & Sparkes, 2016). During an interview, two or more people engage in conversation, constructing knowledge about themselves and the world they live in by interacting with each other (Sparkes & Smith, 2013). We chose to use semi-structured interviews for three main reasons. First, semi-structured interviews allow researchers to use a blend of closed and open-ended questions, often accompanied by follow-up questions leading the dialogue to meander around pre-determined topics (B. Smith & Sparkes, 2016), rather than adhering to strict list of questions in a standardized manner (W. Adams, 2015). The flexibility of semi-structured interviews allows researchers to address aspects that are important to each individual participant, granting them the freedom to talk about lived experiences (Fylan, 2005).

This aligns with our subjective/transactional epistemological position and meets our objective of gaining insights on coaches lived experiences with SRC.

Second, semi-structured interviews have been used in previous studies employing a creative non-fiction methodology (Alexander et al., 2021; Coker-Cranney et al., 2018; Richardson & Motl, 2021; Sass et al., 2021). Third, through the accounts and descriptions of their experiences our participants revealed the knowledge they had on SRCs and the resources that were offered to them. Hence, semi-structured interviews also provided us with the opportunity to dive into an elaborate insight of our participants decision making process when faced with SRC situation (B. Smith & Sparkes, 2016).

We created an interview guide that was comprised of three sections (see Annexe A). In the first section, we guided participants through the consent form, answering any questions they had. This first section also allowed us to build rapport with the participants as the interviewer possesses years of experience as a coach in ice hockey. In the second section, we asked participants questions related to their knowledge on SRC. In this section, we also asked participants to detail their experiences dealing with SRC. In the third section, following the description of one of their experiences, we looked to learn more about what lead them to behave the way the way they did by asking questions informed by the COM-B model. Therefore, the goal of this interview was to allow coaches to explain and provide examples of their Capability, Opportunity and Motivation leading to their Behaviors with respect to concussion-related situations in ice hockey. The interviews lasted, on average, 69.25 min. and generated 229 pages of single-spaced transcription.

### *Interviewer and research team*

In line with our philosophical positioning we are providing more information about the researchers involved in data gathering and interpretation to inform the readers on who lead the research and to help them understand how our backgrounds influenced the findings (Clark & Vealé, 2018). The semi-structured interviews were led by GD, a former ice hockey athlete and current ice hockey coach for the last seven years. This experience in ice hockey led GD to have insider perspective, facilitating the participant recruitment and rapport building phases. GD's familiarity with the sport—as an athlete and coach—enhanced dialogue between the researcher and participants. Following the data gathering phase, Dr. Jeff Caron (JC), was involved in the analysis, bringing us to describe his past experiences. JC has a research program that focuses on sport-related concussions and experienced the injury first-hand as an ice hockey athlete. We highlight our backgrounds as a way to demonstrate our positionality and how our past experiences undoubtedly influenced the research process.

## Data Analysis

We used a two-phase process of analysis to develop vignettes in this study. In the first phase, we followed Hsieh & Shannon's (2005) five-step guidelines to conduct a directed content analysis, allowing us to analyze our data through the lens of the COM-B model to identify experiences that we felt were congruent with Michie and colleagues' (2011) conceptualization of capability, opportunity, and motivation. In the second phase, we followed Martinelli and colleagues' (2021) steps for creative non-fiction analysis as it guides researchers through a rigorous process of creating vignettes. Our analytic process is described in detail in the following paragraphs.

For the first phase of analysis, we used a directed content analysis to analyze the interview data using predetermined codes (i.e., the COM-B model). The first step of Hsieh & Shannon's (2005) recommendations for directed analysis is to become familiar with the data. GD immersed himself in the data by transcribing the audio recordings of the interviews and taking notes regarding initial impressions of the interviews. The interviews were led by GD in French or English, depending on each participant's preference. Three interview transcriptions were initially generated by the Zoom platform because they were conducted in English, however the other nine were transcribed manually by GD because they were conducted in French.

Second, Hsieh & Shannon (2005) highlight the importance of choosing and defining the themes used before starting the analysis. Our main themes were Capability, Opportunity, and Motivation, which stem directly from the COM-B model (Michie et al., 2011). The main themes were further divided into second level themes, which also came from the COM-B model: Capability (physical and psychological), Opportunity (physical and social), and Motivation (automatic and reflective). The themes are described in detail in Annexe B.

Third, Hsieh & Shannon (2005) encourage researchers to organize data relevant to their research question into the pre-selected themes. To start the coding, GD downloaded all the interview transcripts into the Nvivo 12 software, a tool used by qualitative researchers to facilitate the coding process. GD then read through the transcripts and highlighted the data that was suitable to our first level themes. To refine the data, GD coded the already categorized quotes into the second level themes.

Fourth, Hsieh & Shannon (2005) highlight that all data does not necessarily fit into pre-determined themes. However, we (GD and JC) agreed upon that all relevant data in this study was able to be coded within the predetermined themes from the COM-B model.

Fifth and finally, Hsieh & Shannon's (2005) recommend that researchers review their data to ensure coherence throughout the coding. To do so, GD and JC reviewed the data to ensure that it was coded in the appropriate themes. After discussion and some minor modifications, we agreed that the coded data matched Michie and colleagues' (2014) definitions provided for our themes.

For the second phase of our analysis, we followed Martinelli and colleagues' (2021) recommendations for composite creative non-fiction analysis to generate vignettes about the participants' experiences with SRC. As storytellers, researchers use creative analytical practices to *show* the participants their results rather than simply tell them (Bochner & Riggs, 2014; B. Smith & Sparkes, 2009). The use of creative nonfiction was motivated by our goal to communicate participants' lived experiences in a compelling manner (Cheney, 2001). Three creative non-fiction writing styles exist: 1) snapshot, 2) portrait, and 3) composite. For the purpose of this study, we chose *composite* creative non-fiction (Spalding & Phillips, 2007). The composite approach to writing creative non-fiction was chosen as it allowed us to display similarities across coaches lived experiences regarding SRCs, all while protecting participants' anonymity.

In the first step, Martinelli et al. (2021) suggest developing characters for the stories. Using characteristics from several coaches interviewed for this study, we developed two main characters for this research: Coach Jodie (see Annexe C) and Coach Ollie (see Annexe D). Additionally, to try to make these vignettes relatable to a wider coaching audience, we used they/them pronouns for each coach in the vignettes, which is also consistent with the American Psychological Association's inclusive language guidelines (Association, 2019; *Inclusive Language Guidelines*, s. d.)

In the second step, we developed the plot for our two main characters. To determine the plot of each story, we decided to focus on elements that were brought up by multiple coaches. Hence, the plot lines of our two vignettes are taken from our participants' real life experiences and adapted to facilitate a literary flow.

We added a third step to our analysis that deviates from Martinelli and colleagues' (2021) recommendations to add elements of behavior change and concussion education into the stories. Given a key aspect of this research was to develop *behavior change* vignettes, we attempted to integrate elements of the COM-B model into each coach's story (i.e., data coded as part of the directed content analysis). For example, in coach Jodie's vignette, we integrated aspects of capability and motivation pertaining to the influence of parents in the decision-making process to remove an athlete suspected of SRC from play (for more detail, see "Integration of COM-B model elements" in Annexe C). For coach Ollie's vignette, we integrated aspects of capability and opportunity, which stemmed from their lack of knowledge as a beginner coach (for more detail, see "Integration of COM-B model elements" in Annexe D).

Specific to elements of concussion education in the stories, we integrated information about signs and symptoms of SRC, complexity of management, and the return to sport process, which came from Parachute Canada's Smart Hockey coaches, trainers, and safety personnel's guide (*Smart Hockey Concussion Guide for Coaches, Trainers & Safety Personnel*, s. d.). See the section "Educational concepts integrated within the vignettes" in Annexe C and D for more specific details.

Consistent with Martinelli et al. (2021), in the fourth step we performed narrative smoothing, which seeks to improve clarity in the meanings portrayed in the vignettes while

remaining true to the participant's own words (Polkinghorne, 1995). To do this, GD and JC traded multiple rounds of comments seeking to adjust grammar and punctuation of sentences.

Both stories we developed are written from the first-person point of view. Writing from the first-person perspective allowed us to represent out participant's thoughts, experiences, and behaviors regarding SRCs. As noted by Yeh (2013), writing from the first person grabs the readers' attention, where by the "I" perspective feels, thinks, and acts without any barriers and for the reader to witness it first-hand (Yeh, 2013).

**Methodological Rigor**

Qualitative researchers are encouraged to demonstrate to the reader the quality of their study by outlining the steps that were taken to conduct a rigorous study (B. Smith & McGannon, 2018). Our interpretivist philosophical positioning assumes that everyone interprets the world differently based on their own lived experiences, and therefore there is no universally agreed-upon criteria for judging the quality of our study. We chose to use Sparkes and Douglas' (2007) criteria to judge the quality of our study because they offer important questions for readers to consider when evaluating studies that portray their results through vignettes. First, coherence will be important to evaluate in this study as the results are the outcome of a creative process. The reader should consider if the stories are realistic and if the writer provides a readable and meaningful picture of the concussion experiences. Second, to assess how this study contributes to the existing literature, readers should judge this work by contemplating if the stories further our comprehension of the process involved in managing SRCs. Is it possible for the reader to learn from them, by connecting with their experience, affecting them emotionally and/or intellectually? Finally, as the stories unfold, do they create a space for dialogue and reflection about SRCs? We suggest the readers consider these questions while reading the two stories,

which highlight two scenarios pertaining to SRC management that are rooted in the participants' experiences as ice hockey coaches.

## Results

The interview data gathered with 12 ice hockey coaches were analyzed in two phases. First, we followed guidelines for a directed content analysis (Hsieh & Shannon, 2005) using the COM-B model of the BCW. A description of each theme, including sample quotes from the participants, is presented in Table 2. For phase two, we followed Martinelli and colleagues' (2021) recommendations for developing creative non-fiction vignettes.

The first vignette depicts an experienced coach in a complex SRC situation (*"In need of a leader"*) and features narrative themes such as capability and motivation. The second vignette depicts a coach who is reflecting on their first season as a volunteer ice hockey coach (*"I was never equipped to do this"*) and features narrative themes such as capability and opportunity.

Although the vignettes we present in this study are ultimately fictitious (and help to preserve participant confidentiality), these vignettes are representative of the 12 coaches' lived experiences with SRCs. For example, most coaches discussed the influence of parents in the decision process surrounding SRCs (which we integrated into coach Jodie's vignette). Additionally, several coaches talked about the challenges new coaches face when making the decision to remove a player from a game following a suspected concussion (which we integrated to coach Ollie's vignette). To this effect, the vignettes are embedded with quotes derived from the participant's interviews. Certain quotes have been adapted to be better integrated within the vignettes (e.g., past to present tense, grammatical adjustments).

**Table 2**

*Results from deductive content analysis using the COM-B model*

| 1st Level Themes & Description | 2nd Level Themes & Description | Quote Examples |
|---|---|---|
| **Capability**<br><br>"An individual's physical and psychological abilities to engage in a behaviour" | **Physical Capability**<br><br>"Skills, abilities or proficiencies acquired through practice" | • "Of course, these are not situations that are fun to live with. I think thaet as a teacher and as a coach, these are situations you have to be ready to face. You have to be ready to confront a parent" – Aiden<br>• "Not much big guy. We have the therapist and a piece of paper with the protocol to follow, then you follow the steps that are [written] there. That's it [laughs]. […] For new coaches who have never experienced these situations, they follow the piece of paper and check the boxes." - Milan |
| | **Psychological Capability**<br><br>"Knowledge, memory, attention, decision processes, behavioural regulation" | • " Well, I honestly think that's one of my biggest strengths as a coach. Behind the bench I am able to think fast. " - Johnny<br>• " It takes someone who has the authority, who has the power to say no, enough is enough, If the power is left in the hands of the coach who is emotional, who is not able to manage his emotions, that is where the risk kicks in." - Kevin |
| **Opportunity**<br><br>"Factors that lie outside the individual that make the behaviour possible" | **Physical Opportunity**<br><br>"Environmental and contextual resources" | • "The game is faster, there's more shit happening on the ice. You need more eyes to watch it." – Jodie<br>• " When there is a therapist it is always easier. When there's no therapist it is harder to make the right decision." – Tristan |
| | **Social Opportunity**<br><br>"Social influences such as social pressures, norms, conformity and social comparisons" | • "You have to feel that you have the support of your superiors and that they have your back. " – Aiden<br>• "I think there's still a really big stigma around them. Personally, I think a lot of the times you get the kind of snarky side comments like "oh like how bad can it be" or like, "oh you have a headache like take an Advil", you know what I mean? Like there's all that kind of negativity that comes with it. And while I think that the process has started to bring more recognition to them and like the severity of them and you know" – Lucy |

| | | |
|---|---|---|
| **Motivation**<br><br>"The brain processes that energize and direct behaviour" | **Automatic Motivation**<br><br>"Emotions, reinforcement such as rewards, incentives, punishment. Emotional reactions, impulses" | • "I'm yelling at the ref, "Ref he's hurt" they don't blow the play. I said, "Blow the play he's hurt". Nothing" – Jodie<br>• "Um, I honestly think a coaches role. Well, for for one, he should uh have a certain amount of compassion towards that sort of thing, you know, because it's a, it's sort of like a mental uh problem almost [hesitates]. It's something that's inside. The player looks healthy, but you really don't know. So I tend to think that you should, and especially with dealing with kids, you should give the benefit of the doubt uh that there could be something, because if not, it can lead to long term, issues and things like that." – Anthony |
| | **Reflective Motivation**<br><br>"Beliefs about capabilities and consequences, roles, identity, intentions, goals, optimism, plans and evaluations" | • "It's for the good of the athlete. We didn't want it to be worse! We would rather lose her for a week than lose her for three weeks." – Jessie<br>• "Like obviously you want the kid to play. Yeah, I'm not going to sit here and tell you no. You want the kid to play and like, you're hoping. He's telling you what you want to hear. Like that's what you want to hear obviously, and if it wasn't to the head, if it was like a sore knee or something he definitely would've played. I would've been like, "oh, sure, put some ice on it and go". But like because it's to the head, I guess […] I've had concussions as a player, and it sucks. It really sucks." – Steven |

*Note*: This table demonstrates and defines the first and second level themes that were used to analyze the interview data. Furhtermore, sample quotes are given for each second level theme. The quotes are shown are real and derived directly from our participants interviews.

**Coach Jodie's story: In Need of a Leader**

Kai was picking up speed behind his own net. A lanky 15-year-old boy, Kai can generate a lot of power once he gets moving. Kai had been absolutely on fire this weekend at the Future Prospects tournament in Lévis; weaving around opponents like pylons and absolutely brimming with confidence. Kai is assertive, smart, and focused, which sets him apart from other players his age. As coach Jodie screamed "Change!", Kai crossed the red line—opposite the player's bench—and directed the puck into the opposing team's zone. At the same time, a defender seized the opportunity to lay a clean bodycheck on Kai. Although it was a big collision, it was nothing out of the ordinary. Kai was used to being a target as the team's best player. Nevertheless, as Kai was making his way across the ice to get to the bench, it was clear to me, Coach Jodie, that Kai was in some discomfort, and something was off with the way he was moving. Something just seemed off.

[*4:47 a.m., the smell of coffee engulfs the hotel room and brings Jodie back to reality*]

I've been around hockey my whole life. I played AAA all the way through, then juniors for four years, and then eventually I played five seasons as a pro. When my career ended, I jumped right into coaching, and I've been doing that for the past 13 years. I guess all those experiences explain why I'm so confident in my decision-making as a coach. I've seen it all. So many bus trips and games all over North America and Europe. So many memories. So many ups and downs. And so many injuries. Concussions, too. I can vividly remember what those headaches used to feel like. It was as if my head was in a vice. I even played with concussion symptoms. I mean, we didn't know as much about concussions back then. I can tell you there is no way I would EVER let a player I coach back on the ice if I thought they had a concussion.

Because I know what that's like. Knowing you're not feeling 100%, but you keep going anyway because you're scared that if you sit out, a coach might think you are soft, or another player could steal your spot when you're out of the lineup. I hated that feeling as a player. But as a coach, these kids are my responsibility. Every decision I make is to make sure they have a future—on and off the ice. I want to develop good people and, most importantly to me, keep them safe. I don't want players risking their health for a game. It's just not worth it. Trust me.

That's why I'm so rattled with what happened with Kai. The game was freaking 7-2. Maybe I should have kept Kai off the ice? I probably should have known the other team was going to start targeting him because the game was out of reach. I was hoping the other coach would have controlled his players. You know, tell them to play with integrity and within the rules. Guess I was wrong. That said, I know *these kids* love being on the ice. *Obviously, playing hockey is one of the most important things in their lives. It's their passion, they want to continue* to progress up the ranks. So, who knows how Kai would have reacted to me sitting him out when he was healthy and playing so well. I know I probably would have had some choice words for a coach if I were in that situation.

[*Jodie thinks back on Kai's situation*]

In my 13 years of experience as a coach I'd never seen anything like Kai. He's 15 playing with 18-year old's and making them look bad. Coming into this tournament, we all knew what Kai was capable of. But with scouts in the stands, and all the media attention he's been getting, Kai has kicked it up another notch. Fifteen points in three games? Ridiculous. But at the same time, I can believe it. Kai's always picking my brain. Trying to find ways to improve. Kids like Kai are the reason I got into coaching.

That's ironically why I decided to sit Kai out. I've spent five days a week over the last seven months with these kids. *I know these kids. Even if they don't tell me—I can see when something is off*. I also know from experience that it's usually the quiet hits that hurt the most. Not the ones that make a ton of noise. That's why I went right over to Kai when he got back to the bench. Knowing Kai, I couldn't ask the simple "Are you okay?" type of questions to see if he might have a concussion. That would have been too easy for him. So, I picked up the whiteboard and started drawing a play and asking Kai some questions about strategy. And I just knew something about Kai was off. Normally Kai doesn't like to admit he made a mistake. It's just not in his DNA—and that's exactly why I told Kai he should've passed the puck when it was clearly NOT the right play. I just wanted to see how he would react.

"Yeah, you're right, coach".

Wait, what? Kai *knows* that what I said isn't right. Why is he agreeing with me?

"Kai, next powerplay we're going to try Cleo in your spot."

"Sure, coach. Sounds good." Kai's face had a hint of relief.

Again, I'm thinking, "What?" Who is this kid? Seeing Kai accept my decision to replace him on the powerplay solidified my thinking that something was off. Kai's eyes looked completely empty. You need to understand, Kai loves to compete. He loves his teammates. And he loves to be the player we count on. There's no way on that Kai would agree to sit out if he was healthy—especially when we have a powerplay.

"Kai, you're done."

"What? N-N-No, I can play." There was no confidence in his voice. I could hear that Kai was shaky—almost as if he was thankful I took the decision out of his hands.

"My call, Kai. You can sit in the middle of the bench or head to the room."

Kai sat there for a few minutes, but eventually he got up and started making his way to the room. I knew I made some enemies in the parent section. Sitting the best player isn't an easy call, but it had to be done. I couldn't risk something worse happening to the kid. I'm tough on my players, but I care about them. I do what I think is best for them.

"Kai's out? What's going on?"

"Coach, are you out of your mind?"

I pretended like I couldn't hear the comments from parents in the stands—but I did. My heart started beating faster. I found myself drifting towards thoughts about my own concussions. The fears I had about my long-term health… the uncertainty of never being able to play hockey again.

Snap out of it, Jodie. Stay focused. This is the right call. I'm looking out for Kai. He was in need of a leader—someone to step up and do what was best for him and his safety. I've been talking about putting my players' health before wins and losses all year. Time to walk the talk. That said, I did get the feeling that I would be hearing about this decision sooner rather than later.

***

[*Phone rings later that evening*]

"Hello? Now? Okay. Give me 5 minutes and I'll be right up. Which room? Okay, see you soon."

[*Jodie hangs up*]

Well, that was fast. I guess I know what this is about. The parents, calling the coach to one of the hotel rooms? That's always good, I think to myself sarcastically. I grab my jacket, slip on my beat-up Hamilton Bulldog's hat, my Nike Air Monarch's, and I'm out the door. I've always hated the smell of hotels. Another reminder of the unglamorous life of a hockey player: long bus

trips and 3-star hotels. The worst was being on the road and dealing with concussions. That's another reason why I think it's so important to stick up for Kai. He has such a bright future, whether it's hockey or something else. In any case, he's 15 years old! These kids should never play through a concussion, and, well, sometimes they might *need someone like me to make the call for them.*

[*Knocks on the door of room 762*]

I am usually very calm, but I felt an energy that I had never felt before. There was a lump in my throat developing in anticipation of what was going to happen next.

[*Creaking of the hotel door as it opens*]

Entering the room I could see it was a mix of players and parents—including Kai.

"Hey coach, good to see you. Come on in," said Lucie, one of the parents who yelled down at me during the game when I made the decision to sit out Kai.

"So umm, great game today and nice win. Umm, we wanted to talk to you about, umm…"

"Let's get to it, shall we?, I said with a stern tone. "This is about my decision to sit Kai out." I was not in the mood for the formalities. The parents' faces changed. The energy in the room shifted. I could sense an uneasy feeling amongst the group, but I felt confident. *These aren't fun situations, but we need to go through them as coaches to make sure we stick to our values*.

"You're gonna play him tomorrow, right?"

I wasn't going to shy away from that question. "No. Not until Kai is evaluated by […]"

"What? That's nuts", said one parent, cutting me off mid-sentence. "What are we doing? The kid is obviously fine—look at him" And that got all the other parents going.

“This is the biggest game of the year.”

“Imagine not letting Kai do something he loves? Who are you to make that call?”

“There are scouts in the stands and you’re not going to play him over a little bump on the head?”

I was livid. What were these people talking about? Clearly, they have no clue what it’s like to have a concussion. I felt my anger rising, and blood started rushing to my face. These comments… the ignorance… all got me wanting to stand my ground against them. I felt like it was now me against everyone. This situation brought me back to my own concussion experiences. Feeling as though I had no other choice than to play to keep my position in my team. Feeling hopeless and stuck. I’m not ready to let Kai live through that. Not because some parents value this stupid tournament over a kid’s health. This is the right call, and I know it. Even though I know Kai wants to play, and obviously the parents want Kai to play.

“Listen, I understand your frustration. I do. But my decision is final. As long as I’m the coach of this team, there’s nothing you can say that will change my mind on this issue”.

And I walked out the door.

***

[*Monday, first day back from the tournament*]

I didn’t play Kai for the rest of the tournament. Kai was evaluated and diagnosed with a concussion—just as I suspected. Headaches, nausea, dizziness… all those symptoms kicked in about 12 hours after Kai was hit. I hate the thought of Kai having a concussion, but I am happy that I trusted my instincts and kept him out of harm’s way. We actually made it to the finals of the tournament and lost to a better team. I was super proud of the boys. In some ways, the fact

that Kai was not playing made everyone step their game up. That's what sports can teach you. Not winning at any cost, but finding little victories in everything you do. Kai called me earlier this morning. Interesting. Not one of the parents who questioned my decision called me. After talking briefly with Kai about the weekend and how he was feeling, Kai said something that almost knocked me off my feet:

"Hey coach. Umm, I just wanted to call and thank you for standing up for me. I know it probably wasn't easy.

It takes a pretty mature kid to say something like that.

"Coach I want you to know that I was told I can start practicing soon. No contact yet, but I'll be back soon. I'll do whatever it takes to come back better coach. You'll see, I'll do great."

"I know you will, kid. you always do."

Part of me thought Kai wouldn't understand my decision. And maybe even that he would hate me. But being in this type of situation is why I started coaching. I've always wanted to pass along life lessons to these kids. A big part of that is making sure to walk the talk, so to speak. Demonstrate your values by the way you live your life. I tell my players that I prioritize their health above all else. I always tell them that actions speak louder than words. I feel like I've shown them my values in how we managed Kai's concussion.

**Coach Ollie's story: I was Never Equipped to do This**

"I'll have an extra-large double-double please" That's my fourth coffee of the day. I notice my hands shaking as I fumble the change trying to hand it through my window to a bored-looking teenager employed by Tim Horton's. I guess four coffees will do that to you. I have been thinking about Ava's concussion all day long. It's been slowly eating at me.

My oldest, Emma, is sitting in the passenger seat of my 2018 Dodge Caravan. I hate this van, I really do. It's so big, and clunky, and it's so ugly. Parenthood, though, right? My newborn, Isabella, is at home with my parents. I'm so grateful they can take care of her while I'm at Emma's practices and games. Honestly, I don't know what I'd do without them. With my job, the kids, and this hockey team… my cup is pretty full at the moment.

"That'll be $2.73 please" says a crackling teenage voice over the intercom, snapping me back to the present.

I grab my coffee and place it in one of the cup holders between Emma and myself. I still can't believe that I'm the coach of Emma's team—especially now with this whole concussion thing I've got a lot on my plate.

Johnny, the person who was supposed to coach the team, decided right before the season that coaching would be too much of a time investment this year. TOO MUCH OF A TIME INVESTMENT? You don't say!

I couldn't let Emma's season fall by the wayside, so I put my hand up. Me, the parent with a newborn, a full-time a job, and no coaching experience. Like, I have no coaching knowledge at all. I've never coached. I've never even thought of coaching. If that isn't a recipe for team success this year. Right? But you should have seen Emma's face when the news came out that Johnny wouldn't be coaching. Emma and her teammates were so sad and and scared they wouldn't be able to play this year. Emma worked hard all summer to make the U15 AA team and, to our surprise, she made it. I couldn't let her hard work go to waste!

I must admit though, I've never felt so out of place. Truly, I know some things about the sport. I mean, I love watching it, with my feet kicked up on the couch after a long day at work. But I never thought in a million years I'd actually be a coach. There are so many aspects to coaching. I

never imagined it would be so hard. Managing playing time, personalities—including those from the team's "expert" parent advisory committee, and injuries like concussions. People are telling me that I'm doing a great job, but, come on! I think everyone is just saying that because they're happy they don't have to coach. Let me tell you something, I'm winging it. Every second of every practice and game, I'm winging it.

***

[*Midway through the first period of the game*]

*Ava, Emma's best friend, grabs the puck behind her own net. She starts skating with the puck out of the defensive zone. As she scans the play developing in front of her, Ava tries to deke around the player coming towards her. In the process of making the move, Ava mishandles the puck and pushes it too far ahead. Being a relentless player, Ava stretched out to try regain possession of the puck, which unfortunately left her head exposed to the oncoming defender. The two players collided. Ava was slow to get to her feet. The official whistled the play dead.*

[*Ava gets back to the bench*]

I see her fall over when she gets up. Maybe her skates need a sharpening? She *was* complaining about her skates after warmups. I watch as she skates back to the bench. When she sits down, she is holding her head with her gloves. At that moment, I start to realize she might have hurt her head. My knees start feeling a little weak. Surely somebody was going to do something about this. A doctor or trainer maybe? [They're called trainer's, right? Or maybe physios? I don't know]. Snap out of it, Ollie. Ok, what's the protocol here? It's at that moment I realized that

everyone—players, assistant coaches, and even the expert parent advisory committee from across the ice—was looking at me to figure out what to do. I guess I'm the one in charge here. Ummm I don't know? I've never had to deal with this situation before. I've never been hit in the head. My daughter Emma's never had any head problems. Or, at least I don't think she has.

"Yeah, I'm fine, Ollie. Everything's good", says Ava.

"Phew", I think to myself. Maybe she's just dehydrated, tired, or something. I mean, these kids have a heavy schedule with school and all. And she was complaining about having dull skates after warmups. Maybe that's why she looked a little off-balance? In any case, maybe I should keep Ava off the ice just to make sure?

"Okay well, don't you think you should maybe sit out for a while and rest up?"

At that moment, Ava looks at her parents in the stands [who gesture back at her]. Ava then says, "No, Ollie, I'm fine. I'm ready to go."

Oh, OK. I turn around to make eye contact with the parents and they are both nodding their head in approval. So, I guess everything's good then. Plus, I think to myself, have you ever argued with an angry 14-year-old? If you haven't, trust me when I tell you that it's horrible. They know everything and you know nothing. Actually, less than nothing. Besides, maybe it's true? What do I know? I'm not a doctor. I've never had any training on how to deal with concussions. And Ava obviously knows more than I do about how she feels, right?

"She's fine, Ollie", a voice from the stands tells me. It was Ava's father. He must have rushed down while I was lost in my rambling thoughts.

That got me thinking. Between Ava and her parents, they obviously know how Ava is feeling… right? Who on earth am I to tell this kid she can't play? I can feel knots forming in my stomach. I feel uneasy about this situation. It's pretty clear that Ava and her dad think she's good to go… I

just don't like that I have to make the call. I don't want to disappoint her and the other players on the team. After what seemed to be an eternal moment of thinking, I made my decision.
"Okay, Ava. If you feel good, you can play" and Ava jumped back on the ice and go right back in the play…

***

[*13 years later Ollie is pulling up in the unpaved parking lot of the same Arena where Ava was injured. This time, Isabella—Ollie's youngest daughter, who is now 14 years old—is sitting in the passenger seat.*]
The sound of the wheels crushing the gravel and Rod Stewart on the radio resonate through the 2029 Dodge Caravan. Yes, I still have a Caravan. The 2018 died last year. Even if I hated that van, I bought the exact same model. What can I say, practicality won out over style once again!

[…] ***I wish that I knew what I know now when I was younger.***
***I wish that I knew what I know now when I was stronger*** […]

Rod Stewart's words coming across the radio hit me. I'm smiling, but not the kind of smile you have when you're happy. No, it was the kind uncomfortable smile when you think back to a bad decision you made. I look at the Arena and I think back to Ava's injury. Every single detail of it. I can feel my grip on the steering wheel tighten and my teeth squeeze together. "What an idiot!", I think to myself. I cannot believe I let Ava keep playing. So stupid. You guessed it, the very

next time Ava was on the ice she got hit again. The second time it was clear that it was hear head. The play had to be stopped and an ambulance was needed to take Ava to the hospital. Ava was diagnosed with a concussion. She was unable to participate in school for several weeks. Ava even had to catch up schoolwork during the summertime. She was also unable to play the remainder of the hockey season.

I shuddered at how I handled that incident. I still feel guilty about failing Ava. There's no way I should have let her back on the ice. I feel responsible that she was not able to play the sport she loved and that she couldn't be a regular kid during the summer.

Telling that girl she couldn't play would have definitely been uncomfortable for me. For sure. There's no way around it. She would've hated it. Her parents would have hated it. The expert parent advisory committee would have undoubtedly had some choice words for me. And Ava might have even hated me for it. But now, having participated in so much concussion education training, it's an easy call. I can still hear one of my concussion training moderators saying, "When in doubt, sit them out". I wish I would have looked at Ava and said, "*You're going to hate me right now. You can call me all the names you want, but I don't feel comfortable putting you on the ice.*"

Too bad you can't hit pause and rewind in real life, eh? Everything is easier in retrospect. I felt so vulnerable at the time. I had no coaching experience. No formal education—in coaching or about concussions. No personal experience with the injury. No experience managing athletes with concussion. *It's scary out there for a new coach.*

The summer after Ava's injury, I told myself "never again". I sought out coach education and concussion training. Now, every year, I read Parachute Canada's Coaches, Trainers, and Safety Personnel's guide to concussions before the season. I talk about concussions during the first

meeting at the beginning of the season with parents and players. I feel so much more confident now in my ability to act appropriately in concussion situations. I know the signs. I know the symptoms. And I am getting better at trying to detect when athletes aren't being honest with me. It's important. Not just for me, but for the players on my team. For Isabella, my daughter. Unbeknownst to me, Isabella, who was sitting right next to me in the van, was getting impatient. "Ollie!  You're so weird sometimes. We're gonna be late for the practice. You do know we're supposed to actually go in the arena, not just stare at it."

Ah, the joys of being a coach *and* a parent.

## Discussion

We interviewed 12 youth ice hockey coaches of AA and AAA with the purpose of developing theory-driven vignettes—using the COM-B model of the BCW (Michie et al., 2011)—based on their experiences with SRCs. Hence, we developed two theory-driven, creative non-fiction vignettes depicting ice hockey coaches managing SRC scenarios. Coach Jodie vignette depicts a complex SRC situation, where they made the decision to sit out a star athlete suspected of concussion against the parents' wishes. Coach Jodie's vignette integrates elements of the COM-B model (i.e., capability and motivation) as well as SRC educational concepts (i.e., signs and symptoms, difficulty of decision making). Coach Ollie's vignette depicts a volunteer ice hockey coach who mismanages a concussion situation in their first season behind the bench. Coach Ollie's vignette integrates capability and opportunity from the COM-B model as well as SRC educational concepts such as signs and symptoms and a lack of training.

This study contributes to the SRC education literature by adding the development of vignettes as a new way to disseminate knowledge to sport contributors. There have been a number of reviews and critiques of SRC education (Caron, Bloom, Falcão, et al., 2015; Eliason

et al., 2023; Kroshus & Chrisman, 2019; Mrazik et al., 2015). One review of SRC education from Mrazik et al. (2015) included 89 journal articles, two books and two websites. Mrazik et al. (2015) concluded that most SRC education were insufficiently based on principles of knowledge translation, which involves continuing dialogue, interaction, and partnerships among different groups of knowledge creators and end-users (e.g., Provvidenza et al., 2013). Several authors have suggested that creative modalities of SRC education leads to positive outcomes as it interacts with a captivated audience and suggest exploring new modalities as a way to change attitudes and behaviors about SRC (Bloom et al., 2022; Mrazik et al., 2015). As a result, we believe the present study contributes to the SRC education literature by offering a new and potentially captivating modality (i.e., vignettes) that sport coaches might resonate with. Another contribution of this study is that it integrates behavior change theory into SRC education, which has been suggested as a way to assist in changing SRC-related behaviors (Michalovic et al., 2019). Researchers have previously used a number of psychological theories to *understand* SRC-related behaviours, such as the TPB (Kroshus et al., 2014; Newton et al., 2014), the social norms theory (Kroshus, Garnett, Baugh, et al., 2015), and the social ecological model (J. Register-Mihalik et al., 2017). One example is from Kroshus et al. (2014) who utilized a TPB model to predict concussion symptoms underreporting among 256 late adolescents and young adult male ice hockey players. The authors used a structural equation modeling to assess if the TPB model explained the ice hockey player's reporting behaviors. Upon analysis, the TPB model explained players' reporting behaviors, suggesting that the TBP could be relevant to understanding concussion reporting. The present study differentiates itself from previous research by integrating elements of behaviour change into vignettes of ice hockey coaches. More pecifically, using Michie and colleagues' (2011) COM-B model, we depicted scenarios in which ice hockey

coaches demonstrated their capability, opportunity, and motivation (or lack thereof) to engage in safe SRC-related behaviours. We believe that this study adds to the limited body of literature that has explicitly integrated psychological theory into SRC education.

As seen in Ollie's vignette, a lack of capability (stemming from a lack of knowledge) may place coaches in a vulnerable position when faced with a SRC scenario. We highlighted this aspect in Ollie's vignette because none of the 12 participants interviewed for this study participated in formal SRC training. We found this particularly surprising considering the free educational materials available to coaches through Hockey Québec and Hockey Canada (*Hockey Québec - Commotions cérébrales*, s. d.; *Hockey Canada Concussion Toolbox*, s. d.). A number of researches have previously studied coaches' knowledge of SRCs (A. M. Black et al., 2020; Conaghan et al., 2022; R. Feiss et al., 2020; Kroshus et al., 2019, 2023; O'Donoghue et al., 2009). Black et al. (2020) looked at 796 youth ice hockey coaches and parents' knowledge, beliefs, and behaviors related to SRC education. Their findings suggest that simple exposure to concussion education doesn't significantly affect intended behaviors related to SRC management. Similarly, O'Donoghue et al. investigated 126 high school coaches' knowledge on SRC and found that coaches had a substantial knowledge gap regarding SRC management (O'Donoghue et al., 2009). Our findings regarding coach capability extend Black et al.'s (2020) and O'Donoghue et al.'s (2009) findings as they not only suggest that coaches lack knowledge about SRC management, but also provide insight into coaches' perceptions and thoughts regarding their lack of knowledge SRC management. Hence, our findings show that coach's perception regarding their capability to properly treat their concussed athletes was negatively affected by their lack of knowledge of SRC management.

As seen in both coach Jodie's and coach Ollie's vignette, the coaches we interviewed for this study noted that hockey culture and parental pressure adversely impacted their opportunity to make safe decisions when faced with a concussion scenario, which supports previous research regarding the impact of sociocultural factors on SRCs (Bramley et al., 2012; Cusimano et al., 2016; Malcolm, 2019; Ventresca & McDonald, 2019). Cusimano et al. (2016) aimed to gather an in depth understanding of ice hockey culture from the perspectives of 61 sport contributors. The coaches in the Cusimano et al. (2016) sample mentioned that an aggressive approach to ice hockey gave their team a better chance to win the game. In a study from Bramley et al. (2012), the autors presented seven case scenarios to 314 youth ice hockey coaches to understand how they would respond to a player suffering from SRC. Interestingly, 19.2% of coaches in their sample noted they would allow players suspected of SRC to return to play in a championship game (Bramley et al., 2012), which reinforces the impact of sociocultural factors on SRCs. Our results support this body of evidence, as the coaches in our study mentioned that pressure from parents and ice hockey culture limited their opportunity to act appropriately with SRCs.

As seen in coach Jodie's vignette, a majority of coaches our sample said they believe they place athletes' well-being above results, which was a motivating factor to remove an athlete suspected of SRC from a game. This appears to be congruent with an athlete-centered approach to coaching, which is defined as a philosophy that places the athletes as the priority. Explicitly, an athlete centered approach to coaching supports coaches to offer their athletes the necessary tools to succeed (Svyantek, 2017). Applied to the context of injury reporting, Cranmer et al. (2022) suggested that coaches with an athlete-centered philosophy would encourage their athletes to report possible injuries, which could be extended to include concussions. Another study from Baugh et al. (2014), demonstrates the importance of perceived support from coaches

and teammates on athletes' concussion reporting. Specifically, athletes in this study who perceived higher levels of coach support reported the fewest undiagnosed concussions, suggesting that coaches' attitudes toward concussion reporting may influence their athletes' behavior. Taken together, we believe that our results extend previous findings as they offer a comprehension of the motivating forces that underlie coaches' decisions while managing their athletes SRC. Overall, our findings provide insight into coaches' perceptions of coach-athlete relationships, as well as how they contribute to SRC management.

**Limitations and Future Directions**

A first limitation of this study is the lack of diversity regarding the sex of the participants. Specifically, only two of the 12 participants identified their sex as female. Although we intended to obtain an equivalent amount of male and female participants, research supports the fact that women are under-represented in coaching roles (Acosta & Carpenter, 2014). There is a need to obtain the perspectives of female coaches' experiences with SRCs, as females continue to be woefully underrepresented in SRC research (D'Lauro et al., 2022). A second limitation was the lack of ethnic diversity among our participants. Specifically, 11 out of 12 participants self-identified as Caucasian. Although the purpose of our study was not specifically to investigate the role of ethnicity in how coaches' manage SRC scenarios, there is enough evidence to understand that ethnicity influences lived experiences with SRCs (Wagner et al., 2020). Third, our study was limited by the conducting one single interview with each participant. Researchers have highlighted the benefits of conducting multiple interviews with participants as a means of learning more about their lived experiences (Sparkes & Smith, 2013). Had we conducted a second or follow-up interviews with the participants, it is that we could have obtained a more detailed understanding of the coaches' experiences with SRCs. Fourth, and finally, this study is

limited by relying only on the application of the innermost wheel of the BCW, the COM-B model. When evaluating the COM-B model next to other theories, such as TPB, similar characteristics seem to emerge. As such, both theories can be helpful in acquiring a better understanding of individuals' behaviours. It should be noted, however, that the COM-B model distinguishes itself from TPB and other psychological theories by amalgamating 19 existing frameworks and by being a behaviour change theory rather than a theory trying to explain behaviour. Hence, consistent with suggestions from behaviour change experts (Kelly & Barker, 2016), future researchers using the BCW should use the entire framework and avoid relying on one element (i.e., the COM-B model).

There are a number of avenues for future research based on this study. For example, although these vignettes were created and offer a new way of distributing concussion education for coaches, we were unable to gather coaches' impressions of vignettes as a SRC education modality. Future researchers could compare these vignettes combined with other educational modalities (e.g., printed educational materials, web-based platforms) and gather coaches' psychological precursors to behavior change (i.e., level of importance of the behaviour, their intention to change, and their readiness to change; Daeppen et al., 2007; Hesse, 2006; LaBrie et al., 2005). Additionally, although research suggests the COM-B model has been effective to change health-related behaviors such as smoking habits (Kumar et al., 2021; C. A. Smith et al., 2019), the efficacy of using COM-B in SRC education is still in its early stages. More research is needed before making definitive conclusions about its efficacy in the context of SRC education.

# Chapitre 3

## Discussion générale et conclusions

L'objectif de cette étude était d'utiliser le modèle COM-B pour développer des vignettes théoriques basées sur les expériences des entraîneurs de hockey sur glace avec les CCS. Nous avons interrogé 12 entraîneurs de hockey sur glace évoluant dans un calibre AA et AAA pour mieux comprendre leurs expériences envers les commotions cérébrales de leurs athlètes. Les données ont été analysées selon un processus en deux étapes. Premièrement, nous avons suivi les lignes directrices en cinq étapes de Hsieh et Shannon (2005) pour effectuer une analyse de contenu dirigée, ce qui nous a permis d'analyser nos données sous l'angle du modèle COM-B. Deuxièmement, nous avons effectué une analyse composite de non-fiction créative pour générer des vignettes sur les expériences des entraîneurs avec la CCS. Ensemble, ces deux étapes de l'analyse nous ont permis de développer deux vignettes qui intègrent les composantes du BCW dans l'éducation sur les CCS.

La vignette de l'entraîneur Jodie intègre des éléments du modèle COM-B (c'est-à-dire la capacité et la motivation) ainsi que des concepts éducatifs de la CCS (c'est-à-dire les signes et les symptômes, ainsi que la difficulté à prendre des décisions). La vignette de l'entraîneur Ollie intègre des concepts tels que la capacité et l'opportunité du modèle COM-B ainsi que des concepts éducatifs de la CCS tels que les signes et les symptômes et le manque de formation.

Plus précisément, dans la vignette de l'entraîneur Jodie, nous voyons un entraîneur expérimenté confronté à une situation complexe de CCS. Comme Jodie dispose de nombreuses années d'expérience en tant qu'entraîneur et qu'iel a participé à des séminaires de formation sur les commotions cérébrales, Jodie était capable de reconnaître les signes et les symptômes de la commotion cérébrale de Kai. Il y avait beaucoup de pression pour gagner, et les parents ont

poussé Kai à jouer malgré sa blessure. Néanmoins, grâce à ses connaissances et à l'importance qu'iel accorde au bien-être de ses joueurs, Jodie a eu la motivation d'agir de manière appropriée. À l'inverse, dans la vignette de l'entraîneur Ollie, nous assistons à la première saison d'un entraîneur bénévole. Le manque de connaissances d'Ollie sur la blessure place l'entraîneur dans une position difficile pour prendre une décision, et iel est incapable de retirer Ava du jeu. Ollie est coincé dans une situation où iel subit la pression d'Ava et de ses parents pour qu'elle joue malgré sa CCS, ce qui diminue la possibilité d'agir d'Ollie (opportunités). Enfin, malgré toutes les bonnes intentions d'Ollie, sa motivation à bien faire pour sa joueuse est noyée dans son manque de capacités et d'opportunités. Les vignettes de l'entraîneur Jodie et de l'entraîneur Ollie illustrent la complexité des CCS et offrent aux entraîneurs la possibilité d'être des témoins directs dans la gestion des CCS.

Cette étude apporte une contribution au plan des connaissances et de l'éducation dans le domaine des CCS. Tout d'abord, l'éducation sur les CCS n'a jamais été conceptualisée avec l'utilisation de la non-fiction créative pour produire des vignettes. Ensuite, cette étude propose une nouvelle modalité d'enseignement sur les CCS, en espérant qu'elle offre un moyen captivant d'en acquérir des connaissances. Puisque notre étude est la première à notre connaissance à utiliser la non-fiction créative pour développer du matériel éducatif, il n'y avait pas de guide spécifique. Ainsi, notre étude utilise des critères de création de vignettes qui ont été utilisées dans le passé pour transmettre des connaissances sur des expériences vécues ou des résultats (Cavallerio et al., 2017; Everard et al., 2021) qui n'ont pas nécessairement été développés à des fins éducatives. Or, considérant l'apport des récits comme étant l'une des plus anciennes stratégies connues pour partager les connaissances humaines (Coles, 1989), nous avons intégré

des points éducatifs à nos vignettes dans le but d'éventuellement éduquer des entraîneurs de hockey sur glace sur les commotions cérébrales.

Deuxièmement, cette étude intègre également une théorie du changement de comportement dans une modalité d'éducation sur les commotions cérébrales liées au sport, en espérant qu'elle ait un effet sur la capacité, l'opportunité et la motivation des entraîneurs lorsqu'ils sont confrontés aux CCS d'un athlète, et qu'elle ait finalement un impact sur leurs comportements. Dans le passée, plusieurs chercheurs se sont tournés vers la TPB pour tenter d'expliquer ou de comprendre les comportements nocif de différents acteurs (Schmidt et al., 2020; Sullivan et al., 2018) sans pour autant être capable de changer ces comportements. De notre côté, nous avons choisi le BCW pour comprendre et éventuellement changer le comportement des entraîneurs de hockey sur glace. Dans le passé, cette théorie a été utilisée dans le changement de comportement dans plusieurs autres domaines de la santé tel que l'utilisation de la cigarette (Kumar et al., 2021; C. A. Smith et al., 2019). Plus précisément, nous avons choisi d'intégrer à nos vignettes des aspects de la roue la plus interne du BCW, le modèle COM-B. Cependant, la TPB et le modèle COM-B sont des théories qui se ressemblent. En effet, ce sont deux théories qui tentent de comprendre le comportement en le réduisant à une somme de composantes plus simples. Contrairement à la TPB le modèle COM-B fait partie d'un modèle plus large, la BCW. Le BCW possède des sections visant à opérationnaliser la compréhension du comportement mis de l'avant par le modèle COM-B pour générer un changement de comportement. Ces sections du BCW sont représenté par les deux autres roues du modèle, soit la roue des fonctions d'intervention et la roue des catégories de politiques. De cette façon, nous avons choisi d'utiliser le modèle COM-B puisque celui-ci est le précurseur d'un changement de comportement éventuel.

La BCW ouvre les portes pour de futures recherches. Nous aimerions voir d'autres chercheurs utiliser nos vignettes comme modalité d'éducation sur les CCS pour les entraîneurs de hockey sur glace. Puisque nos vignettes utilisent la roue la plus interne de la BCW, le modèle COM-B, d'autres chercheurs pourraient utiliser les autres roues de la BCW pour oppérationaliser un programme visant à changer les comportements d'entraîneurs de hockey sur glace. Plus précisément, ces chercheurs pourraient combiner nos vignettes à d'autres modalités d'éducation déjà existantes sur les CCS. Cela pourrait être émis aux entraîneurs lors d'une formation (une des composantes de la roue des fonctions d'interventions de la BCW) et cela pourrait éventuellement faire cas d'un changement de législation (une des composantes de la roue des catégories de politiques de la BCW) mandatant cette formation pour tous les entraîneurs de hockey sur glace.

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**Annexe A**
**Guide d'entretien**

**Introduction & Pre-Interview routine:**
Introduce study & build rapport
Review Consent Form

**Rapport Questions:**

- Can you provide your date of birth, gender, sports you have played, history of injuries while playing your sport, past education (specific e.g.: B.Sc. in Psychology) and professional experience.
- Tell me about your athletic background (which sports you played) and why you decided to become a coach.
- Can you talk to me about your coaching philosophy and the characteristics of the teams you coach?

**Main Interview Questions:**

- What do you think is a coach's role with concussions?
- Tell me how sport-related concussions influence your role as a coach.
- Describe a situation when you [or a coach that you know] properly managed a possible concussion, or supported a concussed athlete.
- Describe a situation when you [or a coach that you know] had difficulty managing a possible concussion, or supported a concussed athlete.

**Next Questions relate to the situation(s) described above:**

- *Motivation – (the brain processes that energize and direct behaviour; Michie et al., 2011)*
  - Describe why you think the coach in the example made those decisions in the situation(s) described above.
  - What do you think the coach in the example could have done differently to modify that behaviour in the future?

- *Capability – (an individua's psychological and physical capability to engage in the behaviour; Michie et al., 2011)*
  - Talk to me about the resources (training, skills, etc) that you have to properly manage and support concussed athletes.
    → Can you provide specific examples of these resources?
    → Which resources do you think coaches don't have but need in order to feel comfortable managing and supporting concussed athletes?

- *Opportunity – (Factors that lie outside the individual that make the behaviour possible; Michie et al., 2011)*
  - Generally speaking, how do you think athletes and other coaches perceive concussions (and the protocols that are in place) in ice hockey ?

→ What are some changes that should be implemented , or types of resources or support that coaches should have in order to better manage the situations(s) described above ?

**Summary Questions :**

- Would you like to add any other information to our conversation?
- Do you have any comments or questions for me?

## Annexe B

**Tableau 3**

*Thèmes et définitions du modèle COM-B utilisés pour l'analyse déductive du contenu*

| First Level Themes | Second Level Themes |
|---|---|
| **Capability**<br>An individual's physical and psychological abilities to engage in a behavior. | **Physical Capability**<br>Skills, abilities or proficiencies acquired through practice.<br><br>**Psychological Capability**<br>Knowledge, memory, attention, decision processes, behavioral regulation |
| **Opportunity**<br>Factors that lie outside the individual that make the behavior possible. | **Physical Opportunity**<br>Environmental and contextual resources.<br><br>**Social Opportunity**<br>Social influences such as social pressures, norms, conformity, and social comparisons. |
| **Motivation**<br>The brain processes that energize and direct behavior. | **Automatic Motivation**<br>Emotions, reinforcement such as rewards, incentives, punishment. Emotional reactions, impulses.<br><br>**Reflective Motivation**<br>Beliefs about capabilities and consequences, roles, identity, intentions, goals, optimism, plans and evaluations. |

*Note. Les définitions sont conformes à celles de (Michie et al., 2014).*

**Annexe C**
**Profil de l'entraîneur Jodie**

**Tableau 4**

| ***"In need of a leader"*** | |
|---|---|
| **Jodie Biographical Information**<br>• **Name**: Jodie (they/them)<br>• **Age**: 39<br>• **Levels Coached**: Presently coaching men's U18 AAA, but also has experience at the U13 and U15 men's AAA levels, as well as the Quebec Major Junior Hockey League.<br>• **Reason to start coaching**:<br>- Positive experiences as an ice hockey athlete.<br>- Desire to pass along expertise and life lessons to young athletes.<br>- Wants to be part of the development of the next generation of hockey players.<br>• **Experience as an athlete:** Played parts of 5 seasons professionally in North America.<br>• **Experience as a Coach**: 13 years<br>• **Experience with Concussions:** Six diagnosed concussions. Four came from the collisions with opponents, whereas 2 resulted from on-ice altercations with opposing players. | **Jodie Characteristics**<br>• Calm, relaxed demeanour<br>• Confident in coaching abilities and decision-making<br>• Focused on instilling values such as integrity, respect, and honesty in athletes, which Jodie considers to be important in developing good citizens.<br>• Places athlete well-being ahead of game results, something Jodie appreciated in their favourite coaches. |

***Context:*** Jodie is the coach of a U18 AAA ice hockey team. This weekend the team is playing in a tournament in Lévis, Québec. The scene takes place in Jodie's hotel room. Jodie is having a flash-back on the previous night where they recall the play that led to Kai's injury. Jodie's team played their 3 round robin games, and their best player, Kai, has led the way with absolutely dominating performances. In the 3rd game, Kai receives a legal body check from an opponent along the boards. Afterwards, Kai seemed distracted and was slow to answer questions from Jodie, which was unusual behaviour. Kai is a smart young man and is typically very focused during games. Jodie, having years of *experience as a coach* and, *knowing how Kai typically acts*, decides to sit Kai out for the remainder of the game. The parents were all unhappy with the decision to remove Kai from the game, a point they would later bring up with coach Jodie. The scene shifts to a parent gathering to meet with coach Jodie. The parents believe that the team can only win the tournament if Kai is playing.

***Plotline - Internal monologue and dialogue with parents on the team***

***Beginning:*** Focuses on getting to know coach Jodie. They will be in their hotel room, early morning when a flash- back of last night's game will start dominating Jodie's thoughts.

***Middle:*** Jodie is lost in their own thoughts; recalling the play-by-play of the injury that was sustained by Kai in the 3rd game of the tournament. We get to live the struggle that Jodie went through while making this decision. Kai was the best player on the team, and Jodie had to balance winning the tournament and their desire to look out for Kai's well-being. This decision is complicated by the pressure placed on Jodie by parents of players on the team.

***End:*** Jodie is asked to explain to parents their decision to sit Kai out for the remainder of the tournament. Jodie guides the parents through their decision. Jodie explains that athletes' well-being comes first—no matter the situation. The parents push back on this decision, and Jodie's immediate response to the parents' reaction is frustration and anger. Jodie can't believe the parents would put them in this situation. But Jodie won't give into the parents. Jodie *is resolute in their decision*. Jodie will reflect on being satisfied with the decision as it *was consistent with their philosophy of putting players' health interest above all*, which is what matters most to Jodie.

**Integration of COM-B model elements within the vignette above:**

**Capability:**

- Jodie's capability will be reflected throughout the management of the situation.
  - Because Jodie has personal lived experiences with concussions, attended concussion education seminars, and knows the players on the team, Jodie feels capable to identify possible concussion symptoms. Additionally, as a coach with many years of experience, Jodie feels capable to stick to their values (i.e., not putting Kai back in).

**Motivation:**

- Two motivational factors will be seen.
  - Jodie values player safety and well-being above winning, which is the main source of Jodie's motivation to sit Kai out—regardless of Kai's status on the team and how it may impact their chances of winning. Jodie's frustration towards the parents on the team will motivate their decision to be unwavering in their decision to remove of Kai from the game.

**Educational Concepts integrated within the vignette, derived from Parachute Canada's *Coaches, Trainers and Safety Personnel's guide*:**

- This vignette will illustrate which signs and symptoms (e.g., balance problems, not thinking clearly, feeling more emotional, feeling like "in a fog") to look out for in athletes suspected of concussion, as well as a coach's motivations to decide to sit a player out.
- This vignette will illustrate how hard decision making can be and how coaches must stick to their values. Finally, coaches reading this vignette will ideally see how difficult it could be to put the players health at the forefront of the decisions they take.

**Annexe D**
**Profil de l'entraîneur Ollie**

**Tableau 5**

| **Coach Ollie – *"I was never equipped to do this"*** | |
|---|---|
| **Ollie Biographical Information**<br>• **Name**: Ollie (they/them)<br>• **Age**: 37 at the beginning of the vignette<br>• **Level Coached**: Women's U15 AA<br>• **Motivations for coaching**:<br>- The coach of Ollie's daughter's team notified parents approximately one week before the season that they are stepping down.<br>- Reluctantly, Ollie accepted to be the team's coach, despite a lack of coaching experience and coach education.<br>• **Experience as an athlete:** Ollie played recreational ice hockey and enjoyed it, but never aspired to play competitively.<br>• **Experience as a Coach**: None.<br>• **Experience with Concussions**: Never suffered any concussions. Some of Ollie's friends suffered concussions when they were younger. Ollie hears about concussions through the sports media. | **Ollie Characteristics**<br>• Determined and hardworking.<br>• Kind and empathetic.<br>• Lacks confidence as a coach |

***Context:*** Ollie is a hardworking, dedicated parent. Ollie has always loved watching hockey with a beer in hand, but never imagined they would be a coach. This vignette occurs during two moments of time (scenes) in Ollie's life. The first scene is present day. Ollie is picking up a coffee at Tim Horton's before heading to the arena. Ollie's team had a game last night and one of the players got injured while trying to beat a defender to a loose puck. Ollie will think back to the injury itself, how they managed it, and the stress they experienced due to their lack of knowledge about the injury and experience as a coach. Ultimately, Ollie is certain they mismanaged the situation. The second scene occurs 13 years later. Ollie is now coaching their youngest daughter's team. Now, as a coach with more than 10 years' experience, Ollie reflects back on how much they have learned since their first season as a coach (including on concussions), and specifically how Ollie wishes they could go back in time and manage that situation differently.

***Plotline - Internal Monologue***

***Beginning:*** Understand Ollie's busy schedule and many tasks. Ever since the start of the season, Ollie feels like an imposter in their new role. Constantly questioning themselves. Once they have finished describing how they became coach, Ollie will be driving to their practice.

***Middle [flash back to last night's game]:*** During the drive, Ollie will be thinking about how they managed a situation last night, where one of the team's players, Ava, suffered a head injury. Ollie's lack of training and experience leads them to leaving Ava in the game, a decision they will later regret. Almost immediately, Ava is in another collision and suffers what appears to be another blow to the head. The play stops. An ambulance is needed to take Ava to the hospital for evaluation. Ava is unable to participate in school for weeks and misses the remainder of the season.

***End:*** We now shift into the future. Ollie is pulling into the arena parking lot with their youngest daughter, Isabella—the same arena where Ava was injured many years ago. Ollie now has 14 years of experience as a coach. A song on the radio that prompts Ollie to reflect back on their first season as a coach. They recall how unprepared and ill-equipped they felt that first year. And especially about Ava's concussion. Ollie shudders at the thought. Ollie thinks about all they have learned since then.

**Integration of COM-B model elements within the vignette above:**

**Capability:**

- Ollie's capability will be twofold:
  - At the beginning of the vignette, Ollie's lack of experience as a coach and lack of lived experience with concussions sets them up for failure to face a concussion scenario. At the end of the vignette, once Ollie has more coaching experience and has attended multiple concussion education seminars, Ollie will feel capable of making the right decisions to keep their players safe. They know the signs, they know the symptoms, and they are confident in their ability to act adequately when facing concussion scenarios. Ollie knows what to do to keep players safe and knows how to make quick decisions when need be.

**Opportunity:**

- Ollie's opportunity to act will be minimal:
  - This being Ollie's first experience as a coach, they will be filled with uncertainty with their new role and will experience a fear of failure when it comes to dealing with injured players. To deal with this, Ollie will place themselves in a situation where they want everyone to be happy. Hence, Ollie will avoid contradicting players that tell them they are fine. Ollie will even steer clear of sitting out any of their players because of their lack of knowledge on the injury. Unfortunately, Ollie's lack of knowledge will bring them to avoid confrontations and decision making, which will ultimately reduce Ollie's opportunity to act correctly when faced with a concussion situation. This will lead them towards the wrong decision of leaving their injured players in the game.

**Educational Concepts integrated within the vignette, derived from Parachute Canada's *Coaches, Trainers, and Safety Personnel's guide*:**

- This vignette will illustrate some signs and symptoms (e.g., dilated pupils, sensitivity to light, balance problems, low energy) to look out for in athletes suspected of concussion, as well as coach's capability to correctly identify theses signs and symptoms.
- This vignette will illustrate how hard it could be to manage concussed athletes. Coaches reading this vignette will be exposed to a concussion management scenario where the wrong decision was made. Ideally, this will help coaches see that concussion's aren't simple to manage and will give them better tools to properly assist their injured athletes.