

Project M.I.A.: Motivational Interviewing in Athletics

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Abstract

Motivational Interviewing (MI) has been forwarded as an effective communication strategy for enhancing an individual's motivation to make behaviour changes (Miller & Rollnick, 2013). With sport coaches playing a prominent role in an athlete's motivation (Vallerand & Losier, 1999) and continually engaging in behaviour change conversations with athletes (Amorose, 2007), MI presents a viable option that could be used by sport coaches. However, research has yet to address MI in the context of sport despite the evidence supporting its practical use in changing behaviour in various health domains, as well as its endorsement among health professionals who are in the vocation of changing individual's behaviour (Miller & Rollnick, 2013). Therefore, the purpose of the study was to determine Canadian university sport coach's awareness, use, and knowledge of MI, and examine potential differences based on demographic and coaching history variables. A non-experimental, cross-sectional design was used to collect data from Canadian university sport coaches ($N = 152$) from February to March 2017. Coaches reported awareness (27.00%), use (29.80%), and knowledge of MI (77.85%). Chi-square statistics revealed coaches with alternative certifications to those certified by the National Coaching Certification Program (NCCP) reported greater awareness of MI ($\chi^2 = 4.77, p < .05$), and logistic regression results indicated that coaches with more certifications reported greater awareness of MI than those with less certifications ($\chi^2 = 5.59, p < .05$) and use of MI in their coaching practice ($\chi^2 = 6.26, p < .05$). In general, the findings suggest that MI has resonated with sport coaches, albeit minimally, but perhaps greater than anticipated, which presents an interesting avenue to further explore MI in the context of sport as a potential mechanism to improve coach-athlete communication patterns.

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Keywords: Motivational Interviewing (MI), Awareness, Use, Knowledge, Sport

Coaches

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Project M.I.A.: Motivational Interviewing in Athletics

Sport has developed into a significant social phenomenon throughout the majority of western countries, with many people participating for competitive and recreational purposes (Sarrazin, Boiché, & Pelletier, 2007). A significant influencer of the social sphere within physical domains is the coach. From recreational to professional sport, the coach's decision-making processes, method of feedback delivery to athletes, relationships developed with athletes, and methods used to motivate athletes can influence the emotions, thought processes, and behaviours of athletes they coach (Amorose, 2007). The aforementioned list of coach's engagements with athletes provided by Amorose (2007) possesses a specific common denominator; that being in communication with athletes is required. Some sociology academics of athletic coaching would argue that competencies in communication are essential to the success of athletic coaches (e.g., Ronglan & Havang, 2011). Research in health care has examined the application of Motivational Interviewing (MI; Miller & Rollnick, 2013); a style of counselling designed to help people progress towards behaviour change, as a method to improve health practitioner communication with clients (Miller & Rollnick, 2013). Over 200 Randomized Clinical Trials have been conducted in order to examine MI's proficiency with regards to behaviour change in a variety of problem behaviour areas (Miller & Rollnick, 2014). Meta-analyses have reported MI's effectiveness for behaviour change in substance use, weight loss, smoking, gambling, and improving cholesterol, blood pressure, dental carries, mortality, and HIV viral load (Miller & Rollnick, 2014).

MI by definition "is a collaborative conversation style for strengthening a person's own motivation and commitment to change" (Miller & Rollnick, 2013, p. 12).

The preceding definition highlights the collaborative, evocative, and autonomy supportive philosophy of MI. Conversations about change are actively collaborative and utilize a dual decision-making process (Rollnick, Miller & Butler, 2008). MI is evocative, in that the goal is to evoke the person's own motivation and skills for behaviour change (Rollnick et al., 2008). Also, an individual's autonomy is honoured by acknowledging it is ultimately their choice and decision if and how they change their behaviour (Rollnick et al., 2008).

MI is heavily grounded in the idea that people are more likely to change behaviour and continue with the new behaviour long-term if they are motivated for internal reasons as opposed to external reasons (Miller & Rollnick, 2013). Also, that people are naturally inclined to grow and develop in a positive manner. However, the social interactions in which people are imbedded can either hinder or nurture this intrinsic motivation for development and change. MI is essentially a way of communicating and interacting with an individual to help nurture internal motives for change, growth, and development (Miller & Rollnick, 2013).

According to Miller and Rollnick (2013), the primary outcome of MI is behaviour change, and MI utilizes and works with social psychological principals (e.g., cognitive dissonance, ambivalence, resisting the righting reflex, etc.) to increase the chance of behaviour change occurring. Cognitive dissonance is the psychological state of possessing any combination of conflicting cognitions, emotions, and behaviours, which creates an aversive motivational state to decrease this inconsistency (Patall, 2012). MI utilizes cognitive dissonance by having an individual voice their intrinsic values and beliefs in order to arrive at a realization that their behaviour is not conducive to what is

important to them (Miller & Rollnick, 2013). The goal is for the individual to solve their dissonance by committing to behaviour change, rather than changing cognitions that undermine the significance of the behaviour (Miller & Rollnick, 2013).

Ambivalence is the experience of being indifferent in choosing between two options (Miller & Rollnick, 2013). An individual recognizes the positive and negative aspects of both decisions. With regards to MI, the two decisions are to change behaviour or not change behaviour (Miller & Rollnick, 2013). In a state of ambivalence, when a person moves towards one decision they recognize the negative aspects and discomfort associated with it and retract to original behaviour or 'status quo'. This leads to a constant flux between both spectrums (to change or not to change). In order to solve ambivalence, MI focuses on enhancing the weight of pro-change, through open communication with the individual that uncovers their personal motives, reasons, and abilities for change (Miller & Rollnick, 2013).

The 'righting reflex' is designated as a natural inclination to correct an individual of their misconceptions and wrong doings (Miller & Rollnick, 2013). MI works around the principal that if an individual is met with confrontation, resistance to that information will develop. As the individuals argues against what is being said to them, they are convincing themselves not to change their own behaviour, based on the principal that we are more likely to do what we hear ourselves say (Miller, 1983). Rather, the individual is encouraged to explore these cognitions, emotions, and behaviours in order to further understand their predicament, and realize change is needed on their own terms (Miller & Rollnick, 2013).

The philosophy and concepts outlined by Miller and Rollnick (2013) that underlie

MI is engrained in four key micro-communication skills. These skills are (1) open-ended question, (2) affirmations, (3) reflections, and (4) summaries. Open-ended questions invite an individual to elaborate their frame of reference regarding a specific situation. Stated differently, open-ended questions provide the respondent with the freedom and flexibility to choose how they address the inquiry. It provides the MI user an understanding of where the individual resides regarding the problem at hand, and creates collaboration between the two people (Miller & Rollnick, 2013).

Affirmations acknowledge an individual's strengths and efforts in order to increase the individual's self-efficacy for change (Miller & Rollnick, 2013). It is important that affirmations are genuine and realistic (Miller & Rollnick, 2013). They oppose the idea that if people are broken down and feel bad about themselves, they will change. However, the exact opposite will generally occur, because once that punishment is absent, the individual will reside back to their original ways or 'status quo' (Miller & Rollnick, 2013).

Reflective listening aligns with the concept of accurate and genuine empathy (Miller & Rollnick, 2013). After a person provides a statement regarding their thoughts or feelings about an issue, the professional can provide a statement regarding what they think the individual means. The reflection does not have to be perfect, because sometimes people will not articulate their thoughts and emotions to the fullest extent, so giving a reflection may provide the person further opportunity to explain themselves. It also invites the person to further explore the topic of change (Miller & Rollnick, 2013).

The final micro-skill evident in the approach to MI advocated by Miller and Rollnick (2013) is labelled summaries and are used to draw together all of the important

points evident within a conversation (Miller & Rollnick, 2013). It provides the individual further assurance that they are understood, and opportunity to address any issues that have been missed, plus offers the clinician/practitioner the chance to draw together key elements of the conversation as a point to engage commitment to action (Miller & Rollnick, 2013).

MI and its Potential Usefulness for Sport Coaches

The primary outcome of MI is to change an individual's behaviour by enhancing his or her own motivation to do so (Miller & Rollnick, 2013). Therefore, it is difficult to explain why MI has yet to be fully examined with regard to the coach-athlete relationship, considering the coach and athlete share one of the most important interpersonal relationships in sport, and the coach plays a significant role in the athlete's motivation (Vallerand & Losier, 1999). An athlete's motivation is important to coaches because it is what energizes and directs behavioural persistence. It is what produces outcomes, and coaches influence athletes to perform and behave in certain ways that creates athletic success (Ryan & Deci, 2000).

Coaches engage in behaviour change talk with athletes on a regular basis (Amorose, 2007). Specifically, such conversations include providing instruction, correcting an athlete when performing a skill incorrectly, addressing an athlete's actions when incongruent with team rules, encouraging positive behaviour, and acknowledging the need for change in the behaviour of the team organization as a whole (Amorose, 2007). As Ryan (2012) noted, if one is trying to intervene and influence an individual's behaviour, understanding the kind of feedback, important thought processes, meanings, and perceptions of the social context that will develop or hinder the behaviour is essential

to the success of their pursuit. To that point, as Ronglan and Havang (2011) suggest, in order to influence the social interaction with their players, a coach must possess competencies in communication, and that the essence of coaching is communicating effectively. Competencies include an ability to explore and understand the perspectives of those one is interacting with (Ronglan & Havang, 2011). At a deeper level one can understand individual athlete personalities in order to derive their best efforts, considering individual players within a team will possess their own distinctive interpretations of messages. Ricky Pointing described this after reflecting on his career post retirement from cricket captaincy (Rollnick, 2015). Therefore it is arguable that MI, a method used to enhance the quality of a social interaction and communication between two people is a potentially viable skill for sport coaches to possess (Miller & Rollnick, 2013).

The autonomy supportive, collaborative, and evocative philosophy that grounds MI is related to sport psychology research examining athlete motivation and functioning. Athletes who perceive their coaches as autonomy supportive generally have higher intrinsic motivation than athletes who perceive their coaches as controlling (Vallerand & Losier, 1999). To the collaborative aspect of MI, research suggests that athletes who perceive the relationship with their coach as meaningful and feel valued as a human being experience greater intrinsic motivation for sport (Vallerand & Losier, 1999). Also, with regards to MI's focus on evoking individual's internal motivation for change, it is apparent that athletes who are able to develop internal motives for various pursuits within their athletic practice are able to persist longer within their sport, display greater task perseverance, experience greater well-being, and are less likely to experience burnout

(Treasure, Lemyre, Kuczka, & Standage, 2007).

Rollnick (2015) makes an argument that a potential misconception of coaches is that they can simply 'instil' motivation in their players. To that point, Rollnick (2015) contends that one cannot motivate an individual by forcing the motivation upon them in a coercive manner. A coach can yell, force, threaten, and use fear-inducing messages, but then the player inevitably must act on their own. The logic of coaches here is that the coach is the expert and the athletes are simply passive, and therefore the latter needs to be informed of their wrongdoings (Rollnick, 2015). It is similar to teachers, doctors, and parents when they are trying to enforce change upon another individual. The individual in the helping role focuses on pointing out the individual's shortcomings and ill behaviour. Correcting the individual's behaviour is the apparent solution, and is the 'righting reflex' in the health care field (Rollnick, 2015). Coaches who use this method of coaching, simply detecting the mistake and correcting it, most likely believe they are instilling motivation in their players. From the viewpoint of Rollnick (2015), motivation is not something that can be administered, and athletes must become motivated to enhance their performance on their own terms.

A different view-point, one that emphasizes an athlete's strengths and their own motivation would develop different coaching strategies. Athletes would be seen as individuals with strengths, intuition, and would be free to voice their own reasons and avenues for improving performance, while coaches would affirm their athlete's own methods for improvement (Rollnick, 2015). This is the philosophy of MI, that motivation is not something that can be forced on and taken up by an individual but rather requires nurturing of development through the social interaction between people (Miller, 1983). It

provides an alternative angle to address these discussions about change in sport (Rollnick, 2015).

Literature Addressing MI in Sport

To date, virtually no empirical research has examined MI in sport, however some literature has acknowledged its potential viability in the sport context. Miller and Rollnick (2013) do contend that MI can be practiced across a variety of contexts. A variety of specialists, including therapists, medical doctors, educators, clinicians, nurses and even coaches can integrate the conversation style central to MI in their professional practice. There could be variability in the level of directing and guiding that sport coaches use compared to health care providers. Guiding and directing guiding refers to the overarching styles of counselling outlined by Miller and Rollnick (2013). Miller and Rollnick (2013) compartmentalize helping conversations into a continuum of styles. One end of the continuum is a directing style, which consists of informing the individual of exactly what to do. The other end of the continuum is a following style, which is predicated on trusting the individual to make adaptive decisions, and staying engaged while viewing the individual's process (Miller & Rollnick, 2013). Miller and Rollnick (2013) view MI as a counselling strategy that utilizes both ends of the spectrum to form a guiding style. A guiding style focuses on understanding where the individual wants to go, and assisting them when needed. If a guiding style is being utilized where the coach is trying to draw out and nurture an athlete's or team's peak performance, rather than using a highly authoritarian or directive style, MI may have some utility for coaches (Miller & Rollnick, 2013). MI is a way of communicating; therefore professionals engaging in communication with people could implement the philosophy and tools

imbedded in the MI approach into their method of communication (Miller & Rollnick, 2013).

Several lines of research have acknowledged MI's potential as a tool to facilitate behaviour change in athletes. Stainback, Moncier (III), and Taylor (2007) posit that MI could be applied to a variety of specific issues in sport. One issue specifically acknowledged is the low level of therapeutic help seeking among athletes (Stainback et al., 2007). Therapeutic alliance between clinician and client can be one of the most significant factors dictating therapeutic success, including clinical sport psychology, and MI is a style of counselling that helps strengthen this therapeutic alliance. Therefore, MI is a potential technique for sport psychologists to keep resistant athletes engaged in counselling regarding alcohol use (Stainback et al., 2007).

Outlaw and Toriello (2014) acknowledge that competitive sport environments may present stressors to athletes, which could contribute to loss of both self-esteem and personal self-worth. The feelings of loss experienced by athletes are possibly associated with depression, and exacerbate substance use as a coping mechanism (Outlaw & Toriello, 2014). African-American athletes are a distinctive population that may deal with stereotyping and discrimination that affects their self-esteem and self-image. Considering MI has shown effectiveness in the treatment of addictions, treatment of student athletes, and patient adherence to therapy, exploring the possibility of using MI with African-American collegiate athletes is justifiable. Furthermore, with MI being a client-centred approach to therapy, and with African-American collegiate athletes facing specific personal issues, MI may be a style of communication that could address those specific personal issues (Outlaw & Toriello, 2014).

Stephen Rollnick, who founded MI with William Miller, posits that MI is a potentially useful technique for sport coaches (Rollnick, n.d.b). Rollnick (n.d.b) advocates the use of MI skills to refine coaching practice and eliminate the ‘righting reflex’, improve a coach’s personal engagement with an athlete, and help coaches enhance an athlete’s own motivation for change (Rollnick, n.d.b). Rollnick (n.d.b) argues that MI skills (e.g., open ended-questions, etc.) can be used in the team environment such as wards, prisons, and other social settings. Further, Rollnick (n.d.b) proclaims that those in helping roles such as coaches and even athletes could use MI skills to help athletes discover their own reasons and means for change regarding technical aspects of sport, as well as clinical issues that present in sport which include addiction and stress issues (Rollnick, n.d.b). Further to suggesting MI as a potential technique for coaches, Rollnick (2015) addresses some of the issues with coaching communication that are similar to practitioner communication issues in the health and addiction field. MI has shown great promise in both fields with reference to motivating individuals to change behaviour (Miller & Rollnick, 2013). Coaches often concern themselves with the performance of their athletes and a power relation exists between the coach and athlete in the sense that the coach attempts to influence the performance and behaviour of the athlete (Markula & Pringle, 2006). There are many ways to help an individual develop a new perspective and behave differently, however two potentially problematic methods used by coaches are direct confrontation and fear induction (Rollnick, 2015)

Direct confrontation is facing an issue at the forefront, or face to face (Rollnick, 2015). This is indeed needed when an individual or the team as a whole is not performing well. The goal is to make the person change, enhance their motivation, and

develop a new head on perspective about their game (Rollnick, 2015). Coaches, just like other helping professionals such as teachers, managers, and doctors, all experience the sensation of wanting someone to develop a new perspective and understanding regarding their current behaviour. However, the content of the message and style in which it is delivered may produce different outcomes (Rollnick, 2015). When a coach confronts a player with shouting and demeaning messages, with the purpose to single out the individual and embarrass them in front of their peers, it may breed resistance. Coaches may fall into a trap, that when a player resists the message due to their style of language, they falsely believe the athlete cannot comprehend the content of the conversation, and blame the athlete for being arrogant or stupid (Rollnick, 2015).

There is a chance that a team may perform better after a coach provides a verbal attack, but the increased performance is not necessarily due to the coaching style. A coach may develop faulty logic through mere association that this style of coaching produces positive outcomes (Rollnick, 2015). At times, a specific type of feedback will be followed up with a positive performance by an athlete, and other times it will not. Clearly, many variables are associated with a positive and negative performance (Rollnick, 2015). In the practice of coaching, discourses may be formed that are not necessarily true, but through associations and underestimations, they become perceived as factual or natural law (Denison & Scott-Thomas, 2011). This is potentially one-way confrontation and humiliation is inherited into the coaching practice (Rollnick, 2015).

This line of thinking and practice is similar to the treatment of addictions in the 1960's where humiliation and confrontation were used regularly (Rollnick, 2015). Individuals were singled out and confronted by their peers and subjected to humiliating

acts such as women being forced to shave their heads and men receiving vasectomies (Rollnick, 2015). The idea was that intense confrontational strategies such as these were optimal ways to promote behavioural change, albeit no empirical evidence was available to substantiate the effectiveness of these approaches (Rollnick, 2015). Furthermore, individuals with alcohol problems were deemed to possess negative personality characteristics such as being pathological liars, in denial, and possessing little motivation for treatment, however no empirical research actually depicted that these individuals possessed specifically consistent negative personality characteristics (Miller, 1983). If the individual was unsuccessful in therapy, it was due to their personal faults, and when successful in treatment, it was due to the competencies of the program and counsellor (Miller, 1983). It was recognized that this attribution of success was incorrect, and it was not actually the characteristics of the individual, but rather the social interaction between the therapist and patient that developed this lack of motivation and persistent resistance to treatment (Miller, 1983).

Inducing fear is a behavioural change technique used in many different contexts, with varying degrees of utility. Prison warders, doctors, sergeant majors, and teachers use it (Rollnick, 2015). Athletes such as soccer players have reported a positive influence, however they may have developed and possess a resilience to respond appropriately, or have an excellent relationship with their coach that allows for this type of confrontational approach to enhance their motivation. However, it is likely unwise for a coach to believe that fear works for every athlete, and that it is a foundational tool for team culture. Perhaps a good approach in developing a communication style with an

absence of research is to reflect and learn on mistakes, incorporate and learn a variety of techniques, and assess how players react to different conversation styles (Rollnick, 2015).

There is little evidence to suggest whether coaches use MI in their coaching practice, however Rollnick (n.d.a) has attempted to transmit MI skills to coaches. He developed a workshop to enhance coaching practice using MI communication skills led by himself and other knowledgeable MI instructors and elite sporting minds (e.g., Pat Jennings, Dr. Nina Gobat, Dr. Jeff Breckon). The clinic was promoted to coaches as a way to experience and learn effective communication skills that will help overcome challenges such as increasing their athlete's self-governance for training, athletes who partake in poor lifestyle choices, difficulty getting messages across, athletes with personal issues, and maladaptive behaviour for team success (Rollnick, n.d.a).

Study Rationale

Rollnick and colleagues here suggested that MI could be used by coaches (Miller & Rollnick, 2013; Rollnick, 2015; Rollnick, n.d.a; Rollnick, n.d.b), however there is currently limited research investigating MI within the context of sport. Before examining the utility of MI in the sport context, a prior research endeavour could be examining whether coaches are aware, use, and possess any knowledge regarding the evidence-based technique MI. Essentially, evidence-based practice is the philosophical idea that professionals operate in their clinical encounters using the most up to date and efficient guidelines and tools within their chosen field of specialization (McKibbin, 1998). Laske (2006) has expressed the need for evidence-based training in coaching. Surprisingly, there is a minimal amount of research investigating different styles of coaching communication and their effectiveness in sport.

Given the argument that sport coaching should ideally be grounded in empirical evidence, and MI being an important communication technique rigorously tested in other contexts, it seems reasonable to ask if coaches know about MI, do they use MI, and have any knowledge of MI? Looking at the literature addressing these questions with regards to specific populations and their awareness, use, and knowledge of evidence-based guidelines (Spence, Plotnikoff, & Mummery, 2002; Kay, Carroll, Carlson, & Fulton, 2014; Zenko & Ekkekakis, 2015), it becomes apparent that practicing professionals often lack awareness, use, and knowledge of relevant professional-practice guidelines.

Spence et al. (2002) examined Canadian resident's awareness and use of Canada's Physical Activity Guidelines (CPAG). The CPAG were developed by Health Canada in association with the Canadian Society for Exercise Physiology with the intention to inform Canadians about the benefits of physical activity, and thereby encourage participation. Participants were asked if they were aware of CPAG and if they used CPAG. Spence et al. (2002) reported that only 20.70% of Canadian residents were aware of the guidelines, and only 5.50% used them. Spence et al. (2002) also examined if demographic variables moderated the participants level of awareness and use of the CPAG. Females were significantly more aware of the CPAG than males. Individuals with higher education status were more likely to be aware and use the CPAG as well. Differences in age, ethnicity, and household income did not differ in their reported level of awareness and use of the CPAG (Spence et al., 2002).

Kay et al. (2014) examined United States adult's awareness and knowledge of the 2008 government guidelines released in 2008 targeting participation in moderate-intensity physical activity. In 2007, an expert committee reviewed the research

concerning physical activity and health, and formulated the federal Physical Activity Guidelines for Americans (Kay et al., 2014). The guidelines recommend that an individual complete either 150 minutes of moderate-intensity physical activity spread out over an entire week, 75 minutes of vigorous-intensity physical activity, or a combination of moderate and vigorous intensity physical activity. The guidelines also suggest that adults take part in muscle strengthening activities on at least 2 or more days a week (Kay et al., 2014). Kay et al. (2014) examined American resident's awareness of the 2008 federal Physical Activity Guidelines for Americans by asking participants their response to "Have you seen, heard, or read anything about government physical activity guidelines in the last year?" (p. 694) and were given 'yes', 'no', or 'not sure' as response options. The participant's knowledge of the federal Physical Activity Guidelines for Americans was assessed regarding the criteria for moderate-intensity physical activity. Kay et al. (2014) instructed participants to identify "the minimum amount of moderate-intensity physical activity the government recommends for adults to get substantial health benefits" (p. 694) and were given six different options, with '150 minutes spread out over a week' being the correct answer. A total of 36.10% reported they were aware of the guidelines, and less than 1.00% (0.56%) correctly identified the minimum amount of moderate-intensity physical activity required for health benefits. Kay et al. (2014) also examined if there were differences within specific demographic variables for American resident's reported awareness and knowledge of the guidelines. Females were more aware than males, and young adults were more aware than older adults. Adults of white ethnicity were more aware than individuals of other races/ethnicities. Increases in education and income were also significantly related with higher levels of awareness.

BMI categories had no significant effect on awareness. With regards to knowledge of the guidelines, increasing levels in education was significantly associated with providing a correct answer suggesting people with more advanced education were more likely to be knowledgeable regarding the guidelines.

Zenko and Ekkekakis (2015) assessed the knowledge of exercise professionals certified by the American College of Sports Medicine (ACSM) regarding the exercise prescription guidelines issued in 2011 by the ACSM. Participants answered an 11-item multiple-choice survey assessing their knowledge of the ACSM guidelines synthesized from over 400 scientific reports, which contained material regarding exercise as a mechanism for physical fitness and health improvement (Zenko & Ekkekakis, 2015). Zenko and Ekkekakis (2015) hypothesized professionals with greater experience, advanced professional certifications, higher levels of education, employed in clinical or academic settings, and reported scientific sources as their main information resource would display greater knowledge of the ACSM guidelines. The exercise professionals scored an average of 42.00% correct on the multiple-choice test, and reported a higher perceived (70.10%) than actual (42.00%) knowledge with assessment. Sex, age, years of work experience, and number of certifications had no significant effect on knowledge of ACSM guidelines in the sample investigated by Zenko and Ekkekakis (2015). However, higher levels of education, primary job role, and using scientific sources for information attainment positively influenced knowledge regarding the ACSM guidelines.

In summary, the aforementioned studies (Spence et al., 2002; Kay et al., 2014; Zenko & Ekkekakis, 2015) imply that professional practice guidelines developed through systematic research sometimes fail to be taken up, used, and even learned by those

clinicians/professionals who could potentially benefit most from them. It is arguable that coaches could benefit from MI (Miller & Rollnick, 2013; Rollnick, 2015; “Rollnick n.d.a; Rollnick n.d.b) but whether coaches actually are aware, use, or have any knowledge of MI is unknown, and therefore it seems warranted as the first step in a line of research spearheading the investigation of MI in the context of sport. It also appears that demographic variables (i.e., sex, education) could impact the level of awareness, use, and knowledge of evidence based guidelines given the findings reported by Spence et al. (2002), Kay et al. (2014) and Zenko and Ekkekakis (2015).

Study Purpose, Research Questions, and Study Hypotheses

Considering the absence of empirical data regarding MI in sport and specifically research targeting MI and coaches, the purpose of the study was to examine if Canadian university coaches know MI exists, if they have ever used MI when coaching, and their level of knowledge regarding MI. This research study was driven by three questions with specific hypotheses derived from previous research in aligned domains (Spence et al., 2002; Kay et al., 2014; Zenko & Ekkekakis, 2015).

First, are Canadian university sport coaches aware of Motivational Interviewing? It was hypothesized awareness of MI would be evident amongst Canadian university sport coaches. The hypothesis was developed based on findings of Spence et al. (2002), who found that 20.70% of Canadian residents were aware of CPAG, and Kay et al. (2014) who found that 36.10% of American residents were aware of the 2008 federal Physical Activity Guidelines for Americans. Further hypothesis dictated females would report higher MI awareness than males, and individuals with a higher level and number of coaching certifications would also report higher MI awareness. The hypothesis was

derived from Spence et al. (2002) and Kay et al. (2014) who both found that being female, and possessing a higher level of education was associated with a higher level of awareness.

Secondly, do Canadian university sport coaches use MI in their coaching practice? It was hypothesized Canadian university sport coaches would report using MI. The hypothesis was developed based on the findings reported by Spence et al. (2002) who noted that five percent of Canadian residents used the CPAG. Also hypothesized, Canadian university sport coaches with a higher level and greater overall number of coaching certifications would report greater use of MI. The hypothesis was also derived from the work of Spence et al. (2002) who noted that Canadian residents with more advanced education qualifications reported a higher level of CPAG use.

Lastly, do Canadian university sport coaches have any knowledge of MI? It was hypothesized that Canadian university sport coaches will demonstrate evidence of proficiency in the true-false quiz designed for Project M.I.A. to assess MI knowledge (Refer to Appendix A: Section 3). The hypothesis was created based on the work reported by Zenko and Ekkekakis (2015), who noted that exercise professionals displayed an average proficiency of 42.00% on a quiz designed to assess knowledge of ACSM's exercise prescription guidelines. Additionally, it was hypothesized that Canadian university sport coaches with higher levels and a greater number of coaching certifications would display greater MI knowledge evident by a higher percentage of right answers. This hypothesis was developed based on Zenko and Ekkekakis (2015) who noted that exercise professionals with higher levels of educational attainment scored

higher on a quiz assessing knowledge of exercise prescription guidelines created by the American College of Sports Medicine.

Methods

Participants

Head and assistant coaches above the age of 17 years at the time of data collection were recruited from Canadian universities via email. The Canadian Interuniversity Sport (CIS) system contains fifty-two competing universities ($N = 52$) with four separate divisions: (1) Atlantic University Sport (AUS), (2) Réseau du Sport Étudiant du Québec (RSEQ), (3) Ontario University Athletics (OUA), and (4) Canada West Universities Athletic Association (CWUAA).

All four divisions each possessed an official website that provided a list of the competitive sports per division plus the competing teams within their division alongside a contact email for the head and/or assistant coaches per team. The inclusion criteria for Project M.I.A. required that participants were either a head or assistant coach of an athletic team that was part of the list of competitive sports competing within their division.

Instrumentation

Demographics. Participants provided self-report responses to various items pertaining to demographics (see Appendix A – Section 1). The demographic items were selected based on items used in prior research examining awareness, use, and knowledge of evidence-based guidelines (Spence et al., 2002; Kay et al., 2014; Zenko & Ekkekakis, 2015). Refer to Appendix A (Section 1) for a complete list of the demographic questions.

Coaching History. Participants responded to eleven items concerning their coaching experience and certification status. Items were drawn from previous research examining athletic coaches, such as current coaching position (head or assistant), current sport coached, length of time coaching (Botsis & Holden, 2015), level of coaching certification held, and attendance of workshops/conferences (Stoszkowski & Collins, 2015). The remaining item content consisted of variables in order to provide a more comprehensive understanding of the coaching history within the sample. See Appendix A (Section 2) for a list of the questions in its entirety.

MI Knowledge. Participants completed a true-false quiz comprised of six items derived from the Motivational Interviewing Treatment Integrity (MITI; Moyers, Manuel, & Ernst, 2014). The MITI is a coding manual used to assess the proficiency of clinician delivery of MI, and provide feedback to clinicians for improving MI skills (Moyers et al., 2014). The first question assessed knowledge regarding MI consistent behaviours, such as autonomy support and change talk (item: “Athletes who can express their own reasons for change will possess better motivation than an athlete who is forced to take on their coach’s reasons for change.”). The second question addressed resisting the righting reflex (item: “A coach who confronts their athletes about making changes to their game will likely encourage an athlete to express reasons to not change.”) The third question tapped into the use of reflections (item: “Reiterating statements made by athletes is one of the most productive ways a coach can gain a deeper understanding of the athletes’ point of view and express empathy.”). The fourth question tapped into the concept that individuals strive for self-actualization and possess the knowledge needed to make positive changes (item: Athletes do not possess an inherent knowledge of how to improve

in their sport and must be confronted by the more experienced expert coach to make changes.”). Question 5 was directed at the use of affirmations (item: “Recognizing an athlete’s strengths will help them improve as a player in their sport.”), as well as question 6 (item: Acknowledging an athlete’s strengths will help them improve as a player in their sport.”). Correct responses to each item were as follows: (a) Item 1 = True; (b) Item 2 = True; (c) Item 3 = True; (d) Item 4 = False; (e) Item 5 = True; and (f) Item 6 = True.

Refer to Appendix A (Section: 3) for the entire true-false quiz.

MI Awareness and Use. Modified from Spence et al. (2002), who examined Canadian resident’s awareness and use of CPAG, participants were asked; ‘Are you aware of the communication technique called Motivational Interviewing?’ and ‘Have you used Motivational Interviewing in your coaching practice?’ Participants responded to the aforementioned questions with ‘yes’ or ‘no’ answers only. Please refer to Appendix A (section 4) for the presentation of these questions.

The rationale for using single item measures is that they can fare equally to multi-item measures of the same construct under select conditions. Gardner, Cummings, Dunham, and Pierce (1998) compared a multi-item Likert-type focus of attention scale with a one-item focus of attention scale created by Gardner, Dunham, Cummings, and Pierce (1989) on performance in convergent and discriminant validity analyses and common methods bias. Neither scale appeared to hold superior performance over the other based on the aforementioned comparisons. Both multi-item and single item measures converged and diverged appropriately and the evidence for methods bias was statistically significant. Also, Wanous, Reichers, and Hudy (1997) conducted a meta-analysis assessing correlations between single-item measures and scales measuring

overall job satisfaction, and found convergent validity between single-item and scale measurements of job satisfaction. Single-item measures are superior to multi-item measures with regards to specific dimensions such as reducing the time and monotony of completion (Gardner et al., 1998), as well as achieving greater comprehensibility for subjects. It is acceptable to use a single-item measure when the construct is very specific or is explicitly clear to the subject. If the construct of interest is much more complex, such as personality, then multiple items are potentially more appropriate (Wanous et al., 1997). In the case of awareness and use, the questions are quite simple, and are unlikely to provoke confusion, nor do they encompass varying aspects such as a construct diverse as personality, and are quite specific. As Wanous et al. (1997) explained, if the situation appears appropriate to employ a single-item measure, then researchers should hold confidence in their choice.

Data Collection Procedures

A non-experimental (cross-sectional design) was used for this study. Participants were recruited using non-probability (purposive) sampling techniques (Trochim, 2006), guided by the aforementioned inclusion criteria. Study recruitment occurred by emailing head and assistant Canadian university sport coaches (please see detailed analysis in results). Head and assistant Canadian university sport coach's email addresses were extracted from publicly accessible web pages. The majority of the universities included in the study possessed a publically accessible directory for athletic staff. Each university also included a separate section on their publically accessible website for information pertaining to each of their athletic clubs, which included coach's names and emails for each athletic team. Initially, emails were retrieved from each publically accessible staff

directory. Emails were further extracted from each university's separate athletic section, as there were assistant coach's emails not listed in the staff directories. The official OUA website (<http://www.oua.ca/landing/index>) provided a list of each competing school's coaches and their respected emails. The process of retrieving OUA coach's emails included the extraction of emails from the aforementioned list on the OUA website prior to examining each school's athletic staff directories, and athletic club websites.

The first recruitment email presented an invitation script (see Appendix B) outlining the purpose of Project M.I.A., study requirements, and confidentiality information. A follow up/reminder email presenting an invitation script (see Appendix C) was delivered exactly two weeks after the first email was sent, following the recommendations advanced by Dillman (2007). Within both the initial and follow up/reminder emails, a link (https://www.surveymonkey.com/r/Project_MIA) was imbedded that directed participants to the survey housed on www.surveymonkey.net.

First, participants were introduced via a Letter of Invitation (LOI; see Appendix D) outlining the research study, study requirements, and anonymity and confidentiality information. Next, participants were directed to the informed consent (see Appendix E), and were asked to address whether they agreed to participate in the study. Participants were provided the response options of 'yes' and 'no' for this item. Participants who responded with 'yes' were directed to complete the survey. Participants who responded with 'no' were removed from the survey study webpage. Participants were notified that their participation in the study is voluntary and withdrawing from the study is available at any point in time by discontinuing the questionnaire which involved simply exiting the web browser. The survey was first accessed on February 1st (2017), and the final access

occurred on March 8th (2017). The data from www.surveymonkey.net was downloaded to SPSS on March 10th (2017) by the primary author (Colin M. Wierst).

Data Analysis

Initially, data were screened for missing and incomplete values, incorrect responses and normality. Descriptive statistics were used to summarize the demographic and history of coaching experience variables that made up the sample. Frequency values were used to report the number of participants indicating they were aware of MI and have used MI in their coaching practice. Descriptive statistics were used to describe percentage of correct scores on the MI true-false questions. Chi-square statistics were used to determine whether there were significant differences in MI awareness and use on variables of sex and coaching certification. Significance of observed differences and type of categorical difference found were assessed at the $p < .05$ level. The following assumptions were tested for the Pearson Chi-square: (a) All variables are nominal or ordinal measures, (b) unequal sample sizes, (c) data obtained by random selection, (d) cell data expressed as counts or frequencies, (e) variable categories are mutually exclusive, (f) each participant contributes data to only one cell, (g) independence of variable categories, (h) two variables are present that are categorically measured, (i) the expected value of the cell should be equal to five or more, and a value smaller than one should not occur in any cells (McHugh, 2013).

Independent *t*-tests were used to assess whether there were significant mean differences on percentage of correct answers on the MI true-false scores between male and female coaches, and coaches with different coaching certification. The assumption that each group is normally distributed was tested for both independent *t*-tests (Pandis,

2015). Logistic regression was used to determine whether number of coaching certifications could predict if coaches were aware of MI and used MI, due to the continuous independent variable of number of coaching certifications and the dichotomous dependent variable of awareness and use (Tabachnick & Fidell, 2013).

The following assumptions were tested for the logistic regression: (a) ratio of cases to variables is adequate in size (b) adequacy of expected frequency and power (c) linearity in the Logit (d) absence of multicollinearity (e) absence of outliers in the solution (f) independence of errors. Lastly, bivariate (Pearson) correlations were used to determine whether a significant relationship between number of coaching certifications and percent-correct on the MI true-false questions was evident (Tabachnick & Fidell, 2013).

Results

Email Outline

Originally, 991 email addresses were retrieved from publically accessible university web pages. Of those, eight coaches possessed two email addresses each. In this case, one of their emails was included in the blind carbon copy (Bcc) function of the email, and the other email was included in the carbon copy (Cc) function of the email, producing one total email sent for that coach. 983 emails were initially sent between February 1st 2017 and February 10th 2017. Thirteen email addresses did not register and could not be sent. Therefore, a total of 970 coaches were emailed in the first round, while three coaches responded to the email indicating they had resigned and were no longer coaching at the university. The follow up/reminder email was sent between February 15th and February 24th. The original follow up/reminder email list contained 975 emails, of

which 8 coaches possessed two email addresses each, and were dealt with in identical fashion as they were in the first round of emails. Therefore, a total of 967 coaches were emailed in the second-round while three coaches responded to the email indicating they had resigned and were no longer coaching at the university. Refer to Figure 1 for an outline detailing the total emails retrieved and sent.

Preliminary Data Analysis

In total, 175 individuals accessed the survey, of which all provided their consent. Partial responders were defined as individuals that only provided responses to demographic items. There were 23 non-responders removed from the sample, resulting in a sample size of 152.

Participants

The coaches in the sample ($N = 152$; $M_{\text{age}} = 43.5$ years; $SD_{\text{age}} = 11.37$ years) were mostly male (75.00%), either a head (77.60%) or assistant (22.40%) coach, reported coaching sport for an average of 19.87 years ($SD = 17.91$ years), with an average of 9.95 years ($SD = 7.86$ years) coaching experience at the CIS/OUA level. There were 21 different sports coached, and the most frequent sports coached were soccer ($n = 25$, 16.40%), basketball ($n = 23$, 15.15%) and volleyball ($n = 18$, 11.80%). Considerable variability in responses was recorded for highest level of competition each coach reported in their history, with the majority of the sample coaching at the National (27.60%), University (17.80%), and International (10.50%) levels of sport. The majority of the coaches possessed coaching certifications (93.40%). The average number of certifications held was 2.95 ($SD = 2.14$), and either possessed a National Coaching Certification Program (NCCP) certification (41.40%) or an alternative coaching

certification (52.00%). It should be noted, however, that it is likely some coaches who were in the group with alternative coaching certification, actually in fact possessed a NCCP certification. The explanation is that the question inquiring coach's certification level possessed an example of how to respond to the question, which was "NCCP Development 1." It is likely that some coaches viewed the NCCP and responded to the question with the level of their NCCP certification, as some coaches provided responses such as "2," and "3," and perhaps indicated they possessed a NCCP level "2" or "3" certification. However, these responses were not sufficient to deem the coach NCCP certified, as it could not be for certain whether in fact they were NCCP certified. Coaches reported holding a coaching certification for an average of 11.27 years ($SD = 10.81$, Range = 1-100 years). Most of the coaches attended professional workshops or conferences to update their coaching skills (88.80%), up to once per year (40.10%), twice per year (36.20%), or every 3-5 years (13.20%). Table 1 displays a complete list of demographic and coaching history variables. Table 2 provides an omnibus outline of sports coached by this sample. Table 3 provides details about the highest level of competition each coach in this sample reported in their coaching history.

Descriptive Analysis

One response was missing for the MI awareness item (0.66% of the possible 152 responses). Participants reported not being aware of MI ($n = 110$, 72.80%) while 41 participants reported they were aware of MI (27.20%). The sample possessed 11 missing values (7.24% of the possible 152 responses) on the MI use item. Participants indicated they did not use MI ($n = 99$, 70.20%) while 42 participants indicated they used MI (29.80%). With regard to the MI true-false questions, four questions (1, 3, 4, and 5) possessed

no missing values in this sample, one missing value (0.66%) was rated to question 6, and question two contained three missing values (1.97%). The scores on the true-false questions ranged from 33.00% (2 questions correct) to 100.00% (all 6 questions correct). The average score for all coaches on the MI true-false questions was 77.85% ($SD = 16.48\%$), while 19.10% of the sample provided correct answers to all six questions ($n = 29$), and 5.00% of the sample provided correct answers for two of the questions ($n = 5$). Table 4 provides a complete outline of the percentage of correct questions recorded for a complete outline of the percentage of correct questions recorded in this sample to the MI knowledge items.

Main Analysis

Chi-square statistics were used to examine if male and female coaches differed in their awareness and use of MI during their coaching practice. No significant differences between male and female coaches were evident regarding MI awareness, $\chi^2 ((1, n = 150) = 0.96, p = 0.33, \phi_c = 0.08, p = 0.33)$ and use, $\chi^2 ((1, n = 140) = 0.24, p = 0.63, \phi_c = 0.63)$. An independent samples t -test was conducted to examine if there were mean differences in MI knowledge between male and female coaches. There were no significant differences ($t(150) = -0.47, p = 0.59$) between percentage of correct responses on the MI true-false questions between male ($M = 77.48, SD = 16.88$) and female coaches ($M = 78.95, SD = 15.34$).

Chi-square statistics were used to determine if coaches who possessed a NCCP certification, compared to having an alternative certification, or possessing no certification reported difference on their awareness and use of MI. Due to the small subsample of coaches who reported not having a coaching certification, an assumption of the

chi-square that zero cells have an expected value less than 5 was violated, therefore the sub-sample of coaches with no certification were removed from further consideration in these analyses. The resultant chi-square statistics tested differences between coaches who possessed an NCCP certification from those with an alternative certification.

Coaches with alternative coaching certifications reported significantly more awareness of MI than those with NCCP certification, ($\chi^2(1, n = 140) = 4.77, p < .05, \phi_c = -0.18, p < .05$) although the effect size was small. However, it was determined that no significant differences were evident between NCCP certified coaches, and coaches with alternative certification for their use of MI, ($\chi^2(1, n = 130) = 2.87, p = 0.09, \phi_c = -0.15, p = 0.09$). Independent samples *t*-tests were used to examine whether there were mean differences between NCCP certified coaches and coaches with alternative certifications on the variable of MI knowledge. There were no differences ($t(140) = -1.01, p = 0.31$) between NCCP certified coaches ($M = 76.72, SD = 16.81$) and coaches certified from an alternative organization ($M = 79.54, SD = 16.22$) in terms of percentage of correct responses to the MI true-false questions.

Logistic regression was used to determine if the number of coaching certifications could predict coach's awareness and use of MI. In this analysis, the number of certifications was a predictor of whether coaches were aware of and used MI. An increase in the number of coaching certifications was shown to predict a higher self-reported awareness of MI, ($\chi^2(1, n = 129) = 5.59, p = 0.02$), and use of MI, ($\chi^2(1, n = 120) = 6.26, p = 0.01$). Bivariate (Pearson) correlation was used to determine whether there was a relationship between number of coaching certifications and percent correct on the MI true-false questions. There was no relationship between the number of coaching

certifications and percent correct on the MI true-false questions ($r_{12} = -0.06, p = 0.48, n = 129$).

Discussion

The current investigation was an exploratory, descriptive study aimed at addressing the extent to which Canadian university sport coaches were aware of MI, if they used MI in their coaching practice, and their knowledge for specific MI concepts. The secondary purpose was to determine if differences in variables such as coach's biological sex, level, and number of coaching certifications were evident for coach's awareness, use, and knowledge of MI in sport.

The first set of hypotheses were directed at coach's awareness of MI and it was noted that 27.00% of coaches in this sample reported being aware of MI. The hypothesis that female coaches would report greater awareness of MI than male coaches was not supported in this study, as male and female coaches did not report statistically different overall levels of awareness pertaining to MI. The hypothesis that coaches with a higher level of coaching certification within their respective sport would report greater awareness of MI was partially supported, as coaches with alternative sources of coaching certification reported more awareness of MI than coaches with NCCP certification. The openness to the response on the certification item made it challenging to provide an organized catalogue of unique certification levels and therefore were amalgamated globally into NCCP (group 1) and alternative (group 2) category clusters for the purpose of this study. It could not be determined whether some of the alternative coaching certifications listed by the coaches participating in this study possessed any degree of higher prestige than some of the available NCCP certifications (e.g., NCCP level 4 vs.

CSA National B), which in turn, precede it impossible to test if a higher level of certification influenced awareness of MI, as well as, use and knowledge of MI. The hypothesis that coaches with a higher number of certifications would report greater awareness of MI was supported.

The second set of hypotheses tested in this study focused on coach's use of MI. With regard to this hypothesis, 29.80% of coaches in this sample reported using MI in their coaching practice. Exploratory analyses revealed that no statistical differences between female and male coaches were evident regarding use of MI in their coaching practice. The hypothesis that coaches with a higher level of coaching certification would report greater use of MI was not supported, as there were no statistical differences between coaches with NCCP certification and coaches with alternative certification for using MI in their coaching practice. The hypothesis that coaches who possessed a higher number of coaching certifications would report greater use of MI was supported in this study.

The third set of hypotheses were aimed at explaining coach's knowledge of MI. With regard to this third hypothesis, coaches in this sample reported an average score on the MI true-false quiz of 77.85% ($SD = 16.48\%$). Although not originally hypothesized, there were no differences between male and female coaches regarding their average MI knowledge. The hypothesis that coaches with a higher level of coaching certification would possess greater MI knowledge was not supported in this study, as there was no statistical differences between coaches with NCCP certification and alternative coaching certification on this variable. The hypothesis that coaches with a higher number of coaching certifications would report greater MI knowledge was also not supported, as

there was no statistical relationship between the numbers of certifications a coach possessed and the percent of correct answers produced on the MI true-false questions that represented higher MI knowledge in this study.

Relevance to Existing Literature on MI and Coaching in Sport

This is likely the first study examining MI in the context of sport, specifically with coaches working in Canadian university athletics. It is important to keep this caveat in mind, as interpreting these results is challenging due to the absence of well developed and sophisticated methods for examining MI in sport, that is contradictory in opposition to other fields of study, such as Self-Determination Theory (SDT; Ryan & Deci, 2017), and the wide range of methods and tools that have emerged in order to examine motivation, emotion, and personality in various contexts of sport/exercise, education, and psychotherapy (Ryan & Deci, 2017). The results of this study take preliminary strides towards filling this apparent void in the sport psychology literature by indicating MI has relevance to sport coaches, in at least the sample of coaches that were recruited for this study who reported being aware of MI, and using MI in their coaching practice. The extent to which coaches reported using MI exceeded threshold values extrapolated from Spence et al. (2002) and Kay et al. (2014). The results show that coaches had more knowledge of core concepts integral to MI practice than was hypothesized based on related studies in other domains (e.g., Zenko & Ekkekakis, 2015).

It is promising that the results of this study indicate coaches are to some extent aware of MI, have used MI in their coaching practice, and possess greater knowledge than expected for core concepts that align with MI practice (Miller & Rollnick, 2013). This is indeed helpful mainly because MI has been recognized as an important

communication skill used to motivate people to make behaviour changes, and athletic coaches are regularly immersed in conversation with athletes that focus on changing an athlete's behaviour (Amorose, 2007). Therefore, it appears that at least a fraction of athletic coaches in the Canadian university system endorse MI as part of their strategy to communicate with the athletes they coach. Furthermore, Canadian university sport coaches appear to have an understanding of MI concepts given the scores in this sample pertaining to MI knowledge. The six items within the true-false questions tapped into key concepts of MI that are related to enhancing an individual's self-determined motivation for behaviour change. Encouraging change talk, avoiding the righting reflex, utilizing reflections, acknowledging the individual possesses the abilities for positive growth, and the use of affirmations to address an individual's strengths are key concepts outlined in the MITI, and align with MI's philosophy of enhancing autonomous motives for change (Miller & Rollnick, 2013; Moyers et al., 2014). It appears that coaches, at least in this sample, have an understanding of these concepts as they apply to motivating athletes to change behaviours, which is likely positive and potentially effective given the significant role coaches play in motivating their athletes (Vallerand & Losier, 1999).

It is worthy to note that coaches with alternative coaching certification sources were more aware of MI than coaches with NCCP certifications, and the total number of certifications held by coaches predicted more enhanced awareness and use of MI in sport. These findings must be interpreted with caution; however, as they are purely descriptive and provide no theoretical insight explaining these relationships. With speculation, coaches possessing alternative certification(s) to the NCCP may have been more aware of MI because they received greater MI exposure at certification workshops they attended

compared to coaches who attended NCCP workshops. However, as addressed previously, coaches who were grouped together under the ‘alternative coaching certification’ category may in fact actually possess NCCP certifications. This potential issue stems from the open-ended nature of the response option to the item querying coaching certifications. A fraction of coaches provided responses to this item that indicated they were possibly NCCP certified, however, the information was not sufficient (or specific) enough to designate the response as NCCP certification. Therefore, it is possible that a fraction of coaches in this sample were NCCP certified, but were in the alternative certification group for the purposes of data analysis, which may have influenced the results of the study. Also, the number of coaching certifications predicting coach’s awareness and use of MI could have resulted from coaches with more certifications receiving greater exposure to MI as a result of attending more programs for certification. Ultimately, future studies will be needed to more fully explain these issues in greater detail preferably building on this study to indicate other ways to assess these variables.

Limitations

This study has several limitations that should be taken into account when interpreting the results. Key limitations of this study include, but are not limited to the following: (1) Use of a cross-sectional, non-experimental design; (2) Self-report nature of the data; (3) Sampling techniques used to recruit study participants and resultant sample size from study recruitment efforts; (4) Coaches were sampled as opposed to other groups within sport settings; (5) the study was atheoretical in design; and (6) Use of modified instruments to assess key variables of MI use, MI awareness, and MI knowledge

examined in this study. Each limitation is discussed below along with plausible suggestions for future research to advance our understanding of MI in the context of sport.

First, participants in the study provided responses to the items within the questionnaire at a single point in time using a non-experimental approach. Cross-sectional (non-experimental) research designs preclude the ability to ascertain cause-and-effect relationships due to an inability to assess temporal relationships among study variables (Trochim, 2006). However, given the nature of the study was descriptive from the outset, a cross-sectional design was deemed appropriate to address the major purposes of this investigation. Future research could address more specifically the factors that influence the use of MI by athletic coaches, in terms of contextual factors within sport environments, and explore temporal relationships between relevant contextual factors over the course of the season using suitable longitudinal designs. Future research could also address whether coaches can improve their knowledge and use of MI after receiving formal training in MI, in order to develop greater insight into the causal mechanisms linked to the development of MI skills in sport coaches.

Second, there are limitations inherent in the self-report data used in this study. The quality of self-report data can be compromised by numerous issues including social desirability response bias (SDRB; Paulhus & Vazire, 2007). Participants whose responses are distorted by SDRB are characterized as responding to items in a way they believe is most acceptable within their social milieu (Dooley, 2001), or when an individual is motivated to provide a self-description that appears positive (Paulhus & Vazire, 2007). For example, a coach may not be willing to admit that they fail to be

aware of (or use) MI in fear that they should be in relation to other coaches who may be aware and use MI. In this case, future research could address coach's awareness and use of MI by using subtle items (Paulhus & Vazire, 2007). Future research could address this by asking coaches questions that reflect their use and awareness of MI skills, but do not overtly state the inquiry is focused exclusively upon MI awareness and use. Another suggestion for reducing SDRB outlined by Paulhus and Vazire (2007) is the use of demand reduction, by employing methods to ensure anonymity and confidentiality, as employed within Project M.I.A. by ensuring their responses would remain anonymous and confidential, and were not required to provide any self-identifying information.

Third, for the purpose of this study, a non-probability (purposeful) sampling approach to participant recruitment was employed. The sampling frame consisted of an initial email list of 970 head/assistant coaches that comprised the population of available Canadian university sport coaches accessible by email. The result of emailing all 970 head/assistant coaches was 152 responses. Because the sample was purposeful in nature, it is difficult to determine whether the sample, which was a small fraction of the potential 970 responses ($N = 152$), is an accurate representation of the population of 970 available coaches (Trochim, 2006). However, given the difficulty of randomly selecting from the population of University coaches in Canada for Project M.I.A., it was deemed appropriate to employ a purposeful sampling approach to participant recruitment for this study. It was also noteworthy that the ratio of male to female coaches in this study (male = 75.00%, female = 25.00%) was similar to a study published by Reade, Rodgers, and Hall (2008), which possessed a sample of Canadian university sport coaches comprised of 165 male coaches (80.50%), 38 female coaches (18.50%), and two coaches who did not

declare their own gender (1.00%). Further, the ratio of male to female coaches in this study was similar to statistics provided by the CIS. In 2005, there was a ratio of male (80.00%) to female (20.00%) coaches (“Analysis of male and female coaches in CIS sports,” 2005). Future research could examine awareness, use, and knowledge of MI using samples derived from other populations of sport coaches (e.g., Olympic coaches, Professional coaches, NCAA coaches) in order to determine if results of this study can be replicated and generalized beyond Project M.I.A..

Fourth, the sample used in this study was comprised only of coaches which excluded other possible social agents embedded in sport that may be important to consider when evaluating MI (e.g., sport psychologists). Messick (1995) highlights the importance of testing different groups and individuals in various settings to enhance the understanding of score meaning. Therefore, future research could examine MI awareness, use, and, knowledge in other individuals within the sport setting to further extend the results of this study (e.g., sport psychologists, athletic therapists, and trainers). However, given coaches are a central figure within the social setting of the athletic context (Amorose, 2007), and Vallerand and Losier (1999) argue that athletic coaches and athletes share the most significant interpersonal relationship in sport, it was determined that athletic coaches were a suitable group to begin exploring MI in sport.

Fifth, the atheoretical nature of the study is a limitation because there is no proposed explanation of the results that emerged from the data collected in Project M.I.A. (Messick, 1995). Future research could test the utility of different theoretical frameworks that could explain variation in MI awareness, use, and, knowledge within groups such as athletic coaches. One theory that may prove useful is Social Cognitive Theory (SCT;

Bandura, 1986) which accounts for the social and environmental factors, as well as behavioural and personal factors that combine to effect behaviour. Along with theoretical frameworks that explain MI awareness, use, and knowledge in athletic coaches, it may be useful for future research to test different theories that explain why MI is successful in changing behaviour (Markland, Ryan, Tobin, & Rollnick, 2005). SDT has been presented as a theory that could explain why MI is effective in enhancing behaviour change (Markland et al. (2005). Also, Ryan and Deci (2017) suggest that MI's ability to produce positive outcomes may be explained by SDT's autonomous motivation, as well as, the satisfying of key psychological needs for competence, autonomy, and relatedness.

Finally, the exploratory nature of the study combined with the lack of available instruments to measure key variables explored in Project M.I.A. resulted in the modification of existing instruments for this research project. An assessment of awareness and use of MI required modifying instruments from Spence et al. (2002) that examined Canadian resident's awareness and use of CPAG. The central problem with modifying instruments to measure a construct that it was not originally intended to assess is the potential lack of construct validity of scores produced by the modified items (Kline, 2000). As Gunnell, Wilson, Zumbo, Mack, and Crocker (2012) determined that modifying an instrument to measure a construct in a different context can produce changes on scores produced by the instrument, and caution is needed when changing the wording of instruments for differing purposes (Gunnell et al., 2012). Also, coach's MI knowledge was examined using a series of true-false items developed exclusively for project M.I.A. to assess MI concepts that are outlined in the MITI (Moyers et al., 2014). A limitation of using the true-false quiz is that it cannot be determined whether the items

are actually measuring the construct of interest, which here is MI knowledge. Also, a threat to construct validity is present when interpreting these data, that being inadequate operationalization of constructs, meaning MI knowledge was not properly operationalized into a construct for the purpose of this study. This presents difficulties with determining whether data collected for MI knowledge of coaches was truly being assessed, or rather some other construct other than MI knowledge (Trochim, 2006). The overarching issue regarding both the modification of previous items to assess MI awareness and MI use, as well as, the creation of an instrument to assess MI knowledge, is that data must be presented that supports the construct validity of scores produced by these instruments (Messick, 1995). However, given this was the first study to examine MI in the context of sport, it seems reasonable to suggest that new instruments need to be produced to measure the various aspects related to MI including awareness, use, and knowledge. Therefore a potential addition to the MI literature may be the production and validation of a tool for measuring MI knowledge in the context of coaching sport by refining the true-false items used in the current study, or similarly to Madson et al. (2013), who produced a tool to measure whether recipients of counselling perceived their counselling sessions were in line with MI practice; a tool could be developed that measures athlete's perceptions of their coaches communication and its alignment with MI practice.

Summary

The purpose of the study was to determine the extent to which Canadian university athletic coaches were aware of MI, used MI in their coaching practice, and possessed knowledge of key MI concepts. It appeared that coaches were more aware of

MI (27.00%), used MI in their coaching practice (29.80%), and possessed knowledge of MI ($M = 77.85\%$) to a greater extent than initially expected. It was also revealed that coaches who possessed an alternative coaching certification compared to a NCCP certification expressed more awareness of MI, and possessing more coaching certifications lead to an increased probability of being aware and using MI. The findings of the study suggest that MI communication holds some relevance in the field of athletic coaching, in that athletic coaches endorse the MI communication strategies in their athletic practice, and have some understanding of key MI concepts. Moving forward, it appears that MI has resonated in the athletic field, which can potentially lead to a new area in sport psychology where MI is tested more rigorously in the context of athletics via cross-sectional, longitudinal, and experimental designs.

References

- Amorose, A. J. (2007). Coaching effectiveness: Exploring the relationship between coaching behaviour and self-determined motivation. In M. S. Hagger & N.L.D. Chatzisarantis (Eds.), *Intrinsic motivation and self-determination in exercise and sport* (pp. 209-227). Champaign, IL: Human Kinetics.
- Analysis of male and female coaches in CIS sports (2005, January 14). Retrieved from http://en.usports.ca/information/members_info/pdfs/pdf_research_and_stats/Analysis_of_Male_and_Female.pdf.
- Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, NJ: Prentice Hall.
- Botsis, A. E., & Holden, S. L. (2015). Nutritional knowledge of college coaches. *Sport Science Review*, 24(3/4), 193-200.
- Cushion, C., & Kitchen, W. (2011). Pierre Bourdieu: A theory of (coaching) practice. In R. L. Jones, P. Potrac, C. Cushion & L. T. Ronglan (Eds.), *The sociology of sports coaching* (pp. 40-53). New York, NY: Routledge.
- Denison, J., & Scott-Thomas, D. (2011). Michel Foucault: Power and discourse: the 'loaded' language of coaching. In R. L. Jones, P. Potrac, C. Cushion & L. T. Ronglan (Eds.), *The sociology of sports coaching* (pp. 27-39). New York, NY: Routledge.
- Dillman, D. A. (2007). *Mail and Internet surveys: The tailored design method* (2nd ed.). Hoboken, N.J.: John Wiley & Sons, Inc.
- Dooley, D. (2001). *Social research methods* (4th ed.). Upper Saddle River, N.J.: Prentice-Hall, Inc.

Gardner, D. G., Cummings, L. L., Dunham, R. B., & Pierce, J. L. (1998). Single-item versus multiple-item measurement scales: An empirical comparison.

Educational And Psychological Measurement, 58(6), 898-915.

Gardner, D. G., Dunham, R. B., Cummings, L. L., & Pierce, J. L. (1989). Focus of attention at work: Construct definition and empirical validation. *Journal of Occupational Psychology, 62, 61-77.*

Gunnell, K. E., Wilson, P. M., Zumbo, B. D., Mack, D. E., & Crocker, P. R. E. (2012).

Assessing psychological need satisfaction in exercise contexts: Issues of score invariance, item modification, and context. *Measurement in Physical Education and Exercise Science, 16(3), 219-236.*

Kay, M. C., Carroll, D. D., Carlson, S. A., & Fulton, J. E. (2014). Awareness and knowledge of the 2008 physical activity guidelines for Americans. *Journal of Physical Activity and Health, 11(4), 693-698.*

Kline, P. (2000). *The handbook of psychological testing* (2nd ed.). New York, NY: Routledge.

Laske, O. E. (2006). From coach training to coach education: Teaching coaching within a comprehensively evidence based framework. *International Journal of Evidence Based Coaching and Mentoring, 4(1), 45-57.*

Madson, M. B., Mohn, R. S., Richard, S., Zuckoff, A., Schumacher, J. A., Hutchison, Kogan, J., Hutchison, S., . . . Stein, B. (2013). Measuring client perceptions of motivational interviewing: Factor analysis of the client evaluation of motivational interviewing scale. *Journal of Substance Abuse Treatment, 44(3), 330-335.*

- Markland, D., Ryan, R. M., Tobin, V. J., & Rollnick, S. (2005). Motivational interviewing and self-determination theory. *Journal of Social and Clinical Psychology, 24*(6), 811-831.
- Markula, P. & Pringle, R. (2006). *Foucault, sport and exercise: Power, knowledge and transforming the self*. New York, NY: Routledge.
- McHugh, M. L. (2013). The chi-square test of independence. *Biochemia Medica, 23*(2), 143-149. Doi:10.11613/BM.2013.018.
- McKibbin, K. A. (1998). Evidence-based practice. *Bulletin of the Medical Library Association, 86*(3), 396-401.
- Messick, S. (1995). Validity of psychological assessment: Validation of inferences from persons' responses and performances as scientific inquiry into score meaning. *American Psychologist, 50*(9), 741-749.
- Miller, W. R. (1983). Motivational interviewing with problem drinkers. *Behavioural Psychotherapy, 11*(2), 147-172. Doi:10.1017/S0141347300006583.
- Miller, W. R., & Rollnick, S. (2013). *Motivational interviewing: Helping people change* (3rd ed.). New York, NY: Guilford.
- Miller, W. R., & Rollnick, S. (2014). The effectiveness and ineffectiveness of complex behavioral interventions: Impact of treatment fidelity. *Contemporary Clinical Trials, 37*(2), 234-241.
- Moyers, T.B., Manuel, J.K., & Ernst, D. (2014). *Motivational interviewing treatment integrity coding manual 4.1*. Unpublished manual.

- Outlaw, K. R., & Toriello, P. J. (2014). Off the court: Helping African American athletes address behavioral health concerns while using motivational interviewing. *Journal of Human Behavior in the Social Environment, 24*(5), 557-564.
- Pandis, N. (2015). Comparison of 2 means for matched observations (paired t test) and t test assumptions. *American Journal of Orthodontics and Dentofacial Orthopedics, 148*(3), 515-516. Doi:10.1016/j.ajodo.2015.06.011
- Patall, E. A. (2012). The motivational complexity of choosing: A review of theory and research. In R. M. Ryan (Ed.), *The oxford handbook of human motivation* (pp. 248-279). New York, NY: Oxford University Press, Inc.
- Paulhus, D. L., & Vazire, S. (2007). *The self-report method*. In Robins, R. W., Fraley, R. C., & Krueger, R. F. (Eds.), *Handbook of research methods in personality psychology* (224-239). New York, NY: Guilford Press.
- Reade, I., Rodgers, W., Hall, N., (2008). Knowledge transfer: How do high performance coaches access the knowledge of sport scientists? *International Journal of Sports Science & Coaching, 3*(3), 319-334.
- Rollnick, S. (n.d.a). Coaching Conversations: A practical workshop for staff working in sport at all levels. Retrieved from <http://www.micardiff.co.uk/sport.php>
- Rollnick, S. (n.d.b). Stephen Rollnick–Sport. Retrieved from <http://www.stephenrollnick.com/sport.php>
- S Rollnick. (2015, December 21st). A confrontational approach to football coaching: Does it lift motivation? [Web log comment]. Retrieved from <https://stephenrollnick.tumblr.com/post/135631377147/a-confrontational-approach-to-football-coaching>.

- Rollnick, S., Miller, W. R., & Butler, C. C. (2008). *Motivational interviewing in health care: Helping clients change behaviour* New York, NY: Guilford Press.
- Ronglan, L. T., & Havang, Ø. (2011). Niklas Luhman: Coaching as communication. In R. L. Jones, P. Potrac, C. Cushion & L. T. Ronglan (Eds.), *The sociology of sports coaching* (pp. 79-93). New York, NY: Routledge.
- Ryan, R. M. (2012). Motivation and the organization of human behavior: Three reasons for the reemergence of a field. In R. M. Ryan (Ed.), *The oxford handbook of human motivation* (pp. 3-10). New York, NY: Oxford University Press, Inc.
- Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *The American Psychologist*, 55(1), 68-78.
- Ryan, R. M., & Deci, E. L. (2007). Active human nature: Self-determination theory and the promotion and maintenance of sport, exercise, and health. In M. S. Hagger & N. L. D. Chatzisarantis (Eds.), *Intrinsic motivation and self-determination in exercise and sport* (pp. 1-19). Champaign, IL: Human Kinetics.
- Ryan, R. M., & Deci, E. L. (2017). *Self-determination theory: Basic psychological needs in motivation, development, and wellness*. New York, NY: The Guilford Press.
- Sarrazin, P., Boiché, J.C.S., & Pelletier, L. G. (2007). A Self-Determination Theory Approach to Dropout in Athletes. In M. S. Hagger & N. L. D. Chatzisarantis (Eds.), *Intrinsic motivation and self-determination in exercise and sport* (pp. 229-241). Champaign, IL: Human Kinetics.

- Schunk, D. H., & Usher, E. L. (2012). Social cognitive theory and motivation. In R. M. Ryan (Ed.), *The oxford handbook of human motivation* (pp. 13-27). New York, NY: Oxford University Press, Inc.
- Spence, J. C., Plotnikoff, R. C., & Mummery, W. K. (2002). The awareness and use of Canada's physical activity guide to healthy active living. *Canadian Journal of Public Health, 93*(5), 394-396.
- Stainback, R. D., Moncier (III), J. C., & Taylor, R. E. (2007). Intervention and performance enhancement. In G. Tenenbaum & R. C. Eklund (Eds.), *Handbook of sport psychology* (pp. 310-331). Holden, N.J: John Wiley & Sons, Inc.
- Stoszowski, J., & Collins, D. (2016). Sources, topics and use of knowledge by coaches. *Journal of Sports Sciences, 34*(9), 794-802.
- Tabachnick, B., & Fidell, L. S. (2013). *Using Multivariate Statistics* (6th ed.). Boston, MA: Pearson.
- Treasure, D. C., Lemyre P.-N., Kuczka, K. K., & Standage, M. (2007). Motivation in elite level sport: A self-determination perspective. In M. S. Hagger & N. L. D. Chatzisarantis (Eds.), *Intrinsic motivation and self-determination in exercise and sport* (pp. 153-165). Champaign, IL: Human Kinetics.
- Trochim, W. M. K. (2006) *Research methods knowledge base* (2nd ed.). Available at <https://www.socialresearchmethods.net/kb/>.
- Vallerand, R. J., & Losier, G. F. (1999). An integrative analysis of intrinsic and extrinsic motivation in sport. *Journal of Applied Sport Psychology, 11*(1), 142-169.
- Wanous, J. P., Reichers, A. E., & Hudy, M. J. (1997). Overall job satisfaction: How good are single-item measures? *Journal of Applied Psychology, 82*(2), 247-252.

Zenko, Z., & Ekkekakis, P. (2015). Knowledge of exercise prescription guidelines among certified exercise professionals. *Journal of Strength and Conditioning Research*, 29(5), 1422-1432.

Figure 1:

Emails retrieved and delivered for Project M.I.A.

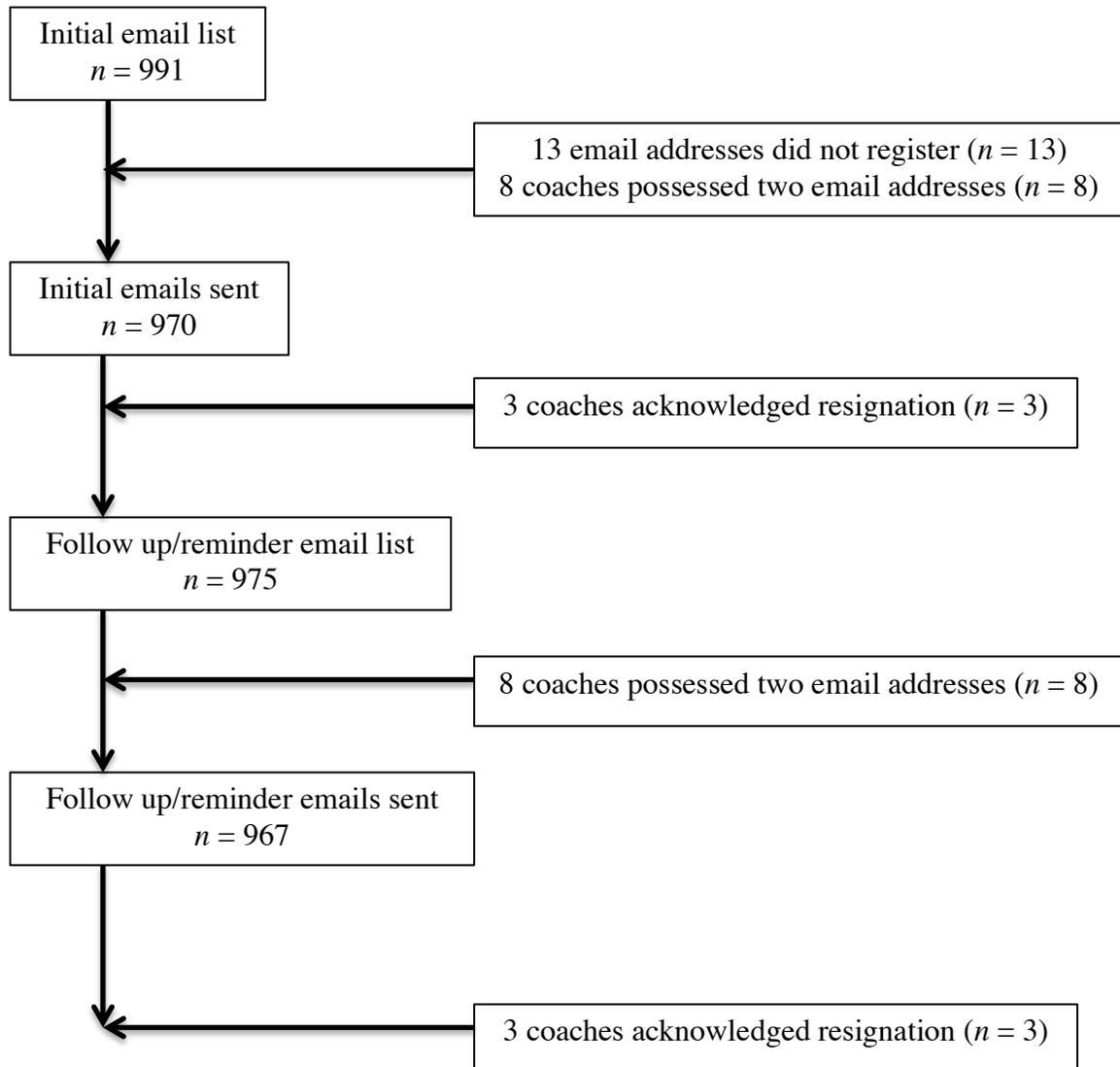


Table 1:*Demographic and coaching history profiles within Project M.I.A.*

Variable	<i>M (± SD) or %</i>
Age (years)	43.50 (± 11.37)
Time spent coaching sport (years)	19.87 (± 17.91)
Time spent coaching sport at CIS/OUA level (years)	9.95 (± 7.86)
Time possessing coaching certification (years)	11.27 (± 10.81)
Number of coaching certifications	2.95 (± 2.15)
Sex	
Male	75.00%
Female	25.00%
Coaching Position	
Head	77.60%
Assistant	22.40%
Coaching Certification	
Yes	93.40%
No	6.60%
Coaching Certification Type	
NCCP	41.40%
Other	52.00%
None	6.60%
Professional Workshop/Conference Attendance	
Yes	88.80%
No	11.80%
Frequency of Professional Workshop/Conference Attendance	
Once Per Year	40.10%
Twice Per Year	36.20%
Every 3-5 Years	13.20%

Table 2:*Frequency counts for the sports coached in the sample*

Sport	<i>n</i>	<i>Percent (%)</i>
Football	6	3.90
Wrestling	2	1.30
Volleyball	18	11.80
Field Hockey	2	1.30
Basketball	23	15.10
Soccer	25	16.40
Swimming	8	5.30
Cross Country/Track and Field	2	1.30
Fencing	4	2.60
Cross Country	1	0.70
Lacrosse	5	3.30
Rugby	10	10.60
Golf	6	3.90
Curling	8	5.30
Rowing	1	0.70
Hockey	14	9.20
Baseball	3	2.00
Water Polo	2	1.30
Squash	3	2.00
Track and Field/Athletics	8	5.30
Tennis	1	0.70

Note: Percent = fraction of the sample providing responses to these items in Project M.I.A. and *n* = sample size.

Table 3*Frequency counts for the highest level of competition recorded in the sample*

Level of Competition	<i>n</i>	<i>Percent (%)</i>
CIS	9	5.90
World Championships	2	1.30
National	42	27.60
International	16	10.50
Multiple	6	3.90
University	27	17.80
Olympic	5	3.30
OUA	1	0.70
USport	6	3.90
Provincial	8	5.30
FISU Team (National Team)	1	0.70
Ontario University	1	0.70
OUAA	1	0.70
Provincial Team	2	1.30
National/International	1	0.70
International, National Team	2	1.30
International/FISU Games	1	0.70
FISU Games	1	0.70
National Team	5	3.30
Professional	3	2.00
CIS/USport	2	1.30
University/Senior Men	1	0.70
Assistant National U20 Team	1	0.70
CIS/Provincial	1	0.70
NBA Pro Summer League	1	0.70
Canada Games	1	0.70
University - Canada	1	0.70
Semi Professional	2	1.30
CIS - Assistant Coach with FISU Games	1	0.70
University/Provincial	1	0.70

Note: Percent = fraction of the sample providing responses to these items in Project M.I.A. and *n* = sample size. Percentage does not equal 100 due to rounding.

Table 4

Frequency counts for percentage of correct responses on MI true-false questions

Percentage of correct answers (%)	<i>n</i>	<i>Percent (%)</i>
33.33	5	3.30
50.00	13	8.60
66.67	38	25.00
83.33	67	44.10
100.00	29	19.10

Note: Percent = fraction of the sample providing responses to these items in Project M.I.A. and *n* = sample size. Percentage does not equal 100 due to rounding.

Appendices

Appendix A: Study Questionnaire

Section 1: Demographics

This first part of the questionnaire is designed to describe the people who participate in this study. All information received is held in confidence. Please provide your...

Age

YEARS (e.g., 30)

Please check one of the following...

What is your sex?

Male Female

Section 2: Coaching History

This part of the questionnaire is designed to describe your involvement in coaching sport in the CIS. All information received is held in confidence.

Please answer each of the following questions by considering only the sport (or sports) you coach in the Canadian Interuniversity Sport (CIS) and/or the Ontario University Athletics system at this moment in time.

What is your **current** coaching position?

Head Coach

Assistant Coach

What sport do you **currently** coach?

SPORT (e.g., Hockey)

What is the highest level of competition you have coached this sport? LEVEL (e.g., National)

How many years have you coached this sport? YEARS (e.g., 10)

How many years have you coached this sport at the CIS/OUA level? YEARS (e.g., 10)

Do you hold any certifications for coaching this sport?

Yes

No

If yes, how many? NUMBER OF CERTIFICATIONS (e.g., 4)

What level of certification do you hold? LEVEL (e.g., NCCP Development 1)

How long (number of years) have you held these certifications? YEARS (e.g., 5)

Do you attend professional workshops or conferences to update your coaching skills?

Yes

No

If so, how often do you attend these events?

Once per Year

Twice per Year

Every 3-5 years

Once every 5+ years

Section 3: Motivational Interviewing Knowledge

Coaches and athletes spend a lot of time with each other when training for, or competing in, sport. Making changes is often difficult yet required for most athletes to stay on top of their game and develop to their fullest potential. This part of the questionnaire is designed to assess your beliefs as a coach about different communication strategies that can be used to change an athlete's behaviour.

	True	False
1. Athletes who can express their own reasons for change will possess better motivation than an athlete who is forced to take on their coach's reasons for change.	<input type="checkbox"/>	<input type="checkbox"/>
2. A coach who confronts their athletes about making changes to their game will likely encourage an athlete to express reasons to not change.	<input type="checkbox"/>	<input type="checkbox"/>
3. Reiterating statements made by athletes is one of the most productive ways a coach can gain a deeper understanding of the athletes' point of view and express empathy.	<input type="checkbox"/>	<input type="checkbox"/>
4. Athletes do not possess an inherent knowledge of how to improve in their sport and must be confronted by the more experienced expert coach to make changes.	<input type="checkbox"/>	<input type="checkbox"/>
5. Recognizing an athlete's strengths will help them improve in their sport.	<input type="checkbox"/>	<input type="checkbox"/>
6. Acknowledging an athlete's strengths will help them improve as a player in their sport.	<input type="checkbox"/>	<input type="checkbox"/>

Section 4: Awareness and Use of Communication Techniques

This part of the questionnaire examines your use of different ways to communicate with the athletes you coach at the CIS or OUA levels of competition. Coaches often use different ways to communicate with the athletes they train and develop in sport. We would like to know more about the way you communicate with the athletes you are coaching in your sport. The following questions have no right or wrong answers – so please be as honest and open as possible in your responses.

1. Are you aware of the communication technique called Motivational Interviewing? Yes No
2. Have you used Motivational Interviewing in your coaching practice? Yes No

Appendix B: Initial Recruitment Email

This script will be used to guide the initial contact with participants. These instructions are consistent with Dillman et al.'s (2009) Tailored Design Method for participant recruitment and retention using the internet/e-resources.

Good Morning/Afternoon/Evening Coach

I am contacting you on behalf of Dr. Philip M. Wilson and Mr. Colin M. Wierts who are both with the Faculty of Applied Health Sciences at Brock University. You are being invited to participate in a research study entitled "Project MIA: Motivational Interviewing in Athletics". The study is designed to determine what communication techniques are used by coaches and the beliefs that coaches endorse about how to communicate effectively with athletes in their sport. Communication techniques represent an important dynamic within sport occurring between coaches and athletes yet limited research has focused on the techniques used, or beliefs held, by Canadian University Sport coaches.

Should you choose to participate, the information that you provide will help us understand more about communication techniques used by sport coaches in Canada. Your participation in this study will involve completing a series of questions on a survey designed specifically for this study that will take approximately 15-20 minutes of your time. Your participation is voluntary and all of the information that you provide will remain confidential. This means that we will not be sharing your personal information with any other person or party in such a manner that you could be identified as a consequence of participating in this study.

If you wish to participate, we ask that you click on the link below for more information:

https://www.surveymonkey.com/r/Project_MIA

Please direct any questions or concerns about this study to either Dr. Wilson (pwilson4@brocku.ca) or Mr. Wierts (cw11cf@brocku.ca) using the email addresses provided.

Thank you for your time and effort. This study has been reviewed and received ethics clearance through Brock University's Research Ethics Board (File 16-074).

Respectfully submitted,

Colin M. Wierts, BSc
Philip M. Wilson, PhD

Appendix C: Follow-Up (2nd) Email

This script will be used to guide the second contact with participants. These instructions are consistent with Dillman et al.'s (2009) Tailored Design Method for participant recruitment and retention using the internet/e-resources.

Good Morning/Afternoon/Evening Coach

This is a follow-up email to our initial contact two weeks ago concerning your invitation to participate in a research study being conducted by researchers at Brock University entitled "Project MIA: Motivational Interviewing in Athletics".

We have collected data from some of the coaches we approached within the past two weeks and the information they have provided will be useful in terms of understanding various communication techniques and beliefs about communicating with athletes endorsed by sport caches in Canada.

The phase of Project MIA focused on recruiting coaches to provide data in this study will be closing soon. This is the second and final contact our research team will make with you concerning your participation. You are being contacted again because the experiences and beliefs of every coach is important to ensuring our study has accurate data. If you have already provided data for Project MIA, please accept our sincerest thanks for taking the time to be involved in this important Canadian research initiative.

If you have not already provided data for Project MIA, we are sending this final contact email to ensure that every coach within the Canadian Interuniversity Sport system has a chance to be involved in the study thereby improving the utility of the study findings for sport coaches.

We wish to remind you that your involvement is voluntary and thank you for taking the time to consider our request for participation in Project MIA.

If you wish to participate, we ask that you click on the link below for more information:

https://www.surveymonkey.com/r/Project_MIA

Please direct any questions or concerns about this study to either Dr. Wilson (pwilson4@brocku.ca) or Mr. Wierls (cw11cf@brocku.ca) using the email addresses provided.

Thank you for your time and effort. This study has been reviewed and received ethics clearance through Brock University's Research Ethics Board (File 16-074)

Respectfully submitted,

Colin M. Wierls, BSc
Philip M. Wilson, PhD

Appendix D: Letter of Invitation

Letter of Invitation

Title of Study: Project M.I.A. (Motivational Interviewing in Athletics)

Principal Investigator: Dr. Philip Wilson, Associate Professor, Dept. of Kinesiology

Principal Student Investigator: Mr. Colin Wierts, BSc, Graduate Student, Faculty of Applied Health Sciences

Dear Participant,

Introduction: This project is being conducted to determine the level of awareness, use and knowledge of different communication techniques by Canadian Interuniversity Sport (CIS) coaches. The investigators work in the Behavioural Health Sciences Research Lab (BHSRL), which is located in the Faculty of Applied Health Sciences (Welch Hall, Room 141).

Purpose: The purpose of this study is to determine what communication techniques are used by current CIS coaches and the different beliefs that coaches endorse when it comes to communicating with athletes in their sport. Communication techniques represent an important dynamic within sport that occurs between coaches and athletes, yet limited research has focused on the techniques used by Canadian University Sport coaches and the beliefs associated with different communication techniques held by coaches.

Involvement: Your involvement would be greatly appreciated and will help to further our understanding of the level of awareness, use, and knowledge of different communication techniques reported by coaches involved in Canadian Interuniversity Sport. If you choose to participate, we will ask that you complete a questionnaire on a single occasion. The questionnaire is expected to take approximately 15-20 minutes to complete. A sample question is: "How often do you use open-ended questions when communicating with your athletes in the following situations?". Select demographic questions will also be queried such as age, sex, sport coached, and coaching certification in order to describe the sample that provided data for this study. If you choose to participate, you will be asked to complete this questionnaire using an electronic interface housed on an encrypted website (www.surveymonkey.com).

Benefits: There are a number of benefits associated with participating in this study. These benefits may include, but are not limited to, the following: (a) Greater awareness of communication techniques used in sport by coaches, and (b) Contribution to a unique area of research that will provide an initial understanding of sport coaches and their awareness, use, and knowledge of communication techniques. Everyone who participates in this study has the option to receive feedback regarding the overall findings of this investigation. Feedback will be in the form of a summary report of aggregate-level data pertaining to the key study questions and findings obtained from those who participated once the study is complete. The study findings may also be disseminated in academic

journals and conference presentations in such a way that no participant is identified personally as a function of their involvement in this study. Any information that is provided from participants will be treated with confidentiality and access to all information provided in this study is restricted only to members of the research team listed in this Letter of Invitation. All recorded data will be kept on an encrypted website accessible only to members of the research team. Consistent with guidelines that control the collection and storage of scientific information in Canada, all data collected for this study will ultimately be destroyed.

Participation: Participation in this study is voluntary and individuals may decline answering any question(s) that they find invasive, offensive, or inappropriate. There may be risks associated with participation including answering questions that solicit personal information (e.g., age, coaching certifications, etc.) which may make some people feel uncomfortable or anxious. You may choose to decline or withdraw your participation at any time throughout the course of the study and will not experience any negative consequences as a result of your decision. Once data that any participant submits as a function of their involvement in this study is received by the study investigators, the data cannot be removed from the data base upon request because the data will be anonymous and include no personal identifiers. All data requested are anonymous in nature and will be treated with the utmost confidentiality. Any summary reports emanating from this study will use data that does not identify any participant in any way or form.

You are eligible to participate in this study if:

- You are currently a Head or Assistant Coach for a sports team competing in the Canadian Interuniversity Sport system
- Willing to commit to the length and requirements of this study
- Able to read and write in English

It is important to note that a portion of the data that will be requested if you participate in this study may be collected and stored on a web-server (www.surveymonkey.com) that is based in the United States of America and therefore is subject to American Homeland Security laws such as the Patriot Act. This study has been reviewed and received ethics clearance via the Brock University Research Ethics Board (File #16-074). If you have any comments or concerns about your rights as a research participant, please contact the Research Ethics Office at (905) 688-5550 Ext. 3035, reb@brocku.ca.

Thank you for your interest and involvement in this study.

Sincerely,

Philip M. Wilson, PhD
Associate Professor
Email: pwilson4@brocku.ca
Tel: 905 688 5550 Ext. 4997

Colin M. Wierst, BSc
Principal Student Investigator
Email: cw11cf@brocku.ca
Tel: 905 688 5550 Ext. 5564

If you wish to participate in this study, please continue to the next page by clicking the NEXT button.

Appendix E: Informed Consent

The Informed Consent form was presented online (at the following weblink: https://www.surveymonkey.com/r/Project_MIA prior to initiation of the study questionnaires. Clicking “yes” indicates that the participant is consenting to the research study and may proceed with the questionnaires.

Informed Consent

Project Title: Project M.I.A. (Motivational Interviewing in Athletics Study)

Principal Investigator (PI): Dr. Philip Wilson, Associate Professor
Department of Kinesiology
Brock University
(905) 688-5550 Ext. 4997; pwilson4@brocku.ca

Student Principal Investigator (SPI): Colin Wierds, BSc, Graduate Student
Faculty of Applied Health Sciences
Brock University
(905) 688-5550 Ext. 5564; cw11cf@brocku.ca

INVITATION

You are invited to participate in a study that involves research. The purpose of this study is to determine what communication techniques are used by current CIS coaches and the different beliefs that coaches endorse when it comes to communicating with athletes in their sport. Communication techniques represent an important dynamic within sport that occurs between coaches and athletes yet limited research has focused on the techniques used by Canadian University Sport coaches and the beliefs associated with different communication techniques held by coaches.

WHAT'S INVOLVED

As a study participant, you will be asked to complete questionnaires that ask a series of questions about communicating with athletes as a coach. Two questions will be used to generate demographic information about the sample who enrol in this study. Eleven questions will be used to allow participants to provide details about their own coaching experiences and history. Twenty-one questions will be used to ask coaches to provide greater details about their awareness, use, and knowledge of different communication techniques when discussing various matters about sport with athletes. If you choose to participate, you will be asked to complete this questionnaire using an electronic interface housed on a password protected and encrypted website (www.surveymonkey.com). Participation will take approximately 15-20 minutes of your time on a single occasion.

POTENTIAL BENEFITS AND RISKS

Possible benefits of participation may include, but are not limited to, the following: (a) greater awareness of communication techniques when working with athletes in sport, and (b) making a contribution to a unique area of research that will provide greater

understanding about communication techniques used by sport coaches in Canada. There also may be risks associated with participation including questions that solicit responses (e.g., age, coaching certifications, etc.), which may invoke feelings of discomfort or anxiety in some participants because upon self-reflection they are being asked to divulge personal information. It is important to note that a portion of the data that will be requested if you participate in this study may be collected and stored on a web-server (www.surveymonkey.com) that is based in the United States of America and therefore is subject to American Homeland Security laws such as the Patriot Act. However, no information will be collected that identifies you personally and therefore the risk is low.

CONFIDENTIALITY

All data collected in this study will be anonymous. Participants will not have any personal identifiers linked to data collected as a function of the study. Names and contact information may be provided if participants wish to receive aggregate feedback pertaining to the results of the study. Contact information collected for feedback delivery purposes cannot be linked to survey responses, will be stored securely, and ultimately destroyed.

Data collected during this study will be stored on a password protected server or in a locked filing cabinet in the Exercise and Health Psychology Lab (Welch Hall 141 at Brock University) for the duration of the study. All data will be secured until summary findings have been published and any/all participant feedback has been completed in full. At this time, all electronic files will be erased from any and all hard drives. Any printed materials (e.g., the list of participants requesting feedback) will be destroyed using a paper shredder upon completion of the study. Access to this data will be restricted to those involved in the study, exclusively the principal investigator (Dr. Philip M. Wilson) and the principal student investigator (Colin M. Wierst).

VOLUNTARY PARTICIPATION

Participation in this study is voluntary. If you wish, you may decline to answer any questions or participate in any component of the study. Further, you may decide to withdraw from this study at any time and may do so without any penalty or loss of benefits to which you are entitled. However, once any participant submits their responses to the questionnaire to the study investigators, their data cannot be removed from the study because the data are anonymous and thereby unidentifiable.

PUBLICATION OF RESULTS

Results of this study may be published in academic journals and presented at professional conferences. Feedback about the results of this study will be available once all data has been collected and analyzed. It is anticipated that this may take between 1-2 months to complete after the final set of participants have completed their involvement in the research study. If you wish to receive feedback about the major findings from this study, please provide the information requested on the participant debriefing form that you will be directed to at the end of this study.

CONTACT INFORMATION AND ETHICS CLEARANCE

If you have any questions about this study or require further information, please contact Dr. Philip Wilson or Colin Wierds using the contact information provided above. This study has been reviewed and received ethics clearance through the Research Ethics Board at Brock University (File 12-099). If you have any comments or concerns about your rights as a research participant, please contact the Research Ethics Office at (905) 688-5550 Ext. 3035, reb@brocku.ca.

Thank you for your assistance in this project. Please keep a copy of this form for your records.

CONSENT FORM

I agree to participate in this study described above. I have made this decision based on the information I have read in the Information-Consent Letter. I have had the opportunity to receive any additional details I wanted about the study and understand that I may ask questions in the future. I understand that I may withdraw this consent at any time.

Please click the box below stating that you agree with the information stated above and consent to participate in the study.

I hereby agree to participate in this research study

- Yes
- No