

**“In simple terms, Control the Controllables”: Co-production and Piloting of a Novel  
Attribution Retraining in Sport (ARiS) Intervention**

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## **Thesis Abstract**

Attributions help us understand, control, or predict motivation in future situations. They can be either adaptive (positive) or maladaptive (negative), depending on how we interpret events. Use of Attribution Retraining (AR) interventions can promote the development of adaptive explanations, leading towards healthier reflections on performance. Despite this, there has been a lack of research exploring attributions and AR in the domain of sport. This thesis presents findings from the co-production of a novel attribution retraining in sport intervention. After an introduction (Chapter 1), review of literature (Chapter 2), and exploration of methodology and philosophy (Chapter 3), this thesis details extensive work to co-produce an AR in sport (ARiS) specific intervention protocol. Following Hawkins et al.'s (2017) guidelines for intervention development via co-production, are structured into three stages, each corresponding to a dedicated chapter in the thesis (Chapter 4,5,6). Stage 1 provides a systematic scoping review of AR literature since the last review in this area (Robertson, 2000) along with primary stakeholder consultation (n = 11) to explore the presence of attributions in applied sport settings. Stage 2 recruited six new stakeholders to form an intervention development group for co-production of an ARiS intervention protocol. Stakeholders completed two cyclical iterations of data collection with qualitative feedback surveys and focus groups to suggest 27 revisions for the ARiS intervention protocol (v.1 and v.2) development. As an output of Stage 2, ARiS protocol v.3 was then assessed by six new expert stakeholders who recommended a further 11 revisions in Stage 3 of co-production. Concluding the intervention development phase, Chapter 7 presents the final primary findings of the thesis via an evaluative case study approach, piloting ARiS with university futsal players (n = 10). This study also explored the experiences and satisfaction with the ARiS intervention itself via assessment of acceptability and adherence. Quantitative and qualitative data relating to attributions were collected at pre, post, and follow-up time points using the Causal Dimensional Scale II (CDS-II) and Think Aloud method. Pre-post findings suggested that performance outcomes had a stronger influence on participants' attributions than the intended effects of the intervention. Whether participants won or lost appeared to shape their attributions more significantly than the intervention itself. However, pre-follow-up findings revealed ARiS increased adaptive attributions across all four dimensions of the CDS-II and positively impacted mental well-being, subjective performance, and received social support using percentage of non-overlapping data and change of means analysis. Strengths, limitations and future directions are provided for the theoretical, applied, and methodological implications of attributions in the thesis conclusion (Chapter 8).

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## **List of Publications and Conference Presentations from this Thesis Manuscripts in Preparation**

### **Oral Conference Presentations**

CHAPTER 2. Doncom, T., Morris, R., Hartley, C., & Coffee, P. (2022). Attributions are never made in vacuum. Social Identity and a novel attributional retraining in sport intervention [Conference presentation]. 3rd International Conference on Social Identity in Sport, Liverpool.

CHAPTER 7. Doncom, T., Morris, R., Hartley, C., Fullerton, C., & Coffee, P. (2024). Attribution retraining in sport: a case study approach piloting a co-produced motivation-enhancing intervention [Conference presentation]. BASES Conference 2024, Coventry.

### **Poster Presentations**

CHAPTER 4, 5, 6. Doncom, T., Morris, R., Hartley, C., Coffee, P., & Maiden, J. (2022) Co-producing a novel motivation-enhancing intervention: Attribution Retraining in Sport [Poster Presentation]. BASES Conference 2022, Swansea.

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Key changes or revision ideas were drawn from the survey responses and highlighted in the PowerPoint slides. For example, a significant discussion point in Round 1 was the removal of "parent-only" language, with a suggestion to use the term "trusted adult" instead. This was presented as a discussion slide, inviting stakeholders to share their opinions and suggest further revisions to the ARiS Protocol where needed. This format was consistently followed in both focus group discussions, with the content of the discussions evolving based on the responses from the qualitative feedback surveys.

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## **Chapter 1**

### **Introduction and Overview of Thesis**

Is it possible to complete sporting performance without reflecting and explaining our performances afterwards? For example, going on a 5-kilometer run and explaining your experience in relation to your time or your effort whilst considering external factors such as weather conditions, or incline of your route. These explanations for performance are known as attributions and allow us to control or predict future motivation in similar events (Biddle, 1993). Weiner posits that attributions are mostly likely to be constructed when the perceived cause of performance is negative, unexpected or important (Weiner, 1985, 1988). Constructed attributions are then categorised as either adaptive (positive) or maladaptive (negative) based on dimensions of controllability, stability, and locus of causality (Weiner, 1972). Adaptive attributions for future performance are fostered around explanations that are controllable, specific, and likely to change (Weiner, 1985). Conversely, maladaptive attributions are fostered around explanations that are uncontrollable, external, and unlikely to change (Weiner, 1985). Within sport, research on attributions have demonstrated how adaptive attributions can positively impact performance (Rasle et al., 2019), optimism (Parkes & Mallett, 2011), motivation (Simonton & Garn, 2022), and social support (Allen et al., 2012). Importantly, the construction of attributions has a role to play in shaping future behaviours by promoting adaptive explanations for performance. Yet many post-game interviews in sport continue to focus on maladaptive attributions as a form of protection of athletic or team identity (e.g., officiating decisions, weather conditions; Smith & Whiteside, 2021).

To enhance construction of healthier attributions, Attribution Retraining (AR) interventions were created (Forsterling, 1985). The process of retraining attributions has been proven to enhance positive outcomes relating to an individual's controllability (Dryden et al., 2021), reduction in anxiety (McLoughlin, 2024), and reduction in attrition (Saarinen et al., 2023). There is an abundance of recent empirical evidence supporting the method of attribution retraining across domains such as education (Russo & Oliveros, 2024), sport (Moffat et al., 2021), and clinical health (Singpurwalla, 2020). Despite evidence for the importance of adaptive attributions in sport, and a call to action from Rees et al. (2005), there has been a dearth of literature using AR interventions within sport since the last systematic review of AR interventions (Robertson, 2000).

### **Research Purpose and Rationale**

This thesis aims to make both theoretical and methodological contributions to attribution retraining research. It also aims to present new findings to aid the development of an attribution retraining intervention tailored specifically for sports. These aims will be explored through the following research questions –

1. What is required to develop an effective attribution retraining in sport intervention?
2. How can refinements to an Attribution Retraining in Sport (ARiS) intervention enhance usability?
3. Is the co-produced Attribution Retraining in Sport (ARiS) intervention protocol effective in enhancing adaptive attributions when piloted with a sporting population?
4. How is the co-produced Attribution Retraining in Sport (ARiS) intervention evaluated by athletes via acceptability and adherence?

First, the thesis will provide a theoretical contribution in the form of a formalised Attribution Retraining in Sport (ARiS) intervention protocol. Although research recommendations exist (Rees et al., 2005), only two research studies have explored attribution retraining in applied sport settings. Creation of a formalised ARiS protocol, like the three-phase approach developed for education (Haynes et al., 2011), will aim to provide researchers and practitioners in sport with an intervention protocol that can aid healthier explanations for performance. Implementation considerations for applied sport settings will be central to intervention development, with a focus on capturing these aspects through co-production.

Second, the role of social factors and significant others will be explored in relation to attributions. Allen et al. (2012) findings suggested that both athlete and their support network can impact retraining of attributions in sporting contexts. Building upon the exploration of attribution theory and social identity theory (SIT), as highlighted by Coffee et al., (2020), ARiS development will extend recent research findings and explore whether social factors enhance and maintain the impact of AR intervention effects (Rascle et al., 2019). Research will be underpinned with the knowledge that attributions are “never made in vacuum” and are experienced by both the individual and those around them (Coffee et al., 2020).

Third, calls for participatory action approaches within sport have been reignited after a dearth of research using collaborative techniques (Smith et al., 2022). As a result, use of co-production as a participatory method could enhance the likelihood of creating a usable ARiS protocol in applied sport settings. Use of appropriate intervention development guidelines for co-production developed for public health settings present a unique methodological underpinning for researchers in sport to consider (Hawkins et al., 2017). Co-production will include working with athletes and their significant others as well as researchers in attribution and social identity theories.

Finally, the thesis will contribute to the attribution retraining literature by integrating qualitative research methods ensuring future implementation in sport is accessible and

communicated in lay terms (Moffat et al., 2021). Previous AR research has been dominated by positivistic, experimental-based research, with 99.4% of attribution related sport research between 1954-2011 using quantitative methodologies (Allen, 2012). Use of qualitative methodologies previously have been used to capture live attributions for performance as opposed to reflectively (Moffat et al., 2021). Evaluating live attributions for performance can further highlight the effectiveness of attribution retraining interventions in sport by showing the consolidation of a healthier approach to constructing attributions.

## **Thesis Structure**

The thesis structure was designed to explore and explain the developments, refinements and evaluation of a novel, sport specific attribution retraining protocol. The remaining chapters in this thesis include a literature review of relevant research, four chapters detailing original empirical research, and a final summary chapter to provide a general discussion of the overall implications arising from this research. These chapters are subsequently described in greater detail.

## **Chapter 2**

In Chapter 2, an empirical literature review of attribution theory is presented including the origin, the development, and the transition of attribution theory into modern research. Stemming from this, empirical and applied evidence surrounding the method of attributional retraining is explored both generally and specifically to sport. Upon conclusion of this section, theoretical underpinnings linking these theoretical components are examined, which are also outlined in this chapter.

## **Chapter 3**

In Chapter 3, I discuss the methodological and philosophical underpinning for the PhD thesis. Chapter 3 outlines the methodological foundation of co-production in general, before delving into its application in supporting intervention development. It also details the overall methodology and methods that form the basis for the intervention development presented in Chapters 4, 5, and 6. A section on pragmatism as my research philosophy is also provided acknowledging how this integrates with co-production methods.

## **Chapter 4 - 7**

Chapters 4, 5, and 6 outline the development of the ARiS intervention protocol in three co-production stages, following Hawkins et al. (2017) intervention development guidelines. Stakeholders from both research (social identity theory, attribution theory) and applied (athletes, coaches, sport practitioners, national sporting organisations) backgrounds are

represented to provide a transdisciplinary approach to co-producing a novel attribution retraining intervention protocol. In Chapter 4, Stage 1a, an evidence review of literature is provided via a systematic scoping review of AR literature. This acts as an extension of the literature review's coverage of attribution retraining using systematic approaches and is presented as part of Hawkins (et al., 2017) co-production. Stage 1b, stakeholder consultation, presents primary data from semi-structured interviews that inquired into the prominence of attributions in sport, as well as information that can inform development of an initial ARiS pilot protocol for Stage 2. In Chapter 5, Stage 2, an Intervention Development Group (IDG) is formed of new stakeholders who take an active role in attending workshops and completing qualitative feedback requests to generate discussion and materials that will alter and revise the ARiS pilot protocol. Finally, Chapter 6, Stage 3 concludes the process of co-production by collating stakeholder approval on the ARiS protocol v.3 developed via the outcomes of Stages 1 and 2. Interviews with "expert" level stakeholders will provide the final elements of feedback prior to piloting the intervention. By gathering input from athletes and their support network (coaches, sport practitioners, and national governing body representatives), co-production was successful, resulting in a pilot ARiS protocol ready for testing in Chapter 7: "Attributional Retraining in Sport: A Case Study Approach".

## **Chapter 8**

Chapter 8 concludes the thesis with an overall discussion of the contributions to knowledge from applied and theoretical perspectives. Summaries of how each chapter contributes to thesis aims and objectives, assessment of implications for both research and practice, as well as directions for future extensions to the research are all presented. Strengths and weakness are also considered before a conclusion is provided.

## **Chapter 2**

### **Literature Review**

## **Literature Review**

This chapter begins with a review of the empirical and theoretical literature related to attribution theory. The second section examines existing approaches and interventions designed to retrain attributions, while also addressing the strengths and limitations of the attribution retraining interventions implemented thus far. The chapter concludes with an introduction to Social Identity Theory (SIT) and the role of significant others during construction of attributions.

### **Attribution Theory**

In 1972, Weiner published an empirical research article on the process of attributions and the effects they have in educational settings (Weiner, 1972). This publication pioneered a movement for attribution theory to develop into one of the most popular motivational theories created and even in the present day is credited with keeping the field of motivation “alive, or at least on life-support” (Dweck, 2018, p. 17). As attribution theory has been developed and adapted by Weiner and fellow attribution researchers over time, the definition of what an attribution is can differ depending on what you read, who it was written by, and during what era it was publicised. For the purpose of this thesis, an attribution is what allows us to control or predict future outcomes in similar events (Biddle, 1993). Simply, attributions provide us with explanations as to why behaviours occur in certain situations (Perry et al., 1993). These definitions used within this thesis were opted for based on their ability to be understood by a lay audience.

According to Weiner’s theory, attributions are most likely to occur when the stimulant of the event is negative, unexpected or important (Weiner, 1985, 1988). These three causes are not essential but are known to provoke the cognitive process of causally searching for an attribution. Weiner’s theory asserts that attributions can either be adaptive or maladaptive. An adaptive attribution is an attribution that generates positive effects for future motivation (Weiner, 1972). Contrastingly, a maladaptive attribution is an attribution that has a negative impact on a person’s future motivation (Weiner, 1972). To distinguish whether an attribution is adaptive or maladaptive, Weiner posits four dimensions for causal attributions to be distinguished within: locus of causality (internal vs. external), stability (stable vs. unstable), controllability (controllable vs. uncontrollable), and globality (global vs. specific). The locus of causality, or ‘locus’, refers to where the cause of the attribution is located. This can be either internal to the self (i.e., I can give an extra bit of effort to hit the ball further), or external to the self (i.e., I always struggle when we play on this course). The stability of an attribution explains whether the cause is changeable if the event were to be repeated or replicated. As a result, you

can have either a stable attribution (i.e., My golf swing is never going to be good enough), or an unstable attribution (i.e., I can continue to tweak my technique which may help my future golf ability). Controllability distinguishes whether an attribution is in the person's control or out of it. A controllable attribution would include technique implementation (e.g., I used the correct technique for my golf swing) whereas an uncontrollable attribution would include ability level of opponents (e.g., My golf swing is not as good as their golf swing). Globality assesses whether the attribution affects just the person or if others involved are also affected. For example, an attribution that is global could be the weather (e.g., I couldn't play well in those weather conditions) whereas a specific attribution may include the type of footwear you are wearing that then goes on to hinder your performance (e.g., I should have worn my spiked shoes to keep more grip when I swing). As attribution theory has developed, locus of causality, stability, and controllability have continued to be researched and as a result have been isolated from the dimension of globality (Weiner, 2010, p. 559). In achievement settings (e.g. academic or athletic), these dimensional properties influence a person's expectations regarding their desired outcomes to causes of events (Parker et al., 2016, p. 114). Attribution theory would suggest that in response to failure, a person making internal, unstable, and controllable attributions will operate an adaptive and functional mindset. Contrastingly in response to failure, those making an external, stable, and uncontrollable attribution would operate a maladaptive and dysfunctional mindset.

When assessing attributions associated with negative events such as failure, the principal prescription that derives from attribution theory is to recommend people construct attributions around lack of effort. Attribution theory suggests psychological consequences of attributing failure to something that can change (e.g. my effort) will be beneficial to the person's future motivation as opposed to something less amenable to change (e.g. my ability). This attribution process will also lead to opportunities for the person to increase effort in future attempts, "leading to more favourable outcomes" (Rees et al., 2005, p. 190). These taxonomic systems are at the forefront of research when it comes to assessing or retraining a person's attributions.

Conclusively, Weiner's theory provides the conceptual underpinnings of this thesis. Understanding the process of attributions, how they can be understood within a person's explanations for performance, and how they can be changed through retraining is fundamental to the development of future attribution retraining interventions in sport.

### **Critiques of Attribution Theory**

Critiques of attribution theory have primarily highlighted its lack of contextual sensitivity in explaining how individuals interpret performance outcomes (Malle & Hofman, 2013). While Weiner's attribution model provides a structured framework, categorising explanations along dimensions such as locus, stability, and controllability, it often overlooks the broader situational and environmental factors that shape how individuals arrive at those attributions. For instance, a student may perceive a test result as a personal failure, interpreting it as a definitive sign of academic inadequacy. However, this perception may ignore important contextual information such as the student having achieved one of the highest scores in the class, only falling slightly below their personal expectations. Without accounting for such context, attributional interpretations can be skewed, and current models offer little in the way of systematically incorporating these influences.

Moreover, attribution theory often assumes that individuals engage in rational, objective reasoning when forming causal explanations. This assumption neglects the role of heuristics, emotional responses, and cognitive biases. For example, a rugby fan whose team concedes a penalty may perceive the referee's decision as unfair, while a fan of the opposing team may view the same decision as justified. In such cases, attributions are heavily influenced by emotional investment and group identification, challenging the notion of purely rational attributional processes.

Finally, Weiner's dimensional framework, while conceptually useful, may oversimplify the complexity of real-life attributional reasoning. Some attributions may straddle multiple categories, leading to ambiguity in whether they are ultimately adaptive or maladaptive. For example, attributing a failure to lack of effort (an internal, controllable cause) might be motivating for one person but demoralising for another if it conflicts with other self-perceptions. This complexity further underscores the need for attributional models to more fully incorporate the context in which attributions are formed, as well as the subjective meanings attached to them.

### **Attributions and Sport**

In sport psychology, empirical research into attribution theory has been decreasing despite being one of the "hot topics" of the late 20<sup>th</sup> century (Rees et al., 2005, p. 188). Since Rees' call to "regenerate research inquiry", prominence in attribution driven sport psychology research has remained sparse in comparison to other research areas, despite substantial efforts from dedicated authors (Rees et al., 2005, p. 188). However, more generally in sports literature, attribution theory has gathered pace with empirical research studies being published in sports marketing (Kim et al., 2020), sports fandom (Sato et al., 2018), and sports consumerism

(Hayduk et al., 2021). Limitations on progression could be due to popular attribution theory alternatives already occupying space in this field (e.g., Growth Mindset; Dweck, 2006). Consequently, reasons as to why attribution theory has not been applied within sport psychology as frequently as alternatives remains unanswered.

Research focusing on attributions within sport psychology has been known to focus on specific dimensions of Weiner's construct (Weiner, 1985). Evidence for the use of controllability, locality and stability have all been prominent recommendations for future focus in sport psychology interventions (Coffee et al., 2020; Parker et al., 2016; Parker et al., 2018). Rees et al. (2005) suggests that controllability is fundamental in applied practice. As highlighted previously, many believe that when an attribution is controllable, internal and unstable, it is most adaptive (Weiner, 1985). Uncertainty has arisen within sports related attribution research about the clarity between where the cause lies and whom is in control (Ingledew et al., 1996). As a result, there was a period of time where controllability within sport psychology research had been removed, with many opting to only assess locality and causality of attributions instead (Peterson, 1991). However, Rees' suggestion may be coming to fore with recent practical interventions driven by attribution theory, such as attribution retraining, using locality and controllability to enhance motivation of athletes (Moffat et al., 2021; Parker et al., 2018). For example, Parker et al., (2018) used actors to emphasise the importance of controllability in explanation of academic performance when retraining attributions to become more adaptive. The study found that students who were exposed to attribution retraining via controllability showed enhanced construction of adaptive attributions in the future and increased academic performance. Despite variation in the implementation, Weiner's causal dimensions have been integrated, assessed and recommended by researchers in sport psychology as part of attribution retraining interventions. Further exploration of Weiner's causal dimensions in sports contexts may reveal a tendency to favour certain dimensions over others when communicating with lay audiences, such as athletes.

### **Attributional Retraining (AR)**

Understanding how attributions work, what makes them adaptive, and how we can retrain them if maladaptive, provides the foundations of attributional retraining (AR) interventions. In 1969, Ross and colleagues researched 40 female undergraduate students to assess whether retraining misattributions of fear when attached to an electrical shock device would contribute to performance in completion of an unsolved puzzle. Findings indicated that there were plausible clinical improvements linked to performance when attributions were focused upon and retrained. As research in the area expanded, Forsterling (1985) produced the

first systematic review in the area of AR which analysed and critiqued 15 attribution based training studies. The findings led to the initial recommendation, previously highlighted, that individuals experiencing failure should attribute it to a lack of effort. As a result, this type of attribution became a popular causal reason to experiment with in the future: even in some of the more recent AR studies (Moffat et al., 2021; Singpurwalla, 2020). Forsterling's review began to attract attention from researchers across the multiple domains of research but particularly those researchers within the education domain. Perry, a pioneer in AR research in education, produced one of the first performance orientated AR studies which paved the way for future research to manipulate variables and measure their impact using AR (Perry et al., 1993). Perry and colleagues concluded that AR was effective in enhancing academic performance although further research was needed in alternative domains to explore sustainability of intervention effects. Members of the Emotion, Motivation and Control Research (EMCOR) group, orchestrated by Perry, still continue to be prominent in AR research (Dryden et al., 2022, 2023; Dryden et al., 2021; Hamm et al., 2020; Hamm et al., 2017; Murphy et al., 2023; Parker, 2014; Parker et al., 2017; Parker et al., 2016; Parker et al., 2018; Perry et al., 2014). Consolidating findings from their research group, a 2009 review produced by members of the EMCOR lab group recommended that AR research adopts a new three phase protocol (Haynes et al., 2009). The three phases include: Causal Search, AR Induction, and AR Consolidation. The unique part of this protocol is the introduction of causal search as a recognised step in the intervention. Ruthig et al. (2006) highlighted that causal search is fundamental to align with Weiner (1995) in ensuring participants provide explanations for their most recent performance before retraining attributions. Haynes et al. (2009) suggested that introducing causal search would positively impact on the absorption of information in the AR induction phase and better allow the participants to consolidate information. Further research on each of the three phases and how they were developed are extensively reviewed below.

### ***Causal Search***

Causal search is a cognitive process which individuals seek to identify the underlying causes or reasons for an event or outcome, particularly in relation to their own actions or performance (Johnson, 2001). Often probed by a negative experience or an increase in failure outcomes, causal search is effective for encouraging participants to trigger attributional processes to recent events. For example, researchers in education often deliver this phase after results of an in-class test to capture recent emotions and attributions based on test results (Hamm et al., 2017; Parker et al., 2017; Parker et al., 2016; Perry et al., 2014). In Parker et al.'s (2018) study, student athletes were required to deeply process the cause of previous

performances and rate the extent to which different causal attributions for poor performance (e.g., effort, lack of strategy) applied to them. Findings revealed that causal attributions for poor performance were frequently evaluated using uncontrollable, external and maladaptive reasons. It is believed that the process of causal search subconsciously occurs prior to attribution induction and is a natural instinct upon reflection of recent events (Perry et al., 1993). Within the recommended three phase protocol, causal search as a task is instructed to be completed within the same experimental session as the next phase: AR Induction.

### ***AR Induction***

AR Induction is a traditional phase taken to inform participants about adaptive attributional processes and how they can be generated. This phase has often taken the form of verbal presentation via pre-recorded video tapes or video presentations (Forsterling, 1985; Perry & Hamm, 2017). The contents of the induction have varied depending on target population and the creator of the material. Typically, an expert in the target population's field (e.g., a lecturer for those in education) presents a brief video explaining what attributions are, how they function, and how we can make healthier attributions moving forward (Haynes Stewart et al., 2011). The EMCOR lab group took the opportunity to create their own video AR presentation where an expert in the form of a lecturer verbalises information over the top of a presentation (Dryden et al., 2021; Hamm et al., 2020; Hamm et al., 2017; Hamm et al., 2014; Parker et al., 2017; Parker et al., 2016; Parker et al., 2018; Perry et al., 2014). There are also short video clips within the presentation of actors portraying members of the target population before and after retraining to enhance relatability of taught materials for the participants. The AR videotape, as described in Menec and Perry (1995), is a summation of two undergraduate students discussing their first-year university experiences. One student explains that he performed poorly on several tests and started to doubt his academic abilities. The student then reveals that after doubting his abilities, he realised that he had not studied enough and thus, began to put more effort into his courses and his performance improved. The second student shares a similar recollection of academic failure and discusses how she focussed on changing her study strategies, which improved her academic performance. After the students' discussion, a psychology professor summarises the importance of using controllable versus uncontrollable attributions for academic failure (Ruthig et al., 2006). This method utilises modelling to further underpin the retraining process with empirically rigorous learning theories (Bandura & Walters, 1977). AR induction is suggested to be the most important phase as it is used to ensure that participants are educated and knowledgeable regarding healthy

attributions (Mahmoodi & Doosti, 2018). Following AR Induction, the final phase to ensure understanding and consolidation of taught materials can commence.

### ***AR Consolidation***

Similar to AR induction, the AR consolidation phase has been a significant focus in empirical research prior to the formalisation of the collective three-phase protocol (Haynes et al., 2009). Hall et al.'s (2004) early work was one of the first major publications to acknowledge the role of consolidation as a significant phase in retraining of attributions. Hall et al. (2004) progressed traditional consolidation exercises that followed video tape induction (Manec and Perry, 1995) by explicitly manipulating consolidation activities to match specific groups to intervention techniques. In the study, participants were given a written AR assignment, which asked them to provide a one-page summary addressing the following four discussion points: a summary of their views on the videotape (AR Induction Phase); controllable factors influencing future failure attributions; a personal example of how AR examples could be applied; and a situation where they had previously performed poorly and its emotional impact. Low elaborators in academic settings were provided with a guided writing task to provided structure which can enhance focus on controllable failure attributions. This same written task was applied in several more studies delivered by Hall and flexibly applied to different participant groups to consolidate taught materials from the AR induction phase. Findings have revealed Hall's AR consolidation technique is moderated by student characteristics and the way AR is delivered. As a result, Hall's framework for written consolidation has remained popular amongst recent AR publications (Dryden et al., 2021; Simonton & Garn, 2020; Singpurwalla, 2020). However, alternative methods of AR consolidation have begun to emerge that require verbal or practical consolidation. Matteucci (2017) implemented vignette techniques where small groups compiled evidence around typical failure scenarios. This was based on a video displaying an interview of a male professor interviewing a female professor about healthy attributions. The participants were then played a second video with recommended responses to purpose-built failure scenarios before allowing the small groups to change their written responses. Findings indicated that vignettes improved generation of adaptive attribution related goals. This method could be critiqued due to the social loafing that can occur within group work (e.g., not all group members contribute to compilation of evidence or change in written responses; Liden et al., 2004). Contrastingly, research would suggest that attributions are a social construct and drawing on significant others to consolidate taught materials is an effective form of AR consolidation (Coffee et al., 2020; Jackson & Williams, 1985).

## **Attributional Retraining in Sport**

Traditional forms of AR, such as the three-phase protocol, are often not present in sport research due to the rigid experimental structure that restricts use in applied settings. Since the earliest publication linking attribution theory within the sport and exercise domain by Hastorf and Cantril (1954), the progress has been stagnant, although Allen (2012) indicates this is common within sport and exercise psychology research. Despite this, researchers have noted that AR strategies in sport have been effective in promoting positive achievement cognitions and behaviours (Coffee & Rees, 2011; Miserandino, 1998; Orbach et al., 1999; Orbach et al., 1997; Parker et al., 2016; Parker et al., 2018; Parkes & Mallett, 2011; Rascle et al., 2008; Saarinen et al., 2023; Simonton & Garn, 2020; Sinnott & Biddle, 1998; Van Yperen et al., 2019). Attribution theory was identified as being a hot topic of the 1980s before an unexplained marked decline in the 1990s and 2000s as researchers pursued other interests (Allen, 2012, p. 2; Biddle, 1999). Allen notes that it was not until the publication of two key calls for rejuvenation of attribution theory research in the 21<sup>st</sup> century did it then increase in popularity within the domain of sport and exercise again (Greenlees et al., 2005; Rees et al., 2005).

In 2012, Allen published a systematic review on sport attribution research between 1954 – 2011, identifying 167 empirical research studies (Allen, 2012). The review revealed that most research on attributions in sports focused on performance outcome attributions (94.6%) and attributions related to personal behaviour (66.9%). These studies predominantly involved individual athletes, with limited exploration of how social contexts (like teams or support networks) influence attributions. Assessment of methodologies revealed that 99.4% of papers published in attribution research in sport used quantitative methodologies in some capacity. Allen et al. (2012) highlighted a need for more qualitative studies to gain a deeper understanding of the attributions athletes make to capture the complexity of how athletes perceive and explain their own performance. Findings of the review also noted that much of the attribution research was centred on individual athletes and suggested that future research should expand beyond this focus. Specifically, Allen et al. (2012) called for studies that explore attribution retraining in team environments and involve athletes' support networks (coaches, teammates, family, etc.). To do this, different types of attribution retraining intervention designs were highlighted from attributional feedback (Rascle et al., 2015), traditional two-phase AR approaches (Hall et al., 2007), and the three-phase experimental approach used by the EMCOR Lab (Haynes et al., 2011). However, all these methods were noted to be rigorous within research, with minimal exploration of AR intervention research in applied sport. Specifically in relation to this thesis, consideration for both exploration of significant others

and their influence on attributions alongside the inclusion of qualitative forms of attribution assessment can be key to address Allen et al.'s (2012) recommendations.

### **Moffat's 5 Phase Applied AR Intervention in Sport**

A seminal piece of research exploring AR intervention in sport was published by Moffat et al. (2021). The study is only one of two that have applied AR in applied sport settings, and the first to capture attributions during live performance as opposed to retrospectively post-performance. As a result, specific exploration of the studies methods and findings are focused on below.

Moffat et al., (2021) implemented a two-phase AR Induction and Consolidation approach within a broader 5-phase psychological intervention designed to be used in sport settings (Moffat et al., 2021). The intervention was self-proclaimed as a 'wise' intervention: an intervention that is a brief, psychologically precise approach focusing on individual inferences from their own experiences (Walton & Wilson, 2018). Consequently, the intervention developed was appropriate for contextual needs of the participants (e.g., deliverable in context and time frame) and, utilised cognitive behavioural therapy literature that had been previously used with AR interventions (Boese et al., 2013). The study by Moffat et al. (2021), was unique as the lead researcher was already immersed as sport and exercise psychologist. This meant that they were able to deliver a case study styled approach given they already had built a relationship with the participants within the intervention study. Moffat as the sport and exercise psychologist opted to deliver the intervention over five key phases: assessment, psychoeducation, attribution retraining, evaluation, and follow up.

#### ***Assessment***

In phase one, assessment of the athletes' causal attributions was undertaken to provide pre-intervention data that could be compared again post-intervention. These assessments included use of the revised causal dimension scale (CDS-II) as a quantitative measure (McAuley et al., 1992), and the use of a real-time, verbalisation of cognitions method known as Think Aloud (Ericsson & Simon, 1984), to capture qualitative data. During this assessment, 30% of verbalisations accounted for performance related attributions, of which 78% were maladaptive when losing points. The CDS-II demonstrated that winning players reported more adaptive attributions than losing players.

#### ***Psychoeducation***

This step is designed to follow a cognitive behavioural therapy (CBT) model where psychoeducation can facilitate motivating, self-empowering, and help-seeking behaviours (Gustafsson et al., 2017). Workbooks containing guided discovery tasks were provided to

athletes in hope that they would identify, understand and challenge their performance related thoughts, feelings, and behaviours (McArdle & Moore, 2012). Within the workbook, tasks were structured and developed with the athlete's demographic in mind (e.g., use of language, level of depth). General task categories could include: identification of feelings, differentiating feelings and cognitions, the impact of feelings and cognitions on behaviour, and types of cognition experienced (Moffat et al., 2021). Participants within Moffat's study were given a two-week period to complete the workbook before the sport psychologist followed up with a 15 minute recap session individually with the athletes to reinforce learning (Turnnidge et al., 2014). Expected learning outcomes included the familiarisation with attributions as a concept as well as identification of the different types of attributions in lay terms. The research team notes that this phase was "critical" and that it would have been "inappropriate to progress the intervention had this not been the case" (Moffat et al., 2021, p. 9). Reflections from Moffat as the sport and exercise psychologist did note conflict between attributional retraining methods such as the three-phase protocol and delivery of interventions in applied practice. Without psychoeducation, Moffat suggests the method would have been ineffective, and therefore a limitation of current attributional retraining protocols may be that they are unusable in applied settings due to the lack of education prior to intervention.

### ***Attributional Retraining (AR)***

Consistent with Haynes et al.'s (2009) three-phase protocol recommendation, Moffat's study adopts the latter two stages of AR induction and AR consolidation as the main intervention. As noted in the breakdown of the three-phase protocol previously, AR induction consists of encouraging players to use functional adaptive attributions when explaining performance. The content of this video consisted of practical examples for functional and dysfunctional attributions that were extracted from the Think Aloud data in phase 1 *assessment*. Each athlete also received a 15–25-minute individualised AR consolidation session virtually to ensure understanding of maladaptive and adaptive attributions had been obtained. The AR consolidation session concluded with a failure-task, designed to provide opportunities to implement learning (Haynes et al., 2009; Moffat et al., 2021). Researchers were looking for an increase in adaptive explanations for participants performance based on the psycho education received. An example of this would be for an athlete to be asked to complete keepy-ups using both feet before then being challenged to only do so using their non-dominant foot looking to see whether athletes explain performance using adaptive (controllable, internal, and unstable) attributions. It should be noted that due to COVID-19, Moffat was unable to continue delivery at a group level for the AR consolidation phase, resulting in a video delivery of what would

have been a group workshop styled delivery. This is important as it affected Moffat's initial plan for individual AR consolidation sessions, where more contact time could have supported understanding of adaptive attributions.

### ***Evaluation***

The evaluation phase aimed to replicate the pre-post intervention design by mirroring the assessment phase. Due to COVID-19, Moffat was unable to collect in-person TA related data collection, but the CDS-II was completed in line with the quantitative findings. Moffat did, however, note those results indicated a positive effect with players increasing their adaptive attributions for performance. The results were limited due to the void in qualitative comparisons that could have been made with TA. As a result, it is difficult to conclude whether the CDS-II was affected by memory bias or newfound knowledge of what may be seen as the right answer.

### ***Follow Up***

The follow-up period occurred 8 months after the evaluation phase and allowed the research team to assess intervention efficacy. In this phase, the assessment and evaluation content were repeated to collect a third timepoint of quantitative and qualitative data. Results indicated that athletes were still demonstrating functional attributions both initially and in response to a dysfunctional attribution. For example, a dysfunctional attribution such as “he’s so lucky” was followed with instructional self-talk with adaptive cognitions such as “I am going to have to put a lot of kick on” – an adaptive attribution based on technique (Moffat et al., 2021, p. 12). It may be that while athletes’ instinctive responses were unlikely to change, the negative impact of reactions to performance outcomes (e.g. win or loss) could be reduced allowing them to adopt more functional adaptive attributions.

### **Attribution Retraining as an applied intervention**

Concluding the assessment of research on attribution retraining in sport, only Moffat et al. (2021) and one other study (Parkes & Mallett, 2011) have delivered an AR intervention in applied sport settings. Working with seven male rugby players, Parkes and Mallett (2011) used an adaption from the “Optimistic Swimmer” programme to aid implementation (Manzo et al., 2002). The “Optimistic Swimmer” programme is a self-guided intervention for athletes to integrate positive attitudinal and behavioural changes to promote an optimistic explanatory style. A workbook aimed at teaching swimmers to become optimists, along with demographic questionnaires and the Causal Dimensional Scale II (Attributions), were administered before and after the test. Parkes and Mallet (2011) integrated the workbook content and delivered eight, 30-minute group sessions to retrain attributions and enhance optimism. The sessions

occurred twice a week before training and were integrated into existing athlete schedules. Sessions were based around the adapted “optimistic swimmer” workbook with specific focus on retraining attributions. The quantitative results provided minimal support for the utility of the intervention; but there was evidence to suggest participants’ attributions became more external for negative events. The qualitative data suggested that participants (a) developed greater resilience in the face of adversity, (b) were more confident in their sport, and (c) developed a more optimistic explanatory style for negative events. Findings indicate that AR as intervention can be successfully intertwined with training schedules to provide positive outcomes relating to resilience, confidence and optimism.

Assessing both studies to have delivered attribution retraining in applied sport settings collectively, integration into existing schedules was noted as important for athlete buy-in across intervention duration. Both research teams also kept interactions to a minimal length of time (e.g., 30 minutes) as opposed to alternative attribution retraining sessions that have indicated session lengths between 90-120 minutes (Sarkisian et al., 2007; Wang et al., 2013). This may be a reflection on length of access time for a sport psychologist and a reflection on optimising effective time usage to consider the target audience. Finally, both studies in sport have been underpinned by rigorous step-by-step protocols whilst also considering flexibility in implementation to suit recipients’ knowledge. For example, Moffat and colleagues transferred intervention delivery onto the tennis court to enable a realism in translation of taught content. Although there is only minimal research in applied sport psychology surrounding AR interventions, some of the logistical changes to aid implementation are underpinned by general sport psychology intervention guidance (e.g., delivery time, schedule, and integration) and should be considered for future ARiS intervention protocol development within this thesis (Bates, 2022).

### **The Importance of our social influences: Social identity theory to AR**

Much of the existing attribution theory research focuses on individuals' internal cognitive processes known as self-referent attributions which are used to explain success or failure. However, as sport performance rarely occurs in isolation, neither do attributional processes. Outcomes are often shaped by the perspectives of significant others, such as coaches, teammates, parents, and spectators. This highlights the inherently social and interactive nature of attribution, suggesting it aligns more closely with social cognitive constructs than the individualistic lens often adopted. For example, consider a football scenario where a coach blames a striker for missed chances, while the captain attributes the failure to poor service from teammates. These differing perspectives illustrate how attributions are socially embedded and shaped by interpersonal dynamics (Coffee et al., 2020). Individuals' explanations are also influenced by broader social factors—values, norms, and especially group memberships.

This social dimension aligns with Social Identity Theory (SIT; Tajfel & Turner, 1986), which posits that individuals derive part of their self-concept from group affiliations. Group membership influences perceptions, behaviour, and decision-making, often leading individuals to favour in-group members (Tajfel, 1981; Jenkins, 2014). Levine and Manning's (2013) study exemplifies this: football fans were more likely to help an injured person when they wore the same team's shirt, demonstrating how group identity can affect even prosocial behaviour. Incorporating SIT into attribution theory addresses several critiques. First, it challenges the assumption of rational attribution-making by explaining how group loyalty can lead to biased judgments (e.g., a rugby fan perceiving a referee's call as fair or unfair depending on team allegiance). Second, it accounts for the unconscious, social influences shaping attributional thinking, offering a more contextualised and dynamic understanding.

This integration has important implications for AR interventions. The perceived group identity of the intervention deliverer can affect intervention uptake. Research shows that AR is more effective when delivered by someone seen as part of the athlete's in-group (Moffat et al., 2021; Perry et al., 2010). For instance, Moffat's embedded role within a tennis group likely enhanced the intervention's credibility and impact. However, the specific influence of the deliverer's social identity on AR effectiveness remains underexplored presenting a valuable avenue for future research.

While connections between attribution theory and SIT remain limited, Allen (2012) encouraged researchers to expand attributional inquiry in sport to include the perspectives of coaches and parents. Applied sport psychology has followed this direction, exploring coach-athlete relationships (McGee & DeFreese, 2019), parental involvement (Harwood et al., 2019), and peer dynamics (Weiss et al., 2021). Moffat (2021) also acknowledged the role of significant others, supporting recommendations from Allen (2012) and Henriksen et al. (2019) that involving these figures may enhance the long-term sustainability of intervention outcomes. When both athletes and their support networks understand the value of adaptive attributions (i.e., controllable, internal, and unstable causes), healthier explanations for performance are more likely to endure.

This thesis builds on these insights by developing the Attribution Retraining in Sport (ARiS) intervention protocol. ARiS aims to foster adaptive attributional styles in athletes by firstly encouraging controllable, internal explanations in line with attribution theory, and secondly, involving significant others to promote lasting mindset change addressing calls for socially informed, sustainable interventions (Allen, 2012; Henriksen et al., 2019; Coffee et al., 2020).

### **Research Aims and Questions:**

As a result of literature exploration, this thesis aims to make both theoretical and methodological contributions to attribution retraining research. It also seeks to present novel findings through a co-production methodology to support the development of an attribution retraining intervention specifically for sport. These aims will be explored through the following research questions –

1. What is required to develop an effective attribution retraining in sport intervention?
2. How can refinements to an Attribution Retraining in Sport (ARiS) intervention enhance usability?
3. Is the co-produced Attribution Retraining in Sport (ARiS) intervention protocol effective in enhancing adaptive attributions when piloted with a sporting population?
4. How is the co-produced Attribution Retraining in Sport (ARiS) intervention evaluated by athletes via acceptability and adherence?

## **Chapter 3**

### **Philosophy & Methodology**

## **Underpinning Philosophy**

### **Pragmatism**

As a researcher who acknowledges both the importance of what has gone before, and the contribution of knowledge yet to be discovered, my research philosophy aligns with William James' pragmatism (James, 1907). Jamesian pragmatism is the philosophy of knowledge construction that emphasises practical solutions to applied research questions and the consequences of inquiry. Central to the Jamesian pragmatism perspective is the reference towards future knowledge construction through the most appropriate methods of inquiry. In relation to this thesis, Jamesian pragmatism is demonstrated through the employment of both quantitative and qualitative methods of inquiry where required through collaboration with stakeholders in both research and applied sport backgrounds.

Expanded upon by Hoch (1984), Pragmatism is employed frequently as a middle ground in settling disputes between conflicting philosophical positions such as positivism and constructivism. In simple terms, pragmatism is accepting of various methods to acquire knowledge although one may argue that pragmatism side-steps discussions of reality and truth. Leaning towards a positivistic research philosophy, pragmatists recognise that scientific inquiry is contextual and that a person's historical, social, and political conditions will significantly impact the scientific process (Giacobbi et al., 2005, p. 21). However, pragmatists also believe from an omniscient perspective that God's eye-view is irrelevant and cannot account for the world's peculiarities. For example, in sport psychology there is not a one-size fits all approach for intervention delivery, and understanding the differences in intervention delivery style is essential for effective integration within the target group of recipients. For the pragmatist, total agreement, complete objectivity, and the search for some ultimate truths are not considered useful endeavours (James, 1907).

Pragmatists have moved away from debates about whether theories match reality and instead focus on conversations about how different types of knowledge can help us navigate and succeed in the world (Rorty, 1982). In a way, this is how I envision the development of my research. I believe it will have a meaningful impact when supported by solid, theory-driven evidence, which in my area of study often stems from positivist, lab-based research (e.g., attribution retraining).

In applied sport psychology, a pragmatic research philosophy aims to bridge the gap for future collaborations between academic and applied sport psychologists (Giacobbi et al., 2005). Frequently present in recent sport psychology literature, pragmatic research philosophies are popular due to the ontological reflexivity, epistemological flexibility (e.g., use

of most appropriate data collection methods; Maarouf, 2019) and increased self-awareness, that use of pragmatism can offer (Peters & Crutzen, 2017; Wheeldon, 2015). Pragmatism is appropriate with an acknowledgement of how richness can provide context to statistical significance. As a result, it is frequent to see a combination of both qualitative and quantitative data collection methods in pragmatic research. This allows the practitioners to use historical, social, and theoretical contexts and theories, alongside athlete's experiences, perceptions, and opinions to generate novel findings on their topics.

Presented within this thesis, I aim to continue bridging the gap between attribution theory and applied practice, an important direction in the field of sport and exercise psychology (Smith et al., 2022). This is especially relevant because there is limited research on attribution retraining that can be easily applied in real-world sport settings. Using a pragmatic research approach allows me to assess the validity and strength of attribution theory through discussion, while also evaluating the practical value and outcomes of knowledge through real-world interventions (e.g., ARiS) when needed. The ARiS intervention protocol will be developed based on the most suitable methods, contributions from stakeholders in both research and applied sport, and evaluated through both statistical and anecdotal means to ensure its effectiveness and usability.

## **Method**

The method employed for my PhD took inspiration from the action research informed method of co-production. Prior to discussion of co-production methods used within this thesis, clarity on the difference between co-production, co-development, co-design, and co-creation is required to establish the specific approach to aid intervention development (Smith et al., 2021). Co-creation is defined as an all-encompassing principle about where people work together to solve a problem across a series of phases (e.g., from problem identification to evaluation). Co-design is when stakeholders actively work together to design a solution for a specific problem, while co-production is about involving stakeholders in carrying out the solution for an agreed problem, focusing on making the best use of available resources. The thesis will use co-production to aid development of an ARiS intervention protocol, drawing on the successful use of collaborative methods in sport and exercise settings broadly, as well as the fact that the "problem", in this case, creating an applied attribution retraining intervention, has already been identified.

The remainder of this chapter summarises the use of co-production methods when underpinned by a pragmatic research philosophy. Justification for the use of co-production methods are also provided along with guidelines for intervention development in line with

thesis aims. A note on transparency and reflexivity of researchers opting for use of co-production methods has also been acknowledged below. Finally, some limitations of co-production are discussed and alternative options for intervention development considered before concluding with application of the methodological approach directly mapped to the contributions of this thesis.

### **Co-production and Pragmatism**

Co-production is an approach that aims to draw upon pragmatic methods to collaboratively produce future novel intervention developments (Buckley et al., 2018, p. 587). Aiming to reduce inequalities, widen participation and maximise subsequent effectiveness via inclusion of multiple stakeholder groups, the method of co-production has emerged as a popular ecologically valid framework to capture the joint impetus of both researchers and participants (Milton et al., 2022). The participatory research process, draws upon previous intervention developments, expertise of relevant personnel, and relevant academic literature to co-produce a novel intervention (Hornyak et al., 2022). As an “underutilised approach” (Milton et al., 2022, p. 7), co-production has evolved around pragmatic research paradigms, and provides a framework for knowledge generation, evaluation and decision making (Brooks et al., 2019; Miller & Wyborn, 2020).

Specifically, to this thesis, Jamesian pragmatism provides a philosophical foundation for co-production by emphasising practical experience, pluralism, and the idea that knowledge and truth are shaped through action and interaction in real-world contexts. Firstly, James’ pragmatism denotes that truth is not static and instead evolves through human interaction aligning with the collaborative process of co-production generated through stakeholder inquiry. Secondly, James’ pragmatic philosophy embraces pluralism whereby multiple viewpoints, experiences and methods can coexist together to contribute to a fuller understanding of any situation. In co-production, this pluralism is reflected in the involvement of diverse stakeholders, including athletes, coaches, sport practitioners and research experts, each of whom brings their own knowledge, skills, and experiences to the table. Finally, James’ perspective posits that proof of concept or truth is best measured by the practical application to solve real-life problems. This idea aligns with co-production, where the development of an attribution retraining in sport intervention is measured not just by theoretical frameworks or expert opinions, but by how well it works in practice for all involved (See Chapter 7).

### **Co-production in Sport**

Co-production as a method has had limited use in sport and exercise research, but when applied, it has proven beneficial for both participants and researchers in exploring participants'

lived experiences from their own perspectives (Ma et al., 2020). Recent calls from Smith et al. (2022) have encouraged researchers in sport to reignite inquiry using co-production to enhance usability of future novel interventions despite a “dearth of literature comprehensively detailing co-production relevant to research in and for our field” (p.2). Smith suggested that sport researchers look towards one of three different types of co-production methods: 1. Citizens’ Contributions to Public Services: a form of co-production that aims to influence effectiveness, efficiency, and existence of public services and delivery, 2. Integrated Knowledge Translation (iKT): offers researchers the opportunity to work with ‘knowledge users’ throughout the research process where relevant lived experience can be offered, and 3. Equitable and Experientially Informed Research: similar to iKT but this co-production method requires the lived experience and experiential knowledge as essential criteria for collaboration with stakeholders (Smith et al., 2022). In accordance with research recommendations, these typologies were provided to ensure clear communication and definition of the co-production variants used for the future evaluation of ARiS development in this thesis (Bovaird & Loeffler, 2021; Williams et al., 2021). For this research, iKT was classified as most closely aligned for data collection when working with knowledge users of the proposed Attribution Retraining in Sport (ARiS) intervention (Chapter 4). This was decided based upon the desirability for lived experience and experiential knowledge of participants to aid future implementation amongst athletes, coaches and practitioners. As this does not directly affect public services, citizens contributions to public services co-production were also deemed insufficient for the aims of the PhD.

### **Integrated Knowledge Translation (iKT) Co-Production**

Initially developed for health research in the 2000s, iKT has the aim to improve the translation of knowledge and evidence into practice (Leggat et al., 2023). Since its inception, a growing number of researchers have referred to iKT as a specific type of co-produced research (Allan et al., 2023; Banner et al., 2019; Graham et al., 2018; Graham et al., 2019; Smith et al., 2022). The goal of iKT research is to produce outcomes that can be applied in practice, making ‘knowledge users’ crucial as they can offer a unique insider perspective. To this point, these often take the form of educated professionals and future intervention users alike. Referred to frequently as “Stakeholders”, their importance often holds the key for successful implementation alongside research informed decision making (Leggat et al., 2023).

In sport and exercise specifically, iKT attempts to break down the barrier between the academic and practitioner divide to metaphorically bridge the gap between research and

practice (Gainforth et al., 2021; Martin, 2010). Gainforth and colleagues suggested a 4-step process to support researchers looking to implement iKT co-production research. The 4-step process commences with a review of underpinning research principles: in essence, why does the research require an iKT co-production methodology. Within this step, researchers should review all literature available, conduct initial scoping interviews and needs-analysis with relevant ‘knowledge users’ and conclude an answer to the question on whether iKT is appropriate. In Step 2, a Delphi consensus study is circulated to knowledge users which aims to create and review changes to an initial intervention design. Step 3 of iKT for Gainforth et al. (2021) was a 2-day consensus meeting to conclude a final agreed intervention pilot protocol which culminated in Step 4, surveying expert panel members and end users to conclude development of a pilot intervention.

Aligning with positivist ontologies, iKT traditionally requires agreed consensus to be able to progress with co-production and only makes changes based on the level of agreement in place (Gill et al., 2023). However, the stages of iKT are dynamic and evolve iteratively like that of pragmatism. In the case of this thesis, pragmatic methods highlight the focus is not on level of agreement but rather any level of change can be implemented (Nguyen et al., 2020).

### **Co-production guidelines for intervention development**

Guidelines for use of co-production to develop interventions originated in public health research and provide a rigid structure to research studies via three stages: Stage 1: Evidence Review and Stakeholder Consultation, Stage 2: Co-production of an Intervention Protocol, and Stage 3: Stakeholder Review and Prototyping (Hawkins et al., 2017).

In research, Stage 1: Evidence Review is divided into two sections: Stage 1a: an evidence review of literature and Stage 1b: stakeholder consultation to co-produce a pilot intervention protocol. This stage of research serves the purpose of knowledge collation from both research and applied practice. Stakeholders should provide information as “knowledge users” in line with iKT co-production guidelines.

Stage 1a has minimal guidance on what consists of an appropriate evidence review. Evidence reviews can take the form of systematic (Brooks et al., 2019), scoping (Hornyak et al., 2022) or unpublished (Harris et al., 2024) reviews of the literature. However, Hawkins et al. (2017) does indicate that researchers should scope appropriate literature and theory to underpin intervention development.

Stage 1b: stakeholder consultation invites participants from research and practice to contribute their expertise to intervention development. Stakeholder consultation can use a

variety of methods to collect data for intervention development. This has previously included interviews (Copeland et al., 2022), email conversations (Brooks et al., 2024), phone conversations (Onukwugha et al., 2023) and focus groups (Nuckols et al., 2024). Previous research has referred to this phase as a ‘needs-analysis’, where the research team need to obtain information via key stakeholders on what is required prior to co-production of an intervention (Milton et al., 2022). This phase concludes when the research team are happy that sufficient evidence has been captured on all relevant information points prior to the co-production with the intervention development group (IDG) in Stage 2.

Employing qualitative questionnaires, focus groups, and alternative content production methods (e.g., info-graphics), Stage 2 aims to use collective opinion to inform intervention development (Milton et al., 2024). Being developed with an intervention development group (IDG), Stage 2 consists of members of the research team and key stakeholders building on Stage 1 to co-produce a novel intervention. The use of multiple methodologies is common in co-production as it enhances the opportunity for diversity of participants and evidence (Williams et al., 2024). For example, it is likely that not all members of the IDG will be available for a workshop at once, and therefore use of online technology may be relevant to capture the experiences of those unable to participate in the focus groups (Wray et al., 2021). There should also be opportunities for members of the IDG to select what method of participation they would prefer: encouraging an emphasis on desirable contributions (Maindal et al., 2021). For example, if stakeholders would prefer to answer a questionnaire as opposed to attend an interview could the interview questions be shared whereby a participant can type their appropriate responses. These considerations work to enhance ecological validity for the future co-production of a new ARiS protocol in line with thesis aims.

Finally, Stage 3 concludes co-production with two main aims: (1) to achieve stakeholder approval and (2) to have co-produced a pilotable intervention protocol (Boateng et al., 2021). Stakeholders are invited to provide their opinion on the co-produced protocol that has been developed thus far. The difference in this stage is the encouragement of including a higher level of stakeholder from those previously involved in Stages 1 and 2 of co-production to engage with the process. For example, in sport this could include recruiting ‘experts’ who are involved with elite sport based on Swann et al. (2015) popularly used criteria. Critically, this may present a challenge to the problem aiming to be solved: how can equity be maintained amongst all individual opinions if expert stakeholders have the last say. However, in line with Hawkins et al., (2017) co-production for intervention development,

expert stakeholders can provide refinements where co-production of an intervention protocol has already occurred. Essentially, experts provide expertise to put the finishing touches on an equitably co-produced ARiS intervention protocol. This may provide benefit as those typically involved in elite sport facilitate higher knowledge and experience in their individual silos that can enhance rigor for ARiS development. Upon conclusion of making any final recommended revisions, co-production is recognised as complete once a pilotable intervention protocol has been co-produced (Gill et al., 2021).

Despite iKT co-production having its own 4-stage guidelines for usage, these were not designed for intervention protocol development or validated for this purpose (Gainforth et al., 2021). However, the method's employed would share most similarity with iKT co-production. As a result, Hawkins et al. (2017) three stages of co-production were purposely designed to support intervention development and provide an ecologically validated and rigorous structure for co-production of an Attribution Retraining in Sport (ARiS) intervention protocol.

### **Flexibility, Reflection & Reflexivity in Co-Production**

Pettican et al. (2023) reflect on the role of co-production and participatory research methods synergistically as they provide flexibility for researchers. For example, previous participatory research has demonstrated creative methods for knowledge production such as podcasting (Barbarino et al., 2022), go-along interviews (Harvey, 2024), and WhatsApp® conversations (Keskinen et al., 2024). Intervention development throughout this thesis will consider creative methods to enable recruitment of hard-to-reach populations that may require adaptations for their involvement.

Pettican et al. (2023) also extend calls for further reflection and reflexivity from research teams that use co-production methods. Reflection refers to the “learning experience, resulting in a changed perspective” (Andrews, 2000, p. 396) and can aid transparency in the development of myself as a researcher when using co-production. However, more pertinently to the transparency of good research practice, reflexivity systematically evaluates the researcher's own impact on processes and working relationships by demonstrating the researcher's own assessment of their involvement in their research (Lugueti et al., 2023). This may be noting their own biases, opinions, and values that could influence the outcome of a collaborative research process. In light of using co-production where traditional power dynamics of researcher to participant are removed, clarity on the role I adopt and how this changes will be noted within the individual chapters of the thesis for the reader's attention (Foley et al., 2023). For example, delivery of the pilot ARiS protocol in Chapter 7 highlights

my role as lead researcher, integrated “psychologist”, and my previous experience of playing and coaching futsal. All these positions impacted my delivery of the pilot ARiS intervention (see Chapter 7) and were summarised to aid transparency and qualitative rigour. A reflexivity paragraph is available as part of the final thesis discussion in Chapter 8.

### **Limitations of Co-Production**

It is important to acknowledge that co-production does have limitations. The challenge of working collaboratively with multiple stakeholders can facilitate time management issues when conducting research (Wray et al., 2021). Organising a date that works for all or ensuring all stakeholders have equitable input can challenge the research team to be organised and creative to ensure contributions from all (Maindal et al., 2021).

Pertinent to this thesis, the categorisation of lay vs. expert knowledge when working collaboratively may also present challenges. With athletes who may hold little to no experience of research vs. research experts who may hold little to no experience of applied sports, it is important that classification of all knowledge is regarded as equal and that no single co-researcher’s opinion is more valuable than the next (Betsos et al., 2022). Extending this, Messiha et al. (2023) noted that research experts and lay people are likely to be operating under different epistemic or ontological assumptions. As a result, co-production is challenged to address the difference in knowledge and understanding that cannot always be brought together. However, linking back to my earlier philosophical position, a pragmatic approach offers a neutral view of society, accepting that epistemic and ontological differences are part of human opinion. Consequently, my researcher philosophy provides optimism that this limitation is addressed by seeking multiple perspectives as opposed to only the ‘ideal’ opinion (Rorty et al., 1995). Further limitations of the individual co-production stages for intervention development are presented in Chapter’s 4, 5, 6 and 7.

Finally, the absence of consensus for intervention revisions among stakeholders can introduce an important element of open-ended inquiry for readers. While the goal of co-production is to bring together both lay and expert perspectives in a balanced way to inform the research, it often overlooks or underrepresents disagreements and tensions. This can lead to findings that suggest a misleading sense of consensus and cobiguity of power dynamics (Williams et al., 2020). Although stakeholder conflict and epistemic friction are natural, and potentially valuable components of intervention development, co-production processes rarely highlight such resistance, instead favouring a narrative of convergence (Howard & Thomas-Hughes, 2021). In contrast, this thesis does not aim to achieve consensus; rather, any

disagreements that arise during the co-production process will be documented at each stage to support transparency in intervention development.

### **Alternative Intervention Development Guidelines**

Alternative guidelines for developing an attribution retraining protocol were explored including Developing and Evaluating Complex Interventions by the Medical Research Council (MRC; Skivington et al., 2021). Despite being formalised for the purpose of medical research, these guidelines have seen application to intervention development within sport and exercise (Yao et al., 2021). MRC guidelines created a development-evaluation-implementation process for intervention development over a five-stage research cycle: Developing, Piloting, Evaluating, Reporting, and Implementing. Inspired by positivistic underpinning, MRC guidelines encourage researchers to consider theoretical foundations within development before focusing on an experimental pilot and feasibility approach. Checklist points around effect sizes, variability, attrition and reliability all detail the need for statistical significance to be at the forefront.

As a result, these guidelines were deemed to be conflicting of the philosophical position of the PhD, as well as unsuitable when aiming to bridge the knowledge-do gap between research and applied practice in sport. Firstly, MRC Guidelines were deemed inadequate for the inclusion of lived experiences for future intervention users due to the checklist points highlighted and positivistic underpinning. Secondly, although created interventions serve to bridge a gap between knowing and doing, the design of the MRC guidelines is purpose built for use in research settings as opposed to supporting applied interventions.

### **Co-production of an Attribution Retraining in Sport (ARiS) intervention**

**Table 3.1**

*Stages of co-production for intervention development (Hawkins et al., 2017)*

| <b>Stage of Co-production</b>               | <b>Chapter in the thesis</b> |
|---------------------------------------------|------------------------------|
| Stage 1a: Evidence Review of Literature     | Chapter 4                    |
| Stage 1b: Stakeholder Consultation          | Chapter 4                    |
| Stage 2: Co-production with an Intervention | Chapter 5                    |
| Development Group                           |                              |
| Stage 3: Stakeholder Approval               | Chapter 6                    |
| Pilot the intervention                      | Chapter 7                    |

As seen in Table 3.1 and in line with Hawkins et al. (2017) guidelines, an Attribution Retraining in Sport (ARiS) intervention was co-produced over 3 stages (Chapter 4, 5 and 6)

before concluding with a pilot of the intervention as a case study approach (Chapter 7). As part of Stage 1, a systematic scoping review on attribution retraining and interviews with stakeholders around attributions in sport have both been completed. For the PhD thesis, the systematic scoping review on attribution retraining has been presented in Chapter 4, but a broader literature review on theoretical underpinning (e.g., attribution theory, social identity theory) was presented in Chapter 2. Stage 2 focuses on the role of an intervention development group, which goes through two cycles of data collection, as presented in Chapter 5. Stage 3 invites the opinions of expert stakeholders to conclude development and refinement of the ARiS intervention protocol. This stage is presented in Chapter 6. To conclude primary data collection, in Chapter 7, the ARiS intervention is piloted via a case study approach, which allows for assessment of usability, acceptability, efficacy, and adherence of the intervention.

## **Chapter 4: Study 1**

**Stage 1: An evidence review of literature and Stakeholder consultation to co-produce a novel ARiS intervention.**

### **Stage 1: An evidence review and Stakeholder Consultation**

As covered in Chapter 3, Stage 1 of Hawkins et al.'s (2017) 3-stage approach to co-production focuses on gathering of information. There are two recommended substages for gathering information: (a) an evidence reviews of current literature, and (b) stakeholder consultation.

Stage 1a: An evidence review of current literature allows researchers to assess current theoretical underpinning for future intervention development as well as other relevant strands of research such as application in specific domains (e.g. sport). For this PhD thesis, understanding the development of attribution retraining (AR) as an intervention is fundamental to assist in underpinning the co-production of an AR intervention specifically for applied sport settings. Hawkins et al. (2017, p.3) recognise this step to be a “co-operative enquiry”, whereby researchers use this as an opportunity to gather evidence and knowledge from relevant literature. In line with the recommendations of Hawkins et al. (2017) to evaluate existing evidence before developing interventions, a practitioner review of collaborative methodologies in health research found that 12 articles also included an initial scoping or discovery phase to assess the literature and current practices prior to intervention development (Bevan Jones et al., 2020). This step is consistent with other intervention development guidelines (e.g., Medical Research Council; Craig et al., 2008) and aims to establish a strong theoretical rationale for intervention development prior to commencing any primary research cycles which is paramount for the co-production of a rigorous and usable AR in sport intervention. There are no requirements or recommendations on how to complete an evidence review of current literature within Hawkins et al.'s (2017) guidelines. There is no specification on review type (systematic, scoping, narrative etc.) and alternative research leaning on Hawkins et al.'s (2017) guidelines suggest that the evidence review aims to gather relevant research that can help inform materials for future stakeholder consultations (Thabrew et al., 2018). Conclusively, this provides freedom to select the most appropriate review method to address thesis aims and research questions alongside underpinning future co-production of an AR in sport intervention.

Stage 1b: Stakeholder consultation provides an opportunity to gather multiple perspectives from researchers and domain experts alike to inform future intervention development (Laird et al., 2020). These perspectives gather ideas for future content development and initiate collaborative development of an intervention that can maximise acceptability of the co-produced pilot intervention protocol. Stakeholder consultation within co-production research has been used with a variety of qualitative data collection techniques including focus groups (Pettican et al., 2023), observations (Hawkins et al., 2017), and semi-

structured interviews (Buckley et al., 2022). Collaboratively working with stakeholders who represent demographics of future intervention users provides a unique opportunity to address problems within the target population (Rasmussen et al., 2023). For example, considering the input of athletes and their support network in the development of an AR intervention for sport will support co-production of strengthened usability of future product users. As a result, this step aligns with my pragmatic approach to bridge the knowledge-do gap (Leggat et al., 2023) by consulting with key personnel who are likely to receive, deliver, or effect implementation of a future Attribution Retraining in Sport (ARiS) intervention.

Overall, Stage 1 of co-production aims to extensively scope scientific research and stakeholders' experiences to underpin research development. Therefore, the purpose of this chapter is to provide relevant underpinning prior to the development of an ARiS intervention. Stage 1 will address the following research questions –

1. How can existing attribution retraining intervention research inform development of a sport specific attribution retraining intervention? (Stage 1a)
2. How do experiences of stakeholders from sporting and theoretical backgrounds inform development of a future attribution retraining intervention? (Stage 1b)

Firstly, this chapter will present the findings from a scoping review of attribution retraining literature as part of Stage 1a: Evidence Review of Literature. Taking a systematic approach to a scoping review has been used previously in sport research (Prior et al., 2022) and allows the authors to address a broader research topic than traditional systematic reviews whilst maintaining similar depths of critical appraisal. As a result, this systematic scoping review can explore AR interventions in sport specifically, whilst also critically appraising AR interventions outside of sport that may influence development of a future AR in sport intervention. Broadening the research topic in this sense allows for critical appraisal of both attribution retraining methods and their development, alongside examining specific use of the intervention in sport. Stage 1a is informed by Preferred Reporting Items for Systematic Review and Meta-Analyses (PRISMA) guidelines to enhance systematic rigour, and utilises Grades of Recommendation, Assessment, Development, and Evaluation (GRADE) to critically appraise included articles within sport. Findings will provide an exploration of existing research that have used attribution retraining interventions in performance and achievement settings since the last published systematic review in this area (Robertson, 2000). Consequently, the findings will inform development of future co-production materials (e.g., semi-structured interview

questions) and ARiS protocol development throughout the PhD thesis. Secondly, this chapter will present the primary evidence of semi-structured interviews with relevant stakeholders as part of Stage 1b: Stakeholder Consultation. Upon conclusion of Stage 1b, relevant limitations and future research directions of Stage 1 of co-production holistically will be discussed.

## **Stage 1a: an Evidence Review of Literature**

Informing development of a future ARiS intervention, Stage 1a: an evidence review of current literature, enabled the exploration of Attribution Retraining research. As part of the literature review underpinning the PhD thesis presented in Chapter 2, attribution theory and the development of AR methods have already been extensively reviewed. As a result of this prior knowledge, a decision was made to use Stage 1a to delve further into the specifics of AR research in achievement and performance settings which can relate to the intended domain of choice, sport. To do this, a systematic scoping review was completed in August 2021 which informed development of semi-structured interview questions used in Stage 1b: Stakeholder Consultation. To address both broader chapter outcomes and overall thesis inquiry, Stage 1a aims to present findings in answer to the following research questions –

1. How has attribution retraining research developed since the last systematic review?
2. How has attribution retraining research been used in the domain of sport?
3. How has the use of technology evolved in attribution retraining interventions?

## **Method**

A scoping review is the process of mapping study information (e.g., aims, methods, findings, and recommendations) from existing literature in a certain research area (Arksey & O'Malley, 2005), and is best suited when there are multiple study aims to address as per this chapter (Armstrong et al., 2011). Within this thesis, a scoping review synthesises existing literature to highlight relevant underpinning for future co-production of an AR intervention in sport. This type of review also provides the flexibility to present a consensus of findings (Prior et al., 2022). In sport, Prior et al. (2022) used a systematic approach to a scoping review for mental health interventions within sport as this combination enabled critical appraisal and synthesis of literature for those working in applied settings. A systematic scoping review approach has also been used previously to inform intervention development (Callary et al., 2015; Schaink et al., 2012), as it continues to synthesise and appraise empirical research findings alongside alternative sources of literature (e.g., grey literature) to enhance ecological validity in the future. This can provide theoretical underpinning for future intervention development as well as statistical grading of individual articles and domain specific attribution retraining research on rigor, effectiveness, and validity in assessment of chapter aims and objectives: something that other approaches are not supported by.

From an attribution retraining (AR) research perspective, progress has occurred in recent years on the efficacy and viability of motivation interventions such as AR, yet reviews in the area remain sparse and dated in comparison to the rate of contributing empirical findings (Walton, 2014; Moffat et al., 2021). For example, the last systematic review in attribution retraining methods was published 25 years ago (Robertson, 2000), although small scale reviews relating to the method have taken place since (Haynes et al., 2009, Allen et al., 2011). As a result, a systematic scoping review into existing AR interventions presents firstly an opportunity to synthesise literature and secondly examine evidence systematically in line with future intervention development. Examining this evidence systematically then informs methodological rigour of intervention development by extending good practice and building on limitations identified by systematic examination. In relation to thesis outcomes, limitations could note considerations for future AR in sport interventions to consider such as integration of intervention protocol into existing sporting schedules (e.g., training routines and matchday calendars).

In Stage 1a, the methodological framework for a scoping review proposed by Arksey and O'Malley (2005) was employed. This framework includes five steps: 1) identifying the research question, 2) identifying relevant studies, 3) selecting studies, 4) charting the data, and 5) collating, summarising, and reporting the results (Arksey & O'Malley, 2005). Traditional scoping reviews do not assess methodological limitations or the risk of bias, which often limits their influence on clinical or policy decisions due to the absence of measurable outcomes (Munn et al., 2018). However, for this study, which aimed at guiding future intervention development, a more systematic approach to the scoping review was adopted to facilitate a critical appraisal of existing methods (Peters et al., 2015). A traditional systematic review was not chosen because it would have required a clearly defined review question with specific parameters like population, interventions, comparators, and outcomes of interest (PICO; Amir-Behghadami & Janata, 2020), potentially narrowing the scope and reducing the inclusion of all relevant examples of AR research.

### **Identifying relevant studies**

The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines were utilised to establish appropriate criteria for the scoping review (Moher et al., 2015) and are widely recognised in sports research (Tod, 2019). PRISMA is traditionally employed in systematic reviews but can be used in scoping reviews with a systematic approach (Page et al., 2021). The search was conducted using four scientific literature databases (SCOPUS, Web of Science, SPORTDiscus, PsycInfo) for papers published between January

2000 up to and including August 2021; the latter being the date of completion for Stage 1a. These four databases were selected as they provide results from a variety of domains including sport, education, health, and psychology where attribution theory has been most prominent. The English Boolean data types “AND” and “OR” were used with the following search terms “attribut\*”, “retrain\*”, “therap\*”, “intervention\*”, and “program\*”. The proximity function was also used to reduce the chances of the terms occurring away from one another triggering irrelevant results. For example, without proximity filters, the title “Attributions of a computer retraining programme” would be returned in the search results. However, with proximity filters, since none of the selected search terms appear directly next to each other, the above result would not be retrieved using the current search strategy. This reduces the likelihood of irrelevant results that would require manual review (See full search strategy in Appendix A for more). Following exhaustive searches using the terms stated, reference lists of selected articles were screened for additional results with relevance to the review (Olusoga et al., 2019). Key authors in this area were also contacted to explore the possibility of unpublished literature that would be of relevance, but no further results were retrieved.

The study selection process was conducted independently by three researchers to minimise potential selection bias from the lead researcher, who may have had pre-existing knowledge of certain AR research and key authors in the field. The lead researcher completed the full scoping review according to the provided search strategy. Two additional researchers then independently executed the same search strategy to verify the returned results. To ensure impartiality, all three researchers documented any pre-existing relationships with specific authors. If a researcher had such a relationship, they refrained from commenting on that author's work. The research team also maintained transparency regarding any affiliations with journals, institutions, or organisations that could influence their position within the scoping review. Since the lead researcher was an early career researcher, they had no affiliation with any journal used for publishing research nor any pre-existing relationships with key authors in this area at the time of the review. These measures were put in place to ensure impartiality and reduce potential bias during the selection of appropriate studies.

### **Study Selection: Inclusion and exclusion criteria**

Following recommendations of Tod (2019), the three reviewers collectively agreed on eligibility criteria prior to the electronic search commencing. To avoid publication bias, grey literature was included within the search. Grey literature is “crucial” for inclusion as this is more likely to be picked up by those working in applied settings (Prior et al., 2022. p.3). This may include policies from national sporting organisations or newsletters that provide advice on

sport psychology interventions. However, any articles that did not present primary findings were excluded from the study (e.g., book chapters, books, and literature reviews). These were deemed ineligible for systematic assessment due to the absence of independent primary findings. Articles that did not specifically address AR and its outcome effects were also excluded. For instance, if the article did not provide conclusive evidence regarding the use of the intervention or its results, it was removed due to the lack of primary findings. This exclusion was in line with the inclusion criteria, which required primary data on attribution retraining interventions for future assessments.

Accordingly, studies were included if eligible in the following criteria: (i) primary study of attributional retraining (i.e., randomised trial, observational study), (ii) were available as full text, (iii) were written and published in English language, and (iv) were published between January 1<sup>st</sup> 2000 and August 30<sup>th</sup> 2021. If full text was not available but the title and abstract detailed eligibility on other aspects of the criteria, then the lead author of the article was contacted via email to request a copy of the article. The search result was restricted to those published in English Language due to the limitations of the three researchers involved within the review. The publication date of research or alternative documentation was retrieved if it was published between the most recent systematic review published in Attribution Retraining (Robertson, 2000), up until the date at the time of completion prior to commencement of Stage 1b (June 2022).

Studies were excluded if any of the following were present: (i) duplication of existing record, (ii) did not use attributional retraining as the main intervention, (iii) used attributional retraining as a hybrid solution as part of a broader intervention (e.g., used AR and Growth Mindset to enhance motivation), and (iv) do not present primary findings (e.g., book chapters, reviews of existing literature). Duplication of existing literature included both articles being retrieved from more than one database as well as any results that may have been published as secondary analysis. Attributional Retraining as the main intervention was judged upon the presented methodology in each article reviewed. Any articles with ambiguity were checked by a second researcher and a decision was made collaboratively although no further articles were removed because of this process. If attributional retraining was used in conjunction with another intervention this was removed as results may have been impacted by alternative interventions.

### **Charting the Data**

To chart the data systematically, a password-protected Microsoft Excel spreadsheet was shared among all three reviewers to facilitate collaboration. The findings of eligible studies

were documented based on study characteristics (e.g., author (year), location, participants), experimental design and research methodology (e.g., AR stages, study variables, AR methodology, analysis method), and results and conclusions (e.g., relevant findings, strengths and limitations, future recommendations). The data charting process was iterative, with findings being recorded chronologically across the provided categories. To align with the overarching aims of the thesis, additional criteria were introduced, such as the research domain (e.g., sport, education, health), to consider the development of a future AR intervention. This was done after all other relevant characteristics had been charted. For instance, results were categorised to specifically examine AR research in sport, allowing for a critical appraisal and assessment of potential biases, which may highlight the need to incorporate certain characteristics in future intervention development. This approach also helped identify gaps in the existing research, aligning with the thesis objectives.

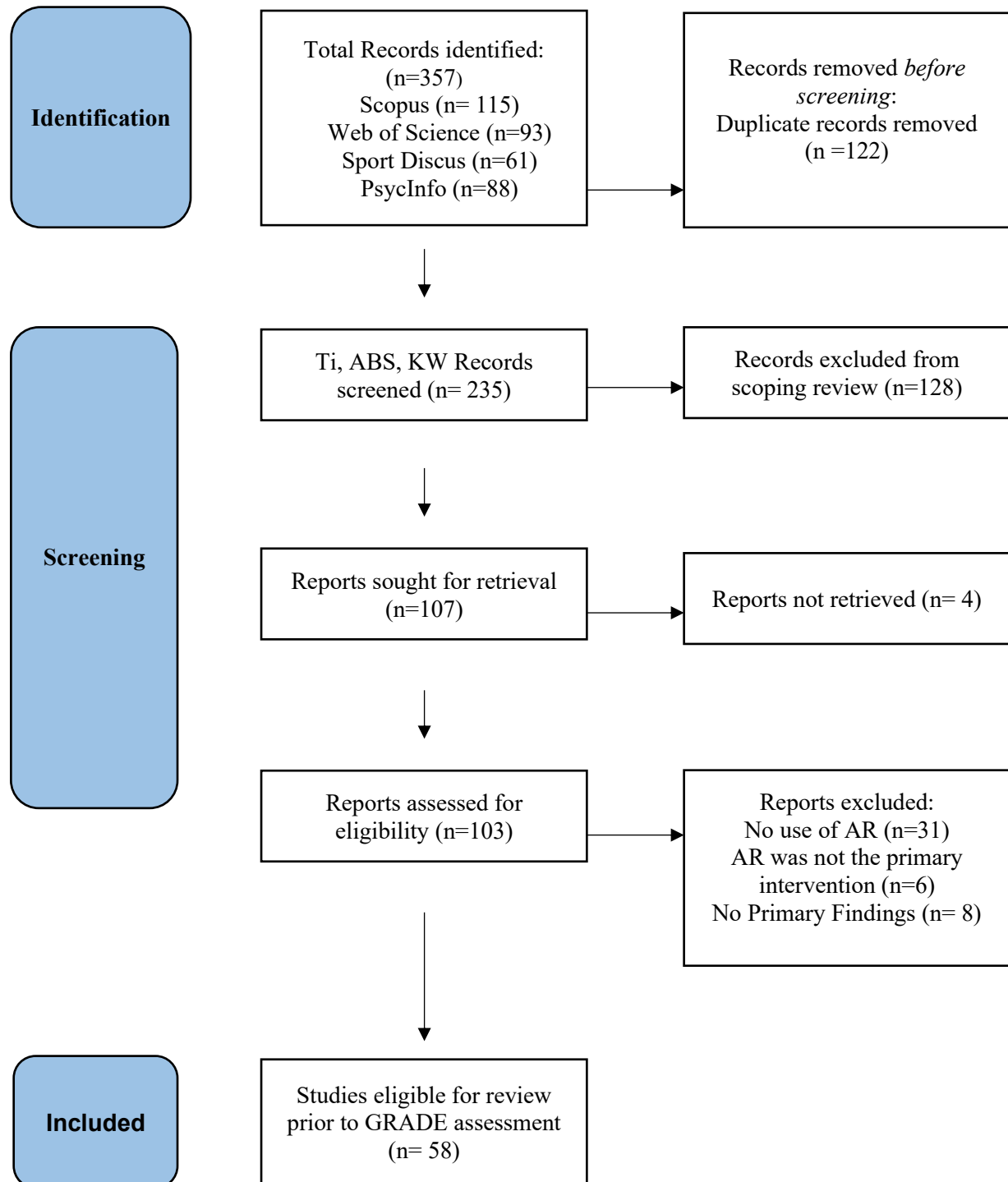
## **Findings**

As shown in Figure 4.1, searches across four databases yielded 357 results: Scopus (n = 115), Web of Science (n = 93), Sport Discus (n = 61), and PsycInfo (n = 88). After removing 122 duplicates, the titles, abstracts, and keywords of the remaining 235 results were screened. Following the application of inclusion and exclusion criteria, 107 articles were deemed eligible for further review. The lead author consulted with the second and third reviewers to clarify the selection of results, and the three researchers collectively agreed on the reasons for removing certain articles at this stage.

During the final full-text review, 49 articles were excluded. The reasons for removal included lack of open access to full text (n = 4), no use of an AR intervention (n = 31), AR not being the primary intervention (n = 6), and the absence of primary findings (n = 8). For articles without publicly available full text (n = 4), the authors were contacted, and support was requested through the university library. Despite efforts, the full texts of these four articles were not obtained, and they were ultimately deemed irretrievable. After applying the relevant criteria and screening the data, 58 articles remained. During the data charting process in a Microsoft Excel spreadsheet, an additional 3 articles were excluded due to insufficient data. Consequently, 55 AR studies were included in the final review.

**Figure 4.1**

PRISMA flow diagram for a systematic-scoping review in Attribution Retraining (Page et al., 2020)



Of the final 55 studies, 53 studies used quantitative methods, with the remaining two using a mixed methods approach (Moffat et al., 2021; Parkes & Mallett, 2011). Of the 55 studies, all opted for pre post intervention assessment of attributions. 43 studies used a randomised controlled trial and the remaining 12 employed observational methods. Sample sizes ranged from 16-806 participants for the quantitative studies and 7-8 participants for the mixed methods studies. Studies varied in age of participants, with 3 studies using participants who were adolescents (9-16 years old), 43 using college or university students (16+ years old), and 9 studies using non-student populations (18+ years old).

## **GRADE**

Grading of Recommendations Assessment, Development and Evaluation (GRADE) offers a systematic approach to making critical statements about the credibility and confidence of primary research (Guyatt et al., 2011). GRADE offers a transparent processes for developing, presenting and evaluating evidence summaries that are generated via accumulative evidence within the review (Tod, 2019). When assessing the body of evidence, GRADE is applied in relation to “outcomes” as opposed to individual studies (Liabo et al., 2017). Aligning with GRADE nomenclature, each outcome will receive an initial quality rating from the lead researcher of high (++++), moderate (+++), low (++) , or very low (+). Ratings are summarised from a series of criteria exploring validity and rigour based upon information available within the published article. These initial ratings can be raised prior to the implementation of GRADE by including: large effect sizes, presence of a dose-response gradient, and accounting for plausible confounding variables (Balshem et al., 2011). Ratings are subsequently adjusted based on the following: risk of bias, inconsistency across studies, indirectness in reference to the application of findings, imprecision of results, and publication bias.

Critically appraising studies collectively and individually using GRADE revealed further information to consider when determining validity and rigour of AR intervention research. Considerations for study design, participant type, AR intervention protocol, and communication of findings are all of interest to aid development of a future AR protocol in sport. For example, knowledge of appropriate protocols and how they have been implemented may highlight successes and failure to consider for future co-production of an AR in sport protocol. Participant type may also indicate populations that have been researched heavily or not been researched at all, again highlighting gaps in research. Table 4.2 details a breakdown of the 55 studies included in this systematic scoping review which were assessed via domain of research (e.g., sport, education and health) to focus on the rigour within performance and

achievement settings. A total of eight studies were carried out in sport, a further six in clinical health, with the remaining 41 studies being delivered in education.

### ***GRADE – AR in Sport***

Using the GRADE tool to assess the quality of published research across each domain, Sport emerged as the highest-rated domain for research quality. However, it is important to note that it still received an overall low-quality rating (++) on the GRADE scale. Of the eight AR studies in sport assessed, three received a very low-quality rating (+), two received a low-quality rating (++), and three received a moderate quality rating (+++). Common deficiencies identified through the GRADE assessment included risks of bias in recruitment (e.g., recruitment of athletes from universities where the lead author is affiliated;  $n = 7$ ) and imprecision in the reporting of results ( $n = 5$ ). Other identified issues included a lack of concealment of intervention intentions (e.g., participants being aware of the intervention's aims) and the assumption of 95% confidence intervals without explicitly stating them. The eight studies collectively recruited 625 participants ( $M = 78$ ), with effect sizes ranging from small ( $n = 1$ ), moderate ( $n = 5$ ), to large ( $n = 1$ ), with one study providing unclear results (Moffat et al., 2021). According to the GRADE criteria, it is estimated that 37 out of 100 attribution retraining studies in sport would produce research of moderate or higher quality. This suggests that only about one in three eligible AR studies in sport would yield credible and reliable findings based on GRADE criteria.

Among the eight studies assessed, three provided moderate quality or higher according to the GRADE standards. Of the 3 studies assessed as moderate in quality, all 3 used a randomised controlled trial as their study design. Attribution retraining varied in implementation, with studies using a 1-phase attributional feedback exercise (Le Foll et al., 2008; Rascle et al., 2008) or a 2-phase AR induction and AR consolidation approach (Simonton & Garn, 2020). Simonton and Garn (2008) and Rascle et al. (2008) recorded moderate to large effect sizes ( $d = 0.5-0.8$ ) and Le Foll et al. (2008) noted a large effect size ( $d = 0.91$ ). Large effect sizes can be considered trustworthy on the basis they represent larger accuracy of the population that have been studied. Future intervention development may benefit from considering the key elements of the three studies rated as moderate quality based on GRADE criteria.

**Table 4.2***Collective GRADE assessment per domain of AR research*

| AR Type (Studies)   | Participants (Mean) | Quality | Quality Break Down of Individual Studies    | Estimate Ratio of Moderate Studies | Range Effect Size (Cohen's d) |
|---------------------|---------------------|---------|---------------------------------------------|------------------------------------|-------------------------------|
| Sport (8)           | 625 (78)            | ++      | (+) = 3, (++) = 2, (+++) = 3, (+++++) = 0   | 37 in 100                          | 0.49-0.91                     |
| Education (41)      | 8646 (211)          | +       | (+) = 20, (++) = 14, (+++) = 7, (+++++) = 0 | 17 in 100                          | 0.05-1.21                     |
| Clinical Health (6) | 1960 (326)          | +       | (+) = 4, (++) = 2, (+++) = 0, (+++++) = 0   | 0* in 100                          | 0.05-0.50                     |

Note: AR Type (Studies) = domain of attribution retraining research (number of studies in this area), Participants (Mean) = total participants across the studies indicated (average number of participants across the studies), Quality = GRADE assessment scoring: GRADE assessment quality (+) = very low, (++) = low, (+++) = moderate, and (+++++) = high. \*May not be accurate due to a low sample size. Estimate ratio of moderate studies = number of studies if 100 were produced to be classed as moderate on GRADE scoring system.

### ***GRADE – AR in Education***

Education received a group GRADE assessment of very low (+) for overall quality. Out of the 41 eligible articles in education, 20 received a very low-quality rating (+), 14 received a low-quality rating (++), and seven received a moderate quality rating (+++). Common deficiencies identified in the GRADE assessment included risk of bias in recruitment ( $n = 40$ ), inconsistency in methods presented ( $n = 3$ ), indirectness of findings to study aims ( $n = 4$ ), imprecision in reporting results ( $n = 35$ ), and a spurious effect suggesting plausible residual confounding ( $n = 1$ ). The 41 studies recruited 8,646 participants ( $M = 205$ ), with effect sizes ranging from small ( $n = 25$ ), moderate ( $n = 5$ ), and large ( $n = 5$ ), while six studies had unclear effect sizes. According to the GRADE criteria, it is estimated that 17 out of 100 attribution retraining studies in education would produce research of moderate or higher quality. Despite the overall low GRADE rating, it is important to note that education featured four times more eligible studies than the sport domain, which may provide a more accurate assessment of AR research due to the larger sample size. However, special attention should be given to the seven studies with moderate quality ratings, as these are considered sufficiently high-quality to support co-production in future interventions.

Of the seven studies assessed as moderate in quality, all seven used a randomised controlled trial as their study design. Attribution retraining varied in implementation with studies using a 1-phase (Horner & Gaither, 2004; Perry et al., 2010; Ruthig et al., 2004; Walton & Cohen, 2007), or 3-phase approach (Mahmoodi & Doosti, 2018; Parker et al., 2017; Stewart, 2011), coinciding with the introduction of 3-phase approach to attributional retraining published in 2011 (Haynes-Stewart, 2011: Causal search, AR induction, and AR consolidation). The GRADE assessment does reveal a trend in effect sizes depending on how many phases of attributional retraining are delivered, with studies using a 1-phase approach all citing large effect sizes ( $> d = 0.8$ ), whereas those using 3-phase approaches all cited small to moderate effect sizes ( $d = 0.2-0.5$ ). This would suggest that delivery of AR via one experiment is likely to display larger effects than those delivering AR via multiple phases of intervention delivery. However, this should be expected as research employing 1-phase approaches have been delivered via randomised control trials – a gold standard assessment when using GRADE criteria. Conclusively those delivering 3-phase approaches provide more depth and education surrounding the role of attributions, which may be more appropriate in domains unfamiliar with the concept of how we explain our performance (e.g., sport).

### ***GRADE: AR in Clinical Health***

Clinical health received a group GRADE assessment of very low (+) on quality breakdown. Out of the six eligible articles in clinical health four received a quality rating of very low (+), two received a quality rating of low (++), with no studies receiving a quality rating of moderate (+++) or higher. Common deficiencies identified by GRADE assessment included risk of bias in recruitment across all six articles, indirectness of findings to study aims ( $n = 3$ ), and imprecision in reporting of results ( $n = 4$ ). The six studies recruited 1960 participants ( $M = 326$ ) with a range of effect sizes from small ( $n = 4$ ), moderate ( $n = 1$ ), with one article unclear. Using GRADE criteria, an estimate of 0 in 100 attribution retraining studies in clinical health would produce a moderate or higher quality study. In practice, this would currently indicate that no studies exploring attribution retraining in clinical health in the future would return trustworthy, reliable, or valid findings. However, this figure should be considered cautiously with only a small sample of articles were retrieved based on inclusion criteria for completion of GRADE assessment.

### **The 3-phase approach**

As highlighted in Chapter 2, the 3-phase approach to attribution retraining is the only official protocol published to provide structure and direction for future AR intervention research (Haynes et al., 2009). As a result, specific exploration of this seminal approach was considered within systematic scoping review.

Causal search, AR induction, and AR consolidation have been used in 36% (12 out of 33) of papers published since the protocol was created in 2009. 10 out of 12 of those papers were published by members of the Emotion, Motivation and Control Research (EMCOR) lab group in Canada, where the 3-phase protocol was created (Dryden et al., 2021; Hamm et al., 2020; Hamm et al., 2017; Hamm et al., 2014; Parker, 2014; Parker et al., 2017; Parker et al., 2016; Parker et al., 2018; Perry et al., 2014; Stewart, 2011). EMCOR lab group have been able to access the Manitoba Motivation and Academic Achievement (MAACH) program of research which contains psychosocial measures and institutional indicators for 20 cohorts of introductory psychology students (1992-2012, excluding 2002;  $n > 20$ , 248). This database was formed by existing professors at the University of Manitoba who have had an interest in attribution research (e.g., Perry). The MAACH database allows for members of the EMCOR lab group to explore longitudinal data findings of psychosocial variables (e.g., perceived control, self-esteem) and treatment interventions (e.g., AR). As a result, AR interventions have become an integral part of the institutional research framework within which EMCOR operates, and the production of AR research has remained prevalent even after the conclusion of the

MAACH database in 2012. This continued prominence may have influenced the frequency of this protocol appearing in the retrieved results of this systematic scoping review, particularly due to the widespread use of the 3-phase protocol within the MAACH database.

Two studies have used the three-phase approach outside of the lab group: Mahmoodi (2018) investigated causal attributions in foreign language students, and Mateucci (2017) used attribution retraining to explore the theoretical and empirical relationship achievement goals. Although these findings may reflect limited exploration beyond the EMCOR lab group itself, it should be noted that this may be due to adaptations made on the three-phase approach to suit different population or intervention needs (e.g., causal search occurring in psychoeducation prior to AR delivery: Moffat et al., 2021). This would mean that some studies have used the three-phase approach unofficially and therefore do not meet eligibility criteria within the review which may alternatively demonstrate increased popularity within research.

### **AR in Sport and Exercise**

Eight of 55 attribution retraining studies were conducted in sport and exercise. They were conducted across France (Le Foll et al., 2008; Rascle et al., 2019; Rascle et al., 2015; Rascle et al., 2008), United Kingdom (Moffat et al., 2021), New Zealand (Parkes & Mallett, 2011), and United States of America (Simonton & Garn, 2020; Singpurwalla, 2020). Using a mix of university sport students ( $n = 6$ ) and adolescent athletes ( $n = 2$ ), AR was delivered in Golf, Darts, Rugby, Tennis and general skill execution tasks. Females ( $n = 1$ ), males ( $n = 1$ ), and non-specified genders by the study publications ( $n = 6$ ) were participants of AR research in sport.

Moffat et al. (2021) worked with eight youth tennis athletes to assess whether AR could improve causal attributions. Working as a sport psychologist embedded within a youth tennis association, adaptations to intervention delivery were made to integrate into pre-existing training and competition schedules. For example, data collection of live attributions was collected during mock competition scenarios within training sessions to create negative, unexpected, or failure inducing scenarios where attributions are most likely to be formed (Weiner, 1985). Moffat employed a five-stage psychological intervention: (1) assessment (2) psychoeducation, (3) attribution retraining (4) evaluation, and (5) follow up. AR was delivered via a traditional two-phase approach: AR induction and AR consolidation. Adapting from the 3-phase approach, Moffat still ensured understanding of attributions and their causes in line with EMCOR's recommendation to include causal search within psychoeducation in Phase 2. This was done by the sport psychologist charting initial observations and educating athletes around the role of attributions in explaining performance outcomes based on her research

understanding. Moffat's study also uniquely included the use of Think Aloud (TA) - a method to capture live verbalisations during performance. This was captured by attaching wearable microphones to participants as they competed in a non-competitive tennis match. Recording from the microphones were then analysed and attributions categorised to enable exploration of live attributions for performance pre- and post-intervention, as opposed to traditional methods that capture attributions reflectively post-performance. Findings from Moffat's study revealed a positive increase in adaptive attributions for all eight tennis players over three time points. This means an increase in healthier explanations for performance focusing on controllable and internal outcomes. Moffat's qualitative findings also indicated a positive transformation in verbalisations associated with adaptive attributions during performance because of the intervention delivered via Think Aloud. Findings suggest future AR research should consider the evolution of assessing attributions during and post-performance with use of methods such as Think Aloud (TA) or other observatory methods. This allows attributions to be captured in real-time during performance as opposed to retrospectively where participants may have time to consider what the "correct" attribution may be in line with their previously received psychoeducation.

The four studies conducted by Le Foll and Rascle in France used a variation of attributional retraining referred to as attributional feedback. Attributional feedback manipulates the information received by the participant on performance from an external source (in this case the research team) to focus on either adaptive or maladaptive causes. Using this information, Rascle et al. (2008) was able to address the causes for performance in a novel golf-putting task. Findings indicated that AR improved confidence and motivation in novice golf-putters. This study was extended by Rascle et al.'s (2019) study exploring a throwing task in university sport students. Findings revealed that the expertise level of the person delivering feedback, alongside group they are affiliated to, influences the perception of attributional feedback received by the athlete. If an athlete perceives the source of feedback to have come from an expert, they were more likely to form similar attributions to the feedback received. For example, this may suggest that if a coach was a former professional tennis player, then they are more likely to have their feedback for performance accepted and acted upon than someone who was not a former professional tennis player. This is also the same for when an athlete receives attributional feedback from a member of their 'in-group' as opposed to feedback from an external source. For example, a football player is more likely to accept feedback for performance from a peer on their team as opposed to a player for the opposing team. With those considerations, it is paramount that sources of support to athletes are also able to understand

the role of attributions and how they can improve future motivation for performance. This reemphasises Allen's earlier point in chapter 2 that the athlete's support network would also benefit from psychoeducation around attributions and their effects on performance (Allen et al., 2011). Based on Le Foll et al.'s (2008) and Rascole et al.'s (2008, 2015, 2019) findings, future AR research should consider the role of others when developing an intervention to be used in sport due to their influence on an athlete's performance when providing feedback.

Parkes and Mallett (2011) also used a unique combination of cognitive behavioural therapy (CBT) techniques alongside an attribution retraining intervention. Working with seven male rugby players, Parkes and Mallett used an AR intervention over a four-week period to improve optimism within the group. Eight x 30-minute group workshops were delivered based on Manzo et al.'s (2002) optimistic swimmer intervention (See Chapter 2), which had content adapted to primarily focus on attributions as opposed to optimism. Semi-structured interviews were conducted with three participants who demonstrated the most progress four weeks after the intervention was delivered. This was to follow up further on how AR had improved optimism and explore whether there were any other psychological benefits. Results from qualitative findings should therefore be interpreted with caution as the three purposely selected for their progress may not reflect overall findings of the participant group (e.g., what about those who showed minimal progress). Quantitative findings revealed minimal change in attributions, although they did note negative events were attributed more externally because of the intervention. Qualitative findings revealed players developed greater resilience, increased confidence, and developed optimism in explanation of negative events. Future recommendations for delivery of AR in sport was that integration into existing training and competition schedule is essential for athlete buy-in as this increased attendance and reduced attrition across the duration of the intervention.

Finally, two AR studies were conducted in the United States of America by Simonton and Garn (2020) and Singpurwalla (2020). Simonton and Garn (2020) recruited 144 female university students to complete an attribution training intervention on a novel throwing task. Assessing boredom, enjoyment, relief, and motivation, Simonton and Garn collected baselines on temperament and trait control before randomising participants into two groups. Participants watched an instructional video before performing 10 wrist shots at a target. Groups then received a treatment specific video (either adaptive or maladaptive attributions) followed by a written consolidation task before trial two of another 10 wrist shots at a target commenced. Instructions focused on effort and practice for adaptive attributions, and innate ability and external barriers for maladaptive attributions. Findings revealed that participants with adaptive

attributional training displayed higher enjoyment and reduced boredom. Relief and motivation trended in the same positive direction regardless of instruction type received. Findings provide stakeholders involved with the development of ARiS with further consideration of the influence of the intervention deliverer and integration of intervention delivery when enhancing an individual's attributions. It may mean that the support network of athletes is educated in some way relating to attributions given their influence on the formation of an athlete's attributions as noted within the attributional feedback research.

Singpurwalla (2020) study recruited 200 exercise intenders to participate in a one-hour AR session that encouraged them to consider their reason for lack of exercise was not dedicating time to exercise: an adaptive attribution. Initially delivering an AR induction session via pre-recorded video, six weeks post session Singpurwalla contacted participants to follow up on their exercise behaviours. The intervention modified the dimension of controllability, but findings revealed that AR may not be successful in enhancing an autonomic process of exercise completion in exercise intenders as attributions require conscious deliberation. No significant changes were revealed to alter exercise intenders decisions from maladaptive attributions to adaptive attributions. It could be considered methodologically that a one-time AR session did not significantly alter adaptive attributions, and therefore more than one session may be needed. However, alternative factors may have also influenced concluding findings (e.g., external sources of feedback, session content itself). Considering these findings from an exercise setting against intended modifications of attributions via controllability, a future AR in sport intervention may consider whether the autonomic process of attributions can be altered by solely focusing on controllability. Considering this can aid performance by reframing cognitive tendencies beyond controllability that currently focus on maladaptive explanations as opposed to post AR focusing on adaptive attributions.

### **Digital Technology usage**

10 of 55 studies in attribution retraining have used digital technology to support intervention delivery (Dresel & Haugwitz, 2008; Dryden et al., 2021; Hamm et al., 2017; Hamm et al., 2014; McCall Ordonez, 2009; Moffat et al., 2021; Parker et al., 2017; Parker et al., 2016; Parker et al., 2018; Tai et al., 2016). Technology has been used in AR intervention to scale up delivery (Hamm et al., 2017; Hamm et al., 2014), use asynchronous content to access distance learning populations (McCall Ordonez, 2009; Parker et al., 2017; Parker et al., 2016; Parker et al., 2018; Tai et al., 2016), increase feedback frequency (Dresel & Haugwitz, 2008), and continue AR delivery during the COVID-19 pandemic (Moffat et al., 2021).

Digital technology use generally in sport psychology intervention delivery has promoted an increase in the number of participants recruited: enhancing rigour of eventual findings (Parker et al., 2018). The use of digital technologies in AR interventions has enabled researchers to reach larger amounts of participants ( $M = 332$ ) compared to AR interventions not using digital technology ( $M = 176$ ). Hamm et al. (2014) recognised this use of online technology can advance AR as an intervention, promoting a cost-effective way to enhance performance. Hamm et al. (2017) implemented an online intervention with 806 first year college students making it the largest AR study to date. Findings revealed that AR interventions are scalable using digital technology, however a lack of research since has addressed Hamm et al.'s (2017) recommendation to assess validity of online AR delivery in comparison to traditional in-person laboratory-based approaches. Assessment of these findings would clarify whether digital technology can be used to deliver rigorous and valid AR research. This may provide support for future AR in sport intervention development that may wish to scale up delivery using online or digital technology.

The growing use of digital technology in AR research has facilitated the delivery of asynchronous content and supported distance learning. In AR research, five studies have used digital technology to access college (McCall Ordonez, 2009) and university (Parker et al., 2017; Parker et al., 2016; Parker et al., 2018; Tai et al., 2016) based students where asynchronous content can be delivered online. McCall Ordonez (2009) delivered an AR intervention to community college students using eight virtual counsellors to provide participants with adaptive feedback. Underpinned by a previous internet-based intervention (Just Think It; Horan et al., 2000), the AR intervention uses user input to follow an algorithm that always ends in production of functional attributions. Findings did not reveal any significant changes in controllability or performance associated with AR, however the results did indicate that those who engaged with the digital technology were more likely to be receptive to future digital psychological interventions. Conversely, Parker et al., (2017) noted a 5% increase in academic performance for students with low perceived academic control and high boredom because of delivering AR with digital technology. Findings indicated that AR delivered asynchronously can be used to aid those who may struggle with online learning conditions, and future research to scale up the research will aid intervention efficacy (Hamm et al., 2017). This could also be translated into sport to indicate that those with low perceived control are likely to benefit from an AR intervention. Finally, Tai et al. (2016) recognised how digital technology can be used to aid AR delivery in enhancing writing performance for university students. An AR induction and consolidation intervention was delivered via an online writing platform and effectively

enhanced perceived confidence of participants. Although minimal, use of digital technologies across AR research has aided access to educational populations by providing asynchronous content which can aid intervention outcomes.

Alternative uses of digital technologies have included addressing methodological research limitations from external factors. Moffat et al. (2021) had to alter their proposed AR intervention to include delivery of follow-up semi-structured interviews via Microsoft Teams because of the COVID-19 pandemic. Comparable to research on psychological interventions in sport AR interventions can continue to benefit from emerging digital technology improvements as a result of the COVID-19 pandemic (Tjønndal, 2022).

## **Discussion**

Stage 1a provides a systematic scoping review of evidence to underpin future co-production of an attribution retraining in sport protocol. Findings have assessed how attribution retraining research has developed since the last systematic review, how attribution retraining research been used in the domain of sport, and how the use of technology evolved in attribution retraining interventions. Attribution retraining has been a successful motivation (Haynes et al., 2006), self-control (Parker et al., 2017), and performance (Parker et al., 2018) enhancing intervention, particularly in education. Despite all three of these variables being desired in sport and exercise, there has been a dearth in applied sport research using AR methods ( $n = 2$ ).

Within the systematic scoping review, one of the common factors to consider when delivering an AR intervention is the number of phases or sessions needed for it to be effective. Within the scoping review are examples of 1-phase (Rascole et al., 2015), 2-phase (Moffat et al., 2021), and 3-phase (Parker et al., 2018) AR intervention processes. Traditional scoping review findings note that fewer AR phases reduced the likelihood of significant results (Singpurwalla, 2020). Concurrently, a three-phase AR approach in line with Haynes et al. (2009) recommendation has also yet to be implemented with non-academic sporting participants, and therefore incomparable to other AR approaches. As a result, it may be difficult to speculate the efficacy of Haynes' approach within applied settings. At the time of this scoping review, a traditional 2-phase approach with AR induction and AR consolidation is the only form of AR to have been integrated as an intervention into an applied sport environment. With all three approaches detailed to have successful implementation in enhancing performance and motivation in other domains, it may be pertinent to consider further factors that can aid AR implementation in sport (e.g., role of the coach, peer and parent).

Highlighted initially in Chapter 2, the role of others is a prominent consideration when altering attributions. The systematic scoping review details how the role of the intervention

deliverer (Parker et al., 2016), group environment (Simonton & Garn, 2020), and social identity (Rasclé et al., 2019) can all influence the formation of attributions by the participants in research. In sport, this would mean an athlete is likely to have their attributions shaped by their peers and coaching team, and in adolescence, the parent or guardian. This may occur as the result of being around a maladaptive attribution styled environment (e.g., peers, parents and coaches suggesting maladaptive explanations for performance), reemphasising Coffee et al., (2019) point that attributions are never made in vacuum. Future development of an attribution retraining programme in sport should consider how an athlete can sustain adaptive attributions by leaning on their own social variables (Allen et al., 2012). Alternative sport psychology interventions have educated the support network of an athlete to enhance sustainability of intervention effects (e.g., Boardley et al., 2024, Burke et al., 2024, Patterson et al., 2023). For example, Patterson et al., (2023) delivered workshops to both athlete and coaches to encourage prevention of doping in rugby union. Following previous research, AR interventions in sport could consider educating the athlete's support network on the difference between adaptive and maladaptive attributions which may in turn create a healthier climate for future motivation and performance.

Seamless integration of AR delivery into participants' schedules has benefitted researchers in sport (Parkes & Mallett, 2011) and in education (Hamm et al., 2020) via increase engagement and decreased attrition rates. In education, researchers have used pre-existing end of year tests and aligned their longitudinal research to suit the academic calendar (Parker et al., 2018). This means conducting pre-AR assessments in September, delivering AR interventions in October and November, before assessing in-class test improvements in December and at follow-up points in June and July - all in line with traditional academic calendars. In sport, researchers have worked alongside coaching staff and the competition schedule to deliver AR as part of training sessions or collect data post competition (Moffat et al., 2021). Both education and sport AR research have benefited from lower attrition, increased participant buy-in and enhanced ecologically valid findings with increased consideration of integrating the intervention. Although this only highlights a select few AR research articles, recommendations to integrate sport psychology intervention research into existing schedules and environments have been noted as a benefit for both the athlete and delivery team.(Mosley et al., 2022; Prior et al., 2022).

### **Strengths, Limitations and Future Directions**

Combining traditional scoping review approaches with a critical appraisal tool presents a combination of coverage and criticality within the review of evidence on attribution retraining

research. The systematic-scoping review highlights advancements in AR interventions methodologically with recognition of the use in applied sport (Moffat et al., 2021). GRADE provides critical appraisal of AR research in sport collectively, whilst concurrently identifying considerations for future AR research.

The limitations of this study include the interpretation of summarised findings through the GRADE assessment and the potential publication bias in the data included in the systematic scoping review. Given the limited AR literature in sport, conclusions drawn from the GRADE analysis regarding validity and rigour should be approached with caution. The scarcity of research on AR interventions in applied sport settings also limits the foundational research available for developing future intervention protocols. This gap highlights the potential value of exploring AR research in alternative domains, particularly those focused on performance or motivation enhancement. However, caution is necessary when considering the transferability of findings from studies in these other domains. For instance, a study of over 800 higher education students may not be directly applicable to populations targeted for future ARiS interventions, which aim to integrate interventions within specific sports teams or groups. Additionally, the research included in the systematic scoping review was conducted using specific search parameters, which may have limited access to additional AR articles. For example, due to constraints within the research team, AR articles published in languages other than English were excluded. Despite using multiple databases, there may be further AR literature beyond the search parameters and databases employed. Therefore, the findings should be considered with appropriate caution, acknowledging the limitations that may have influenced the scope of the results.

## **Conclusion**

Findings from the systematic scoping review provide evidence for the future development of an AR in sport intervention in line with research questions within the chapter and aligning with the overall thesis aims. Use of GRADE indicated that AR interventions are commonly at risk of bias in recruitment. In-line with co-production methodologies deployed, systematic scoping review findings will inform data collection techniques and topics of discussion during future co-production stages (e.g., interview schedule for Stage 1b).

## **Stage 1b: Stakeholder Consultation**

Stage 1b: Stakeholder Consultation is used to collate experiences from future intervention users in line with Hawkins et al. (2017) intervention development guidelines. Stakeholder consultation had two main aims in this PhD: (1) to explore the views of stakeholders on attributions in sport and, (2) to inquire into the stakeholders' understanding of motivation and performance enhancing interventions in sporting domain to aid future intervention development in attribution retraining. Considerations are also present to explore the role of social identity and social factors upon the influence of an athlete's attributional process in line with the findings of the systematic scoping review presented in Stage 1a.

### **Method**

#### **Design**

A qualitative research design was employed to capture the experiences of stakeholder's attributions in sport specifically, and motivation and performance interventions in sport broadly. Using semi-structured interviews provided an individualised approach to research as prompts and follow up questions are unique to stakeholders' responses, encouraging unique contributions of knowledge to the research. This was selected over a structured interview schedule as the fluidity of discussion is key to collating a range of individual perspectives (Adeoye-Olatunde & Olenik, 2021). Focus groups were also considered but could present similar barriers to capturing unique contributions of knowledge where interviewees may feel they should conform to group opinion (Longhurst, 2003). The lead researcher and supervisory team collectively identified six areas for stakeholder representation based on findings from the systematic scoping review. From research, stakeholders held expertise in either Attribution Theory or Social Identity Theory based on the findings of Allen et al. (2012) and Coffee et al. (2020). Allen et al. (2012) notes that attributions can be made as a collective team, and Coffee et al. (2020) extends this to suggest social variables can impact construction of attributions by the individual. As a result of these research findings, Social Identity Theory researchers were included as a stakeholder group for intervention development. From sport, stakeholders were representative of four areas: athletes, coaches, sport practitioners (e.g., psychologists, physiotherapists, strength and conditioning), and national sporting organisations. As the receiver of all previous attribution retraining interventions in sport, the choice to include athletes in co-production was fundamental. The support network of the athlete was also considered under the same justification of a social identity research whereby social variables influence the formation of the constructions of attributions by the athlete (Allen et al., 2012). This supported the inclusion of the coach and sport practitioners in co-production. Finally, in

an attempt to bridge the knowledge-do gap, representatives of national sporting organisations were invited to represent the sixth and final stakeholder group. Holt et al. (2018) noted that members of national sporting organisations were most likely to engage in academic research due to their responsibility to stay updated with any relevant findings to their own sports and as a result may be best placed to have experienced bridging the gap between research and practice. Data for all stakeholder interviews were collected between October 2022 and December 2022.

## Participants

In Table 4.2, demographic information for each of the 10 stakeholders included in Stage 1b of co-production is provided.

**Table 4.2**

*Demographic Information for Stage 1b Stakeholders*

| Stakeholder                      | Gender | Age | Location                 | Additional Information                 |
|----------------------------------|--------|-----|--------------------------|----------------------------------------|
| Athlete 1                        | Female | 22  | Republic of Ireland      | National Gaelic Football Athlete       |
| Athlete 2                        | Male   | 33  | England                  | National Futsal Athlete                |
| Coach 1                          | Male   | 57  | Scotland                 | National Hockey Coach                  |
| Coach 2                          | Male   | 45  | England                  | Football Coach                         |
| National Sporting Organisation 1 | Male   | 32  | England                  | Football Coach Developer               |
| Sport Practitioner 1             | Male   | 31  | England                  | Sport and Exercise Psychologist (HCPC) |
| Sport Practitioner 2             | Male   | 41  | England                  | Sport and Exercise Psychologist (HCPC) |
| Attribution Theory Researcher 1  | Male   | 44  | England                  | Lecturer in Sport Psychology           |
| Attribution Theory Researcher 2  | Male   | 36  | United States of America | Lecturer in Sport Psychology           |
| Social Identity Researcher 1     | Male   | 32  | England                  | Lecturer in Sport Psychology           |

Participants are referred to as stakeholders due to their involvement in this co-production study, contributing to the materials and representing areas of expertise (Parent,

2016). This term is significant because those involved in the co-production of an AR intervention in sport can be collectively grouped as stakeholders or segmented into distinct stakeholder groups where applicable. Stakeholders were recruited through purposive sampling via the research team's network (Campbell et al., 2020). Snowball sampling was also employed, encouraging participants to recommend other relevant stakeholders within their professional networks, which was particularly useful for recruiting athletes (Etikan et al., 2016). These recruitment strategies were considered most appropriate for qualitative research, as they allow for tailored recruitment where the number of stakeholders is not the primary focus. No incentives were offered for participation.

A total of 10 stakeholders participated in this research. Each indicated their primary representation in one of the following areas: athlete ( $n = 2$ ), coach ( $n = 2$ ), sport practitioner ( $n = 2$ ), national sporting organisation representative ( $n = 1$ ), attribution theory researcher ( $n = 2$ ), or social identity theory researcher ( $n = 1$ ). Some stakeholders held more than one area of expertise but were asked to respond based on their chosen primary expertise for the purpose of stakeholder representation. This was indicated via the initial e-consent form. Interview questions were adapted throughout in accordance with the stakeholder's preference of representation. For example, an athlete was asked about their experience of attributions whereas a coach was asked about their influence on an athlete's attribution process. This preference for representation did not prevent the stakeholder from discussing interview questions from their alternative experiences, but stakeholders were made aware at the beginning of the interview of the type of stakeholder the interview questions would be based around. There were instances, for example, where a stakeholder representing sport practitioners also spoke about their experience as an athlete. These responses had value for intervention development and enhanced cross stakeholder group validity by providing justification of reasoning from another stakeholder group's perspective. Stakeholder inclusion criteria can be seen in Appendix B – Inclusion Criteria for Stakeholders and Expert Stakeholders in Co-Production.

### **Semi-Structured Interviews**

Stage 1b: Stakeholder consultations were conducted through semi-structured interviews ( $n = 10$ ). The interview guidelines were developed based on the findings from the systematic scoping review in Stage 1a. For example, questions explored social variables related to athletes, their education and support networks, and the integration of interventions in sport. The semi-structured interviews consisted of four topic areas derived from the Stage 1a findings: 1) experiences of attributions in sport, 2) experiences with sport and exercise psychology

interventions, 3) the influence of others on an athlete's attribution process, and 4) how an ARiS intervention could be implemented. The first two topics allowed the research team to explore participants' pre-existing experiences with attributions in sport and the broader role of sport psychology. This structure enabled the interviews to be flexible, with subsequent questions tailored to the responses provided by the stakeholders, adjusting the depth of follow-up questions as needed. For example, stakeholders' sporting backgrounds and experiences helped guide questions related to motivation and performance interventions. Stakeholders with experience in sport psychology were asked about how they influenced motivation and performance. This adaptable approach fostered a more personalized and engaging dialogue, which is recommended for successful semi-structured interviews, as it allows questions to evolve based on prior responses (Adeoye-Olatunde & Olenik, 2021).

Questions related to attributions varied depending on the stakeholder's expertise. For example, an athlete might have been asked, "Do you think others around you can influence your attributions during sport? If so, how? If not, why not?" In contrast, a coach might have been asked, "Do you think your role as a coach, and other key roles of social support (e.g., peers, parents), can influence an athlete's attributions? If so, how? If not, why not?" These variations in question structure allowed the lead researcher to extract relevant information specific to each stakeholder's domain, aligning with the aims of the thesis.

To enhance methodological rigour, two pilot interviews were conducted with fellow postgraduate students at University of Stirling who both had no background in attribution theory research. This was important as it provided an opportunity to access a lay audience where depth and breadth of language typically associated with attribution theory was non-existent. A key part of their feedback was an indication to specialise questions to suit different stakeholder backgrounds. As a result, six different versions of the semi-structured interview questions were created based on the six different stakeholder groups recruited.

## **Procedure**

Upon receipt of ethical approval from the General University Ethics Panel at University of Stirling, potential stakeholders were contacted via a recruitment email inviting them to participate in a semi-structured interview. Email addresses for perspective stakeholders were sourced through pre-existing contacts, contacts of supervisors, or sourcing information from websites of stakeholders' employers (e.g., university websites). Once a reply was received, an e-consent form was provided and an interview date organised either via Microsoft Teams or in-person with each stakeholder at their earliest convenience. Semi-structured interviews were recorded and transcribed, and preliminary analysis, via familiarisation and coding, was

completed to ensure questions were generating relevant data. Interviews varied in length between 25-57 minutes, with an average time of 42 minutes. This process persisted until data saturation was achieved, meaning that limited new information emerged from stakeholders (n = 10). The data quality was considered sufficient based on the generation of quotational extracts (Low, 2019). This was signalled by a lack of new code generation during analysis, and where information was deemed replicable in responses (Fusch & Ness, 2015). Failure to reach data saturation where new information may still be generated impacts content validity and quality of the intervention development specific to thesis aims (Mwita, 2022).

### **Data Analysis & Research Credibility**

To analyse the transcripts, the lead researcher, alongside co-authors, conducted an iterative approach to reflexive thematic analysis (Braun & Clarke, 2021). Reflexive thematic analysis occurs over six steps: (i) familiarising the data, (ii) generating initial codes, (iii) searching for themes, (iv) reviewing themes, (v) defining and naming themes, and (vi) producing the report.

In Stage 1b, the lead author conducted a line-by-line, verbatim analysis of each interview transcript to generate initial codes. These codes were then organised in relation to the study's research aims and questions. From this process, four overarching themes were developed, based on the grouping of codes across all ten transcripts. After completing the initial coding, the lead author revisited the initial transcripts to ensure no relevant codes had been overlooked. Once the preliminary themes were established, the supervisory team reviewed the associated quotations to confirm alignment with the study's aims and objectives. At this stage, the themes were refined, clearly defined, and named in preparation for the results section. Reflexive TA was completed by providing practical recommendations via quotational support that could support development of an AR in Sport intervention. Thematic analysis also provides increased accessibility for the intended audiences in sport than some complex alternatives (Clarke & Braun, 2013).

By using a reflexive approach, the lead researcher acknowledges their role in the co-production team alongside stakeholders as co-researchers. The lead researcher's potential bias, position in the research, and underpinning reasons to partake are all considered in use of reflexive thematic analysis. The lead researcher was responsible for the recruitment of stakeholders, meaning some stakeholders were part of their existing professional network. Being aware of potential bias, stakeholders were recommended that semi-structured interviews were not to be discussed beyond the interview itself in case of collaboration with future stakeholders that may influence their responses. Alternative members of the research team were

also involved in recruitment of stakeholders and thematic analysis for these transcripts to prevent all stakeholders from being pre-existing connections of the lead researcher. This was to reduce likelihood of coercion where stakeholders may have felt obliged to participate to support the lead researcher in data collection. The research team excluded stakeholders from their current universities to minimise the risk of professional coercion due to their connection to the research team's vested interest in the PhD.

Unique to co-production, the role of the lead researcher can be as a contributor to the project outcomes, which requires consciousness of bias when providing input (Smith et al., 2021). To reduce leaning on their desired outcomes for the research, the lead researcher only provided input based on contents of the semi-structured interviews to date. This included using applied examples from previous interviews that may help bridge the knowledge-do gap with future stakeholders who had applied backgrounds. However, this was only used if the lead researcher felt that initial questions or prompts were misunderstood as opposed to using these examples as replacement questions or definitions. This ensured that all stakeholders still received the same core questions enhancing rigour of responses at all stages of data collection.

### **Qualitative Rigour**

To enhance qualitative rigour, a team approach to reflexive thematic analysis was employed. Birch et al. (2022) suggest that a team approach, where more than one researcher engages in the process of qualitative analysis, increases reflexivity in analysis due to the different demographic and societal status that each researcher occupies. This enhances qualitative rigour by widening opinion base and viewpoints (Braun & Clarke, 2019; Smith & McGannon, 2018). This is created by stakeholders providing different perspectives on the same phenomena (e.g., what is an attribution?). To support the lead researcher, two members of their supervisory team reviewed and defined themes in line with thematic analysis. An external supervisor acted as a critical friend and was able to enhance critical reflexivity by offering new interpretations (Klockare et al., 2022).

To ensure qualitative validity, Yardley's qualitative validity criterion were internally applied upon completion of analysis (Yardley, 2000). Although initially developed for health research, Yardley's criteria were selected due the specific application to qualitative research and 20 years of successful empirical implementation in psychology (Yardley, 2024). Alternative scientific criteria for valid knowledge production were previously deemed inappropriate for qualitative research due to conflicting philosophical underpinning with the PhD. As a result, rigour and validity of the research were assessed across four criteria: sensitivity to context; commitment and rigour, transparency and coherence; and impact and

importance. For example, in relation to sensitivity to context, motivation and performance related research in sport has involved diverse populations such as professional teams, youth sports, or recreational athletes, each with its own unique social and cultural norms. Acknowledging commitment and rigour, an AR in sport intervention provides a nuanced approach to a motivation, performance, and control enhancing intervention. Transparency and coherency align with the lead researcher's philosophy and thesis aims to co-produce a usable AR in sport intervention bridging the gap between research and applied settings. Finally, impact and importance are represented through stakeholder representation emphasising the value of those operating in sport contributing to the final intervention protocol. This approach aligns well with the complex nature of sport research, making it suitable for studying issues related to motivation and performance in sport.

Firstly, Sensitivity to context was considered within this study by reviewing the perspectives, linguistics, and socio-cultural contexts of the responses for each respondent. This was highlighted using role specific interview schedules whilst also considering their alternative experiences that may enhance content validity. Pre-interview briefings confirmed the participants stakeholder group whilst also assessing their knowledge in each of the six stakeholder areas for representation. Commitment and rigour were delivered with a thorough understanding of previous research in Stage 1a, as well as continued depth in engagement through thematic analysis. This included underpinning interview schedules with key findings of the systematic scoping review and aligning with the research questions of this study. Transparency and coherence are intended outcomes when results are presented. The reader should be able to interpret findings from the themes created below, and a conscious effort to continually include lay terms should be noted for the intended audience. This was verified by inviting a colleague of the lead researcher who has no experience of attributions and a previous international level athlete to understand findings in their own experience. Finally, impact and importance can be seen via consideration of practical implications and holistic contribution to the overall aims of the PhD thesis. This can be assessed in the future based on usability and buy in both from sport and research.

Alternative forms of validity assessment in sport and exercise science have originated from a positivist, "one size fits all" background – something that does not align with the lead researcher's philosophical position (Burke, 2016; Sparkes, 1998). Avoiding this criteriological approach of pre-determined criteria was important in the continuation of fluidity encouraged by the methodological inquiry of co-production (Schwandt, 1996; Sparkes & Smith, 2009).

## Findings

Through reflexive thematic analysis, four themes were deductively generated: Stakeholder View of Attributions in Sport; Influence of Others on Athletes' Attribution Processes; Key Considerations for the Development of an Attribution Retraining in Sport (ARiS) Intervention; and Key Outputs of Developing an Attribution Retraining in Sport (ARiS) Intervention. A preview of themes and subthemes can be found in Table 4.3: Table of Themes.

**Table 4.3**

*Table of Themes*

| Theme                                                                                                    | Subtheme                                                                                                          |
|----------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| Stakeholders View of Attributions in Sport                                                               | Attributions in Lay Terms                                                                                         |
|                                                                                                          | Success vs Failure Attributions                                                                                   |
| Influence of Others on an Athlete's Attribution Process                                                  | The Influence of Others Creating A Barrier to Adaptive Attributions                                               |
|                                                                                                          | The Influence of Others in Encouraging Adaptive Attributions                                                      |
| Key Considerations for the Development of an Attribution Retraining in Sport (ARiS) Intervention         | Consideration of External Influences in the Development of an Attribution Retraining in Sport (ARiS) Intervention |
|                                                                                                          | Education and Consolidation in the Development of an Attribution Retraining in Sport (ARiS) Intervention          |
| Key Considerations for the Development of an Attribution Retraining in Sport (ARiS) intervention (Cont.) | Integration of an Attribution Retraining in Sport (ARiS) Intervention                                             |
| Key Outputs of Developing an Attribution Retraining in Sport (ARiS) Intervention                         |                                                                                                                   |

### Theme 1: Stakeholders views of Attributions in Sport

Stakeholders' definitions, descriptions and examples within sport allow the research team to explore what attributions look like in the applied sport environment. There were two sub themes: (a) Attributions in lay terms within sport and, (b) success vs. failure attributions.

### ***Attributions in lay terms***

With the complexity of the term attributions, it was important to understand what attributions meant in stakeholders' own contexts. When asked "what are the first thoughts to consider when you think about attributions in sport?", stakeholders' responses typically varied depending on their role, experience level, and understanding of the term "attributions" –

(Attributions are) ...a reflective based experience thing that you are looking back at. If you imagine, you have got a photograph album in your head, and you are almost flicking through a photograph album for a picture that looks similar to the picture you're looking in front of yourself with. (Coach 1)

This description of attributions could be considered unique and offers insight into how attribution theory is perceived in the applied environment. The recalling of "pictures" can highlight how previous attributions for performance then impact future performance explanations. These experienced based reflections differed to that of alternative stakeholders, who defined attributions as a concept to "outwardly kind of explain why they (athletes) performed in a certain way, or why they played in a certain way, or why they are feeling in a certain way" (Attribution Theory Researcher 1). Some stakeholders acknowledged the requirement for athletes to constantly reflect on their performances by generating attributions. Athlete 1 also highlighted that "a player is always going to format attributions straight away. They form them during the game. They form them straight after".

Stakeholders also discussed the likelihood to form maladaptive or adaptive attributions depending on performance outcomes. Coach 1, who has experiencing coaching both youth and adult age groups, suggests the athletes they work with are most likely to form maladaptive attributions post-performance: "70% of the time it is blaming the people around them in the team, the tactics or the umpiring refereeing decisions".

### ***Success vs. Failure Attributions***

Stakeholders referred to the variation of attributions experienced based on success or failure scenarios within relevant sporting environments. Sport Practitioner 1 agreed with information presented previously that attributions frequently occur upon reflection of performance, however within their definition they highlighted the use of attributions specifically to detail "why things went well" –

You typically come across attributions usually when athletes are reflecting on positive performances. I would say that is probably the most common way that I have ever heard athletes' kind of talking about their experiences and why things went well. (Sport Practitioner 1)

Expanding upon this notion, Athlete 1 discussed how different performance outcomes are likely to lead to different types of attributions: "With wins and with success, it is definitely more of an internal attribution [...] there is definitely a difference between how we attribute our performances depending on if it was a loss or win". Despite a lack of clarity as to what this may look like when unsuccessful, Athlete 1 does highlight that wins and success feature internal attributions which are classified as adaptive due to the focus on the self.

### **Theme 2: Influence of Others on an Athlete's Attribution Process**

Stakeholders' explanations of attributions in sport have alluded to the influence of others on an athlete's attribution process. Aligning with recommendations of the systematic scoping review in Stage 1a, Theme 2 explores the role of other when forming explanations for performance. Reference was made both to the barriers and opportunities others can have on enhancing an adaptive attribution process within athletes.

#### ***The Influence of Others Creating a Barrier to Adaptive Attributions***

Stakeholders stated that managers, coaches, senior leadership figures, parents and peers can all present barriers to creating adaptive attributions. Athlete 1 discussed how a manager can have a direct influence on the way an athlete could attribute their performance –

If my manager said to me, you know, you had a poor game and you could have done this differently, maybe I will start to reflect a little bit more inward on my own performance and how I could have contributed to the team a bit more.

Building on this, stakeholders also highlighted the influence that parents' attributions can have on an adolescent athlete: "Other parents would, as you've probably heard in other interviews, get involved in things that were outside of their control, which obviously is then mirrored directly by the child" (Sport Practitioner 1). The act of mirroring attributions is not only prominent in parent-adolescent dynamics but is also present in the role of the peer according to Athlete 2 who stated "(peers) project onto you, or you project onto them, and they (attributions) just sort of come out pretty organically".

Aside from direct attempts to influence another's attributions, the role of others in creating a reflective climate is also important. Fostering an environment that encourages or discourages healthier attributions can impact an athlete's future motivation to perform. This may not always be perceived as a barrier, but athletes in elite settings can be influenced to reflect or not reflect in certain moments –

No, we always reflect after games on analysis on the screen. We always do it as a group. That is how we do it, because why? I have always done that way and that is how we will do it. (Coach 2)

In an elite team environment, players can be brought into reflective environments that do not suit their personal preference on how to reflect. For example, an athlete that prefers to be alone in their thoughts post-performance might be encouraged to verbalise their attributions for performance in front of the group. There may be differences in these environments, but Social Identity Researcher 1 stated that these differences depend on the support of senior leaders: “Unless you've got the coaches or senior leaders on board, then I think it's that having that retention, that longevity of the interventions not going to work”.

If the buy-in to a motivation-enhancing intervention is there from external influencers, then the opportunity to assist, develop and sustain adaptive attribution processes in athletes is a possibility. However, the influence of others will likely require education and retraining themselves to make that possibility feasible. This suggestion is supported by findings in Stage 1a where Allen et al., (2011) emphasised the importance of considering the athlete and the coach in attribution retraining. The findings also indicate an increase in the likelihood of creating and sustaining healthier attributions for the athletes' moving forwards.

### ***The Influence of Others Encouraging Adaptive Attributions***

Like those involved with potential barriers, the coach, the peer, and any “individual we relate to” (Social Identity Researcher 1) are all discussed as positive influences on an athlete's attributions. Social Identity Researcher 1 also indicated that “having that group setting can help shape our own perceptions or own thoughts, and just maybe highlight some areas where things are controllable”. The group setting an athlete operates within can present an opportunity for enhanced motivation and healthy attributions. This can be facilitated by the coaching team or peers also displaying adaptive attributions for performance. As an external influence on the athlete, those providing social support can affect the climate in which an athlete operates in. For example, a coach displaying adaptive attributions for negative performances is likely to

influence the formation of attributions within the athlete(s) themselves based on Coffee et al. (2021). This can include what interventions, or training will take place and how this will be received by the group –

If this was an intervention coming into my environment, I would want to know “OK, well, how do I support this?” Because I am aware of my influence. And if I am not supporting this. It is not going to be as successful as it should be. (National Sporting Organisation Representative 1)

This was reiterated by Social Identity Researcher 1 who stated, “I am thinking the peer group and the other people around them are possibly, if not probably, more important in this than the person themselves because their view of self is staring in mirrors around them”. The analogy of mirrors is demonstrative of how attributions are reflected within group environments based on external influences. Ensuring significant others are on board can help sustain healthier attributions by reinforcing relevant underpinning. For example, a focus on controllable outcomes of performance is more likely to encourage adaptive attributions for athletes and their support network. With both stakeholder and research evidence emphasising the influence of others as significant, it is fundamental that the novel co-produced Attribution Retraining in Sport (ARiS) intervention considers the role of significant others.

### **Theme 3: Key considerations for the development of an Attribution Retraining in Sport (ARiS) intervention**

To gather specific information regarding the development of an AR intervention in sport, questions regarding the development of an ARiS protocol concluded stakeholder interviews. Theme 3 summarises stakeholders’ responses provided the foundations for three sub-themes to be developed.

#### ***Consideration of external influences in the development of an Attribution Retraining in Sport (ARiS) intervention***

Numerous different stakeholders discussed the value of identifying personnel who are key sources of support as important influencers in the development of an ARiS intervention. Athlete 1 indicated that “the individuals to identify are the key people they seek support from after their performance and then you can do it with key individuals who may be struggling” whereas Coach 1 noted “Any work that does this (ARiS) has to involve all parties”.

National Sporting Organisation Representative 1 progressed the notion of including external influences in this intervention by suggesting there are “3 avenues” that require explicit

education. These are the athletes individually, the coach and their role in the athlete's attribution process, and then the coach-athlete dynamic when working together. The athletes receiving the intervention would benefit from education on the role of attributions ahead of retraining their attributive process. The coach would then benefit from a similar education intervention directed towards their influence on an athlete's attribution process. Finally, dependent on the pre-existing coach-athlete dynamic, the education of both athlete and the coach could occur in unison should the environment be facilitative of collaborative outcomes. These avenues for support could aid implementation of an intended intervention by being educated on, and sustaining the effects of, healthier attributions.

### ***Education and Consolidation in the development of an Attribution Retraining in Sport (ARiS) intervention***

The process of education was discussed by multiple stakeholders during the interview. Following on from the points raised in the previous sub-theme, National Sporting Organisation Representative 2 highlighted the opportunity to educate the athlete and their support network together as opposed to in isolation –

Although we say we are a team, we do a lot of education in isolation. We do not link it together, which you know, seems a little bit confusing. But that is kind of the reality of the situation we face.

Education content is also something that requires consideration. Athlete 1 provided some insight into how they may see the exposure to attributions in their practice being explored initially, suggesting that use of recent sporting performances or previous experiences would be a good place to start: "I think maybe starting very broad so maybe just kind of looking at, let's say our semi-final last weekend". Following this comment, Athlete 1 predicted that fellow athletes may share maladaptive attributions due to the performance ending in defeat, aligning with Weiner (1985), but emphasised that use of recent performances may be a good place to start. Use of recent performances may not only be restricted to those that were negative, rather a shared experience where different attributions may have been individually generated. For example, how an athlete perceives success may be different to that of their peers or coaches. An athlete may be happy that they scored the winning goal as they want to achieve the top goal scorer trophy, however teammates may be disappointed with the other opportunities the athlete had to pass the ball which could have increased the team's likelihood of scoring more goals.

Reasons for this included sharing of experiences, identification of problems, and reliving moments of failure to identify areas for improvement (Athlete 1).

Athlete 2 identified previous use of ‘flagging exercises’ as a consolidation styled activity that may be an appropriate on field activity to consolidate off-field based education –

It is almost then maybe having a system in place where that is flagged up by anybody that hears it [...] then you put something in place like if you recognise a maladaptive attribution then it is your responsibility to go and speak to that player or something like that, and then it is almost kind of like a flagging exercise (Athlete 2).

This was supported by Sport Practitioner 1 who also recognised the use of flagging exercises in previous interventions –

But when mistakes were made, it was kind of “next job”. That was the phrase that was the same that the player would say either say to themselves or if I made a mistake, you as my teammate, would just shout “next job, next job”. And it was a way of potentially stopping someone from making those maladaptive attributions.

The use of flagging exercises advocates a transition of taught information from a traditional education session towards a practical integration into the athlete’s sporting environment. The flagging exercise can enable further consolidation of previously taught content by highlighting attributions during performance, which can demonstrate the different adaptive and maladaptive attributions that may occur during performance. Beyond a flagging exercise, alternative consolidation techniques such as the development of an ARiS app were frequently suggested as a tool for reflection, as explained by Sport Practitioner 2: “Using some kind of app [...] could be something that could be developed, because then it's immediately there on their phones for them to just pump the information into something”.

### ***Integration of an Attribution Retraining in Sport (ARiS) intervention***

Stakeholders emphasised the importance of integrating proposed interventions into the athlete’s sporting itinerary. Integration could include enhancing knowledge of those who provide social support, or the sustainability of the intervention effects long term. Some stakeholders alluded to the cut-throat nature of elite sport, where an intervention must fit with the current structure and not exist “outside of it” –

But it is (ARiS Intervention) built into the programme, not added on where it is an inconvenience, because once it becomes an add on, you get stopped doing it cause a coach would be like, stop going over there (Coach 1).

This idea was echoed by Sport Practitioner 1 –

Often if you have to give them (the coach) extra stuff to do, they are not going to do it. So, it is about like, well, how will it fit within their current pattern of play or training or anything like that.

The factors raised above could inherently shape the impact, sustainability, and longevity an intervention of this type can have in elite sport. A future AR in sport intervention should be packaged as a structured approach that can be flexible to suit the needs of those that use it (Coach 2). However, consideration should be given to the possibility of this not always being implementable given time constraints and alternative demands within a sporting environment (e.g., competitions, level of performance, coach demands).

#### **Theme 4: Key outcomes to consider as an output of developing an Attribution Retraining in Sport (ARiS) Intervention**

The intended outcomes of an AR in sport intervention in the future are important to highlight. In discussion with stakeholders, they identified some of the potential problems that could be addressed, as well as some of the opportunities that could be pursued, by undertaking an AR in sport intervention. For example, Stakeholders discussed athletes' reactions after a defeat, focusing on their attributions, and suggested the opportunity to address external factors that might be causing distractions –

...we give out about all these external factors but that is totally just I think to cover up the responsibility that we need to take ourselves [...] it is a waste of energy because, ultimately, it is just a distraction from the ownership that you need to take for your own performance (Athlete 1)

This quote may suggest that a key outcome of a future AR in sport intervention is to consider educating athletes on how to explain performances. Underpinning an AR in sport intervention, attribution retraining as a method identifies the negatives of focusing on external factors and recommends the need to focus on internal factors. In a similar self-analysis capacity, analysis

revealed how the modern-day athlete views themselves as a holistic “product” that needs rounded development –

I think players are more receptive to analysing their own game [...] I think lots of athletes I see now almost view themselves as a bit of a product. They wanna be better [...] So I do think there is athletes willing to be more receptive to feedback and reflection (Coach 2)

With a view that players are now more receptive to feedback and reflection, a future attribution retraining intervention could educate athletes on how they can do this effectively with a focus on adaptive attributions. Supporting the notion that elite athletes should be focusing on psychological development alongside physiological development, Attribution Theory Researcher 1 suggested that “players need to learn how to make those (adaptive attributions)”. A future attribution retraining intervention can enhance awareness of how to deal with negative outcomes which may help athletes who become increasingly self-critical: “if the result is not the positive, not the positive one that I look for, I’ll always sort of lean towards the more self-critical” (Athlete 2).

## **Discussion**

Stage 1b explored the perspectives of stakeholders on attributions in sport and how they may inform the development of an AR in sport intervention. Using a deductive approach to reflexive thematic analysis, four themes were highlighted: Stakeholder Views of Attributions in Sport; Influence of Others on Athletes’ Attribution Processes; Key Considerations for the Development of an Attribution Retraining in Sport (ARiS) Intervention; and Key Outputs of Developing an Attribution Retraining in Sport (ARiS) Intervention.

The relationship between attributions being more internal and adaptive if successful and external and maladaptive if unsuccessful is present in both theory and practice. For example, healthier attributions will focus on explanations in a person’s control, and specific to them as an individual (Weiner, 1985). These internal attributions when successful may include high levels of effort or technical execution. Conversely, unhealthy attributions will focus on explanations out of a person’s control, and likely to affect more than the individual (Weiner, 1985). These external attributions are often linked to failure and may include blaming the weather, the officials, or the difficulty of the task itself (e.g., opponents level). Stakeholders’ responses in this study demonstrated the prominence of internal attributions, a tenet of adaptive attributions, after success but alluded to the void of such attributions in the case of negative

performance outcomes. These thoughts are the premise that AR interventions have been built on, however not all athletes will have the level of understanding to appreciate these differences in explanation without psychoeducation.

In traditional AR interventions, participants receive AR education as part of the retraining programme to inform them of what is adaptive and maladaptive (Perry et al., 1993). However, more recent work in the domain of sport applying AR interventions have opted for an initial *psychoeducation* session first, prior to delivery of the traditional AR education (Moffat et al., 2021). Psychoeducation provides a holistic overview of the role of sport psychology, whereas AR education highlights the importance of attributions and focuses on the need to form adaptive thoughts post-performance. In Moffat and colleagues recent research, both were delivered in different sessions and seen to add value to the intended intervention outcomes as opposed to being viewed as more important than the other. Psychoeducation has been stated to be a “valuable tool” for the improvement of welfare in competitive athletes and provides underpinning for sport psychology interventions generally (Bar et al., 2016, p. 337). This is due to the knowledge shared around the importance of understanding the mind and body in unison ahead of any sporting performance. As future ARiS implementation will also work with competitive athletes, implementation of a psychoeducation phase like Moffat et al. (2021) should be considered where athletes are educated on the concept of sport psychology first, before an introduction to attribution theory and AR methods second. This is to ensure appropriate understanding of how psychology can support sporting performance in lay terms before specific exploration of the impact of attributions.

Researchers have acknowledged the importance of considering the role of significant others in a person's attribution process (Coffee et al., 2020). As identified in Theme 2: influence of others on an athlete's attribution process, there is evidence to suggest external influences can support or threaten the implementation of adaptive attributions in athletes. Findings focused on applied sport examples of how reflective climates, where attributions can be discussed post-performance, can be created by senior coaching staff in an elite environment. This could be viewed as an opportunity if the peers and coaching staff surrounding an athlete are fostering an environment where adaptive attributions are prominent. This may indicate that an athlete would be likely to pick up on other attributions for performance in turn influencing our own. Conversely, the reflection can act as a significant barrier if the environment encourages maladaptive attributions. These conflicting suggestions for creating a reflective environment that can aid formation of attributions demonstrates both the influence of those around an athlete and the challenges that can come because of retraining attributions on an

individual basis. For example, having peers that form adaptive attributions for performance despite an individual's tendency to focus on explanations external reasons may influence the maladaptive individual to shift towards more adaptive attributions over time. As a result, a future intervention exploring attributions in sport may consider the inclusion of significant others relating to athletes in psychoeducation, similar to the work of Steptoe, Barker & Harwood with the 5Cs model in football academies (Steptoe et al., 2016; Steptoe et al., 2019). This would mean that the athlete and those that influence their social variables are familiar with what makes adaptive attributions for future success, and how to avoid maladaptive attributions that may increase likelihood of future failure. In line with stakeholder recommendations to consider all parties during education, Fogaca et al., (2021), agreed that the success of a mental health and performance intervention with swimming athletes was based on the buy-in of their significant others. As a performance enhancing intervention, ARiS can consider the buy-in of significant others valuable based on Fogaca et al., (2021) findings. As a result, future development of an AR in sport intervention could consider educating the athlete and their significant others to enhance sustainability of intended outcomes: aligning with Allen et al's (2012) recommendations.

Once educated, and in line with ecologically valid AR protocols previously discussed (e.g., Dryden et al., 2021), the need for consolidation of adaptive and maladaptive attributions processes were also emphasised by a range of stakeholders. Consolidation of taught AR materials outside of sport typically took the form of written reflection (Hall et al., 2006), but stakeholder's suggestion in sport focused on moving the intervention away from the classroom and into their sporting environment (e.g., psychology integrated into physical session on-court or on the pitch). Recent research by Dean et al. (2022) noted the importance of integrating classroom-based workshops into on-pitch training sessions in English Premier League soccer academies. A future AR in sport intervention could consider the translation of taught materials into the athlete's sporting environment to highlight the importance of attributions both during and post-performance.

Alternative tools for implementation include mobile applications which allow for immediate interaction and promote ease of use (Terhorst et al., 2020). Recording of these may be useful for future reviews to assess whether attributions are maladaptive or adaptive, the former of which may indicate more attribution retraining to be beneficial. Recent use of mobile applications to promote alternative sport psychology interventions have seen success in implementation, albeit researchers appreciate the amount of time taken and costly financial implications for investing into this type of development (Price et al., 2022; Turner et al., 2020).

The mobile application presents a less invasive way of asking why the athletes have performed the way they have done (Schack et al., 2020). By developing an ARiS mobile application, the athlete can record their internal thoughts privately without the judgements of others if said aloud. This may begin to address some of the issues raised in Theme 2 surrounding the barriers of external influences on forming adaptive attributions by creating a private alternative for the athlete to record their attributions post-performance.

### **Strengths, Limitations and Future Research**

The present study's strengths also include methodological rigour with use of the systematic scoping review findings in Stage 1a providing underpinning for interview questions in Stage 1b. Completing the first stage of Hawkins et al. (2017) co-production guidelines in full establishes underpinning for developing an appropriate intervention. Pertinent to this research, the next steps would be creation of an ARiS pilot protocol using the findings of Stage 1a and Stage 1b. At the time of writing, this would be the first study to create an official protocol for Attribution Retraining in Sport, and the first motivation-enhancing intervention specifically designed by the athlete and their support network, for the athlete and their support network. This provides a unique opportunity to create a sport-specific intervention with consideration into how psychology can be integrated across sport by those operating within it. Alongside the evidence reviewed in Chapter 2, Stage 1 of co-production has provided extensive empirical and primary evidence from research and applied settings alike to highlight considerations for the development of an AR in sport intervention in the future.

Considering limitations of the study, use of a deductive approach to analysis means that findings were extracted based upon the development of an AR in sport intervention in the future. As a result, opinions formed from stakeholders in this research on the role of psychology in sport should be considered specifically in response to motivation enhancing interventions as opposed to sport psychology interventions broadly. Responses are still valid and accurate, but findings should be interpreted with caution beyond the discussion of attributions in sport. This study had a small sample of stakeholders representing individual stakeholder groups. Although not required to justify findings, an increase in diversity of stakeholders sporting and research backgrounds may have fielded further findings. For example, Martin and Carron (2012) denote that the role of attributions differs based on individual sports comparatively to team sports. In this research, there were stakeholders with representation in both team and individual sport, but this was not consistent across all relevant stakeholder groups. Future research could consider equitable coverage of team and individual sporting backgrounds in selection of research participants to enhance validity of assessment across both domains. It is likely that the

attribution process of an individual athletes, often not surrounded by peers, is very different to that of an athlete representing a team.

Aside from contributing to intervention protocol development, Stage 1 of co-production provides an insight into the perceptions of existing intervention delivery in sport. Specifically, findings of Stage 1a highlight a dearth in research and applied perspectives in attribution theory in sport since Rees et al.'s (2005) call to action. The systematic scoping review in Stage 1a could be published to assess 10 years of empirical research since the last review covering attribution theory in sport specifically (Allen, 2012). Future research, therefore, may also consider a review of motivation-enhancing interventions within applied sporting contexts which may emphasise a dearth in literature despite successful implementations of these interventions in alternative domains. This exploration may also re-emphasise the importance of an AR in sport intervention protocol in the future as a successful motivation-enhancing intervention in alternative domains. Secondly, the findings of Stage 1 of co-production indicate the potential to explore the role of attributions in sport specifically through primary research, with consideration to the nuances that operate within sport. Some of these nuances include: (1) level of sport, (2) individual vs. team sport, (3) the role of the national sporting organisation, and (4) the support network around the athlete. Research addressing these nuances should look to gather opinion of key stakeholders within each demographic population and may consider quantitative measures of attributions such as the Causal Dimension Scale II (CDS-II: McAuley et al., 1992) or CSGU (Coffee & Rees, 2008) to assess their prominence. This would then provide a measure of attributions that could be assessed pre post intervention which would indicate whether participants are displaying enhancements in adaptive attributions.

## **Conclusion**

Combining scientific underpinning and stakeholder opinion, Chapter 4 presents the methodological components and overarching findings from an evidence review of existing literature in section one. The second section of the chapter also identifies practical solutions to develop an Attribution Retraining in Sport (ARiS) intervention protocol, via stakeholder consultation. Stakeholder consultation provides exposure to the experiences and opinions of attributions in sport broadly, and attribution retraining interventions specifically, from key stakeholders in both research and applied settings.

## **ARiS Protocol Development**

**How a 5-stage ARiS Intervention Protocol v.1 was produced after Stage 1 of co-production.**

## **ARiS v.1 protocol**

Upon completion of Stage 1: Evidence Review of Literature and Stakeholder Consultation, the development of version 1 of an Attribution Retraining in Sport intervention protocol took place (ARiS v.1). ARiS v.1 was underpinned by the systematic scoping review of attribution retraining research within Stage 1a: Evidence Review, and recommendations from stakeholders within Stage 1b: Stakeholder Consultation. This initial ARiS v.1 protocol consisted of five Stages: (1) Baseline Assessment and Needs Analysis, (2) Psychoeducation, (3) Creation of ARiS Leadership Group, (4) Attribution Retraining, and (5) Evaluation and Follow-up (Figure 4.2).

### **ARiS Stage 1: Baseline Assessment & Needs Analysis**

Stage 1: Baseline Assessment & Needs Analysis was developed to capture baseline measurements for both specific intervention (e.g., causal attributions) and alternative research outcomes (e.g., performance, motivation, controllability). For measurement of attributions, previous attribution research in sport has used the Causal Dimensional Scale II (CDS-II; McAuley, 1992). Alongside this baseline measurement, capturing live attributions during performance is encouraged via Think Aloud (McGreary et al., 2024) or Video Observations (Moffat et al., 2021). Use of these methods will support the initial CDS-II in providing baseline data of attributions during performance for two future purposes: (1) to present a pre-post intervention comparison, and (2) to provide some group specific examples of maladaptive attributions and or behaviours that could be used in future ARiS education (Stage 2: Psychoeducation, or Stage 4: Attribution Retraining). Further needs analysis may also be carried out via informal conversations and observations to assess attributions amongst athletes, coaches, and the support network, where relevant.

### ***ARiS Stage 2: Psychoeducation***

This stage has two main purposes: (1) to educate the athlete and their support network on the role of psychology within sport and exercise settings, and (2) to provide an induction into the role of attributions during sporting performance. To carry out psychoeducation, three main strands have been proposed.

**Stage 2a: In-class workshop.** This initial stage is designed for athletes and coaches to attend either simultaneously, or separately, depending on preferences of those receiving the ARiS intervention and in line with findings of Chapter 4. A 1 x 60-minute workshop will be delivered by the intervention delivery team, covering the role of psychology and attributions in sporting performance (Moffat et al., 2021). This workshop could use excerpts from Stage 1's Think Aloud transcripts to provide examples of attributions in the participants sporting

environment. This could include a task as part of the workshop where participants need to separate Think Aloud excerpts into adaptive and maladaptive, like Mateucci's use of vignettes in AR research previously (Matteuci, 2017). Alternative content suggestions include using famous athlete interviews and assessing their style of attributions.

**Stage 2b: In-practice education.** This second stage aims to transfer taught materials from Stage 2a into the relevant sporting environment of ARiS participants in line with recommendations from Chapter 4. Working with the coaching team, this is likely to be integrated into pre-existing training sessions or organised an appropriate time in the athlete's schedules like Parkes and Mallett (2011). Content of this session will be unique to each sport but should aim to identify possible causes of attributions and challenge instances where these attributions may typically be maladaptive. For example, a keep the ball session in a netball warm-up where the playing area is smaller and referee decisions made by coaches are incorrect, therefore generating maladaptive attributions about playing conditions or officials that are uncontrollable and external.

**Stage 2c: Parent Discussion.** The final stage of Stage 2: Psychoeducation is created for those working with adolescent athletes. It aims to provide parents of adolescent athletes with a round table discussion on the role of others in forming attributions for sporting performance. This session should introduce the concept of psychology and attributions, before challenging parents to consider their role in influencing their child's attribution style. Topics may include the role of attributions during the car journey home (Tamminen et al., 2022) and how a parent's feedback during performance can affect performance attributions (Holt et al., 2008).

### ***ARiS Stage 3: Development of "ARiS Leadership Group"***

A leadership team consisting of coaches, athletes, and other external influences (i.e., members of the club hierarchy, parents, sport practitioners) will be invited to form an "ARiS Leadership Group" to take ownership of the implementation and consolidation of taught content from Stage 2: Psychoeducation and Stage 4: Attribution Retraining. Individuals could be selected via existing in-house group dynamics, chosen by members of the coaching team, volunteering, or use of Social Identity Mapping to identify key influences within the group (Cruwys et al., 2016). Responsibility of ARiS Leadership Group members include supporting athletes to maintain an adaptive attribution process, reporting any issues with the ARiS intervention to the intervention delivery team, and ensuring sustainability of adaptive attributions beyond completion of the ARiS intervention.

#### ***ARiS Stage 4: Attribution Retraining***

Stage 4 follows the research underpinned three-phase Attribution Retraining approach presented in Chapter 2: Causal Search, Attribution Induction, and Attribution Consolidation. With Causal Search, the cognitive process of generating explanation for performance, organically occurring as part of the content in Stage 2: Psychoeducation, ARiS Stage 4 will focus on two elements: ARiS Induction and ARiS Consolidation

**Stage 4a: ARiS Induction.** Athletes and coaches will participate in a 1 x 60-minute ARiS induction workshop. Contents of this session will focus on the difference between adaptive and maladaptive attributions in their sporting context. This also provides another opportunity to focus on fellow athletes displaying adaptive and maladaptive attributions for their performance whilst delving deeper into the causes for the types of attributions experienced. At the end of the session, athletes and coaches should be able to identify the different types of attributions, how they are generated, and why there is an emphasis on adaptive attributions for future performance. The session will also allude to the role of others when forming attributions.

**Stage 4b: ARiS Consolidation “No Mal Pal!”.** Co-designed with the coaching team, athletes will take part in a training session designed to increase the likelihood of failure. By increasing failure, and thus the likelihood of generating negative, uncontrollable, external attributions (Weiner, 1985), athletes will have an opportunity to organically put into practice the taught content of Stage 4a: ARiS Induction. An example task could be one entitled “No Mal Pal”, where athletes are encouraged to identify peers who continue to make maladaptive attributions related to their performance. “No Mal Pal” is short for “No Maladaptive Attributions Pal” to enhance buy in from external influences such as coaches and fellow athletes. If an athlete is caught attributing their failure maladaptively, then the team or athlete identifying this should shout “No Mal Pal!”. Rules and content for the failure invoking task should be considered prior to the session by coaches and the intervention delivery team collaboratively. For example, in soccer, a task may advocate that in a small-sided game, one team can only score with their weaker foot whilst their opponents do not have the same restrictions. This activity will aim to promote adaptive attributions and enhance the role of social support in sustaining adaptive attributions in the future.

#### ***ARiS Stage 5: Evaluation and Follow-up***

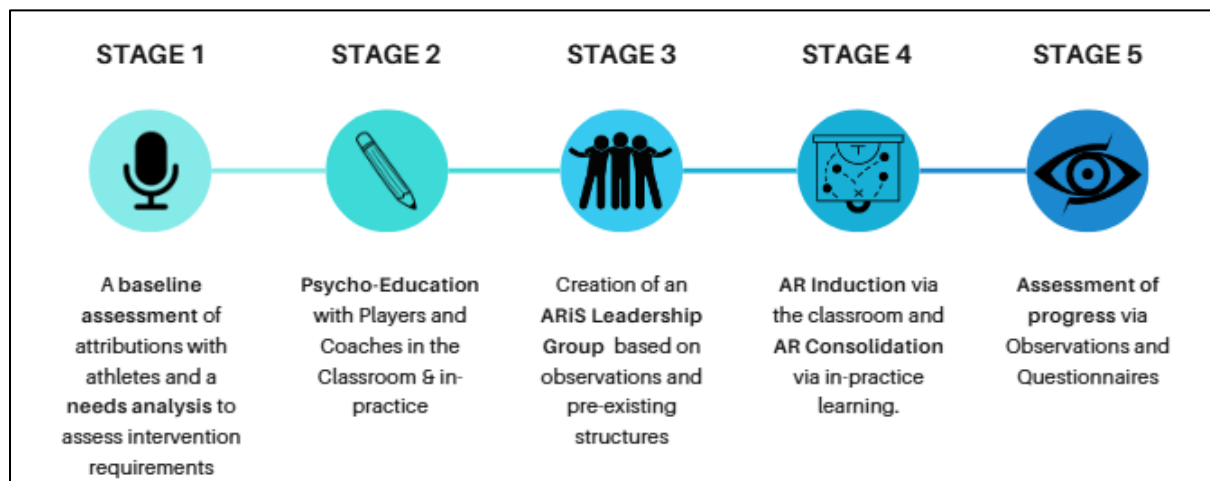
Stage 5 assesses the role of evaluation and follow-up over two recommended timepoints.

**Stage 5a: Evaluation (3 months post-ARiS Stage 4).** Mirroring baseline tests carried out in ARiS Stage 1, Stage 5a will involve the recollection of data from the CDS-II to assess pre-post intervention changes in attributions. Use of Think Aloud and video observation is also recommended to recapture live attributions during performance. These data will permit triangulation of quantitative and observational changes in attributions style to assess impact of the ARiS intervention.

**Stage 5b: Follow-up (6 months post-ARiS Stage 4).** Athletes will be invited to complete the CDS-II for a third time providing pre-post-follow up data. The ARiS Leadership Group will be consulted on sustainability of ARiS intervention aims and outcomes and a discussion around what resources are required to further sustainability can be held. On a case-by-case basis, next steps may include revisiting ARiS Stage 2: Psychoeducation or ARiS Stage 4: Attribution Retraining depending on the needs of the group (Moffat et al., 2021). Releasing pre-recorded content from these original sessions may also be recommended to act as a refresher (Parker et al., 2020).

**Figure 4.2**

*ARiS Protocol v.1 graphic*



## **Chapter 5: Study 2**

### **Stage 2: Co-production of an ARiS intervention with an Intervention Development group**

## **Introduction**

Chapter 5 presents an iterative data collection cycle with six new stakeholders representing each of the six areas of expertise used thus far in co-production: Athlete, Coach, Sport Practitioner (e.g., Sport Psychologist, Physio Therapist), National Sporting Organisation Representative, Attribution Theory Researcher, and Social Identity Theory Researcher. The recruited six stakeholders will form an Intervention Development Group (IDG) to adapt and refine the ARiS pilot protocol developed thus far.

As highlighted in the systematic scoping review (Stage 1a), only eight AR interventions focused on sport, and just two of these were conducted in applied sport settings. Both studies reveal similar key findings for AR research in practical settings. Firstly, anecdotal and qualitative evidence was used to complement quantitative data by incorporating the lived experiences of individuals participating in the AR intervention. Both athletes and their support networks reported notable changes, with behaviour changes often captured through visual observations, such as video recordings, or through observations by researchers, sport psychologists, or members of the athlete's support team (e.g., coach or parent). While statistical significance is considered the gold standard in traditional research, Sly et al. (2020) emphasize that real-world change is crucial for successful applied research in sport. Building on these insights in Chapter 5, ARiS could explore measurement approaches that address both traditional research standards and the practical demands of applied sport settings, ensuring the intervention is relevant both for the PhD and for its future use in the field.

Building on the findings from Chapter 4, which covered Stage 1 of co-production, Chapter 5 focuses on refining an applied attribution retraining intervention through Stage 2 of co-production. This involves establishing and collaborating with an Intervention Development Group (IDG) to adapt and improve the novel ARiS pilot protocol developed in Chapter 4. The IDG brings together diverse expertise and perspectives to co-create a suitable intervention. By utilising both individual and collective data collection methods, stakeholders can first form independent opinions on the protocol before engaging in focus group discussions, where further revisions or adaptations may emerge. This process advances the work done so far by allowing stakeholders to refine the ARiS protocol through shared knowledge and expertise, both individually and collaboratively. To support this, qualitative feedback questionnaires will accompany the latest version of the ARiS protocol, and the research team will actively seek direct feedback on the intervention protocol and its supporting materials. In line with Hawkins et al. (2017) guidelines for co-production in intervention development, the IDG will be encouraged to propose refinements wherever possible.

## Aims and Objectives

The purpose of Stage 2: Co-production with an Intervention Development Group (IDG) was to adapt and refine the novel ARiS protocol (v.1 and v.2) ahead of Stage 3: Stakeholder Approval (Chapter 6). To achieve this, Chapter 5 has two main objectives –

1. to use qualitative methodologies to gather opinions and experiences of IDG members on the novel ARiS intervention protocol
2. to complete two iterative data collection cycles with members of the IDG to co-produce ARiS v.3 protocol suitable for use in applied sport settings.

## Method

### Participants

In Table 5.1, demographic information for each of the six stakeholders included in Stage 2 of co-production is provided.

**Table 5.1**  
*Demographic Information for Stage 2 Stakeholders*

| Stakeholder                      | Gender | Age | Location         | Additional Information                 |
|----------------------------------|--------|-----|------------------|----------------------------------------|
| Athlete 3                        | Male   | 21  | Northern Ireland | National Youth Golfer                  |
| Coach 3                          | Male   | 28  | Norway           | Professional Women's Football Coach    |
| National Sporting Organisation 2 | Female | 53  | England          | Female Football Development Officer    |
| Sport Practitioner 3             | Female | 32  | Scotland         | Sport and Exercise Psychologist (HCPC) |
| Attribution Theory Researcher 3  | Female | 30  | Scotland         | Sport and Exercise Psychologist (HCPC) |
| Social Identity Researcher 2     | Male   | 44  | England          | Lecturer in Sport Psychology           |

Participants are referred to as *stakeholders* due to their role in this co-production study as a contributor to materials and a representative for an area of expertise (Parent, 2016). Stakeholders were recruited through purposive sampling via the lead author and supervisory team's network for increased accessibility to a diverse range of participants (Campbell et al.,

2020). No stakeholders from affiliated universities of the lead author or supervisory team were recruited (Southampton Solent University, University of Stirling, and Heriot Watt University). This was to ensure that no participants had prior knowledge of the lead author's PhD, nor any pressure on them to participate due to pre-existing relationships. No incentive was offered for participation.

A total of six stakeholders formed an Intervention Development Group (IDG) who indicated their primary representation as one of the following areas: Athlete (n = 1), Coach (n = 1), Sport Practitioner (n = 1), National Sporting Organisation Representative (n = 1), Attribution Theory Researcher (n = 1), or Social Identity Theory Researcher (n = 1). All stakeholders were recruited based on the primary representation of one of the six stakeholder types, although stakeholders in some cases held two or three qualifying areas of expertise. This adds ecological validity where some stakeholders can offer multiple points of expertise translating in cross-stakeholder type opinion (Rowe et al., 2025). Each individual stakeholder was required to meet relevant inclusion criteria. For example, an athlete was defined as anyone participating in any level of sport whereas a coach was required to have fulfilled a coaching qualification via a national governing body or have 5+ years of experience in coaching. Researcher representation was classified as an individual who has published in attributions or social identity within the last 15 years. Full inclusion criteria for all six stakeholder groups can be found in Appendix B.

## **Measures and Materials**

An initial ARiS protocol v.1 Microsoft Word document and accompanying qualitative feedback survey via JISC online surveys v.2 were created to begin data collection. To complete the iterative data collection cycle, a focus group was then organised to discuss stakeholders feedback and gather further opinion on the proposed revisions (see below Figure 5.1). This format was followed for the second iterative data collection cycle (A feedback survey and then a focus group) where ARiS protocol v.2 was formed. As an emergent design, some materials were developed throughout data collection by co-researchers and their qualitative survey feedback (e.g., topics for focus group content). Below provides an overview of the three main materials used: ARiS Protocol v.1 and v.2, qualitative feedback survey, and focus group structure.

### ***ARiS protocol v.1 and v.2***

ARiS protocol v.1, interspersed between Chapter 4 and 5, was sent to all stakeholders. Created in a Microsoft Word document, ARiS protocol v.1 (See concluding Chapter 4) was shared via email to all 6 stakeholders prior to completion of a qualitative feedback survey.

Within the document was a short introductory paragraph into how the ARiS protocol had been developed so far, alongside a ‘key terms’ section that provided definitions for theoretically informed or jargon related terms. Examples of these include attributions, social identity, maladaptive, and adaptive. The decision to include this prior to the protocol was to ensure all stakeholders, regardless of domain and expertise, were able to interpret the document clearly and in line with fellow stakeholders. Upon conclusion of the key terms section, the ARiS protocol v.1 was provided in full for stakeholders to provide their feedback on via the qualitative feedback survey. All sections of the document were updated in line with suggested revisions from Round 1 to co-produce ARiS protocol v.2 ahead of the second cycle of data collection with the IDG.

### ***Qualitative feedback survey***

A qualitative feedback survey served as an accompaniment to the ARiS protocol v.1 and v.2 that were circulated to the IDG (Hawkins et al., 2017). This feedback survey was created to capture feedback and opinion on both the overall structure and individual stages of the ARiS protocol v.1 and v.2 as they developed. The qualitative feedback survey featured five set questions, each aligning with the five stages of the proposed ARiS protocol, before concluding with an overall feedback comment offering an opportunity to the IDG to provide any other feedback they had not yet offered. This allowed the lead researcher to make appropriate revisions to each of the five stages individually before assessing collective comments that may be addressed either via revisions or discussion at the upcoming focus group. The qualitative feedback survey was created via JISC, an online survey platform, and provided to stakeholders via email. They were requested to provide feedback on the protocol within 2 weeks of receiving the content.

### ***Focus Groups***

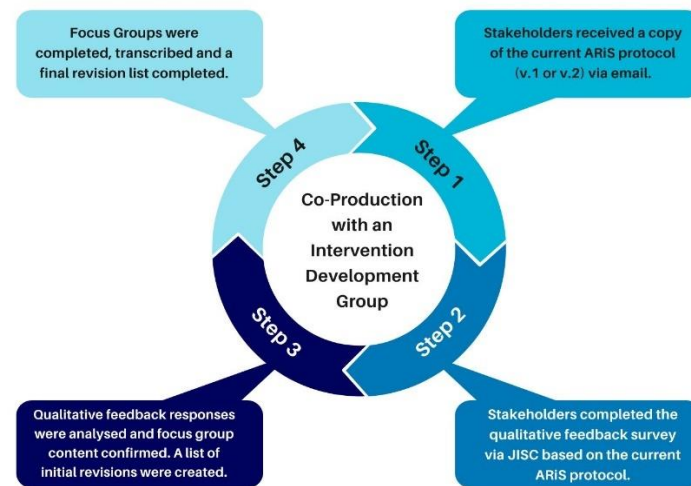
Two online focus groups were organized to allow stakeholders to discuss the feedback from each data collection cycle, enriching their individual qualitative feedback surveys. Each focus group was guided by a brief Microsoft PowerPoint presentation that served as a backdrop for the discussion. The presentation content was developed through content analysis of the individual feedback surveys, identifying key themes related to the desired outcomes (Eisenhauer et al., 2022). Content analysis was used deductively to extract themes that could spark discussion among stakeholders, particularly where there were differing opinions about the protocol, which could lead to productive debate.

Key changes or revision ideas were drawn from the survey responses and highlighted in the PowerPoint slides. For example, a significant discussion point in Round 1 was the

removal of "parent-only" language, with a suggestion to use the term "trusted adult" instead. This was presented as a discussion slide, inviting stakeholders to share their opinions and suggest further revisions to the ARiS Protocol where needed. This format was consistently followed in both focus group discussions, with the content of the discussions evolving based on the responses from the qualitative feedback surveys.

**Figure 5.1**

*The co-production cycle with an intervention development group (IDG)*



*Caption:* A 4-step cycle using an intervention development group (Hawkins et al., 2017) as part of co-producing an ARiS intervention protocol.

## Procedure

Upon receipt of ethical approval from the General University Ethics Panel at University of Stirling, recruitment of stakeholders began via email and social media. A consent form was forwarded to any potential stakeholders who were interested in the study, along with an outline of expectations to participate in this research. Research was able to commence once all six stakeholders were recruited: one stakeholder for each area of expertise forming the IDG (Hawkins et al., 2017).

Following this, the IDG received a welcome email with two attachments: the initial ARiS protocol v.1 and a link to the online qualitative feedback survey, where they could provide their initial thoughts on the protocol. The IDG was also invited to indicate their availability for focus group 1. The 3-week period between the welcome email and the first focus group gave stakeholders sufficient time to complete the qualitative feedback survey and allowed the lead researcher ample time to inductively analyse the responses. All stakeholders were encouraged to submit feedback through the survey and attend focus group 1. However, due to time constraints, attendance was lower than anticipated, with only four participants ( $n =$

4). Focus group 1 was recorded, and transcripts were made available to those who were unable to attend, giving them the opportunity to contribute based on the discussion. The lead researcher concluded this cycle of research by analysing both the focus group 1 transcripts and the qualitative feedback survey responses in tandem, which led to several revisions of ARiS protocol v.1. This cyclical process was then repeated in full for focus group 2, from the qualitative feedback survey to the discussion. This marked the conclusion of the co-production process with the IDG, resulting in the creation of ARiS protocol v.3. Upon completion of the analysis, all recordings of the focus groups were deleted, and the contributions were anonymized using relevant stakeholder pseudonyms for the purpose of the write-up. Participants received a debrief form via email and were thanked for their time. They were also offered the opportunity to receive a copy of the final ARiS protocol upon completion of co-production, to which all stakeholders (n = 6) responded positively.

### **Data Analysis**

Data were analysed via content analysis, a systematic method used to analyse textual, visual, or audio content by categorizing and coding data into themes or patterns (Drisko & Maschi, 2016). The process typically involves familiarisation with the data, generating initial codes, and organising these codes into meaningful categories. It can be conducted using either a deductive approach (guided by pre-existing theory) or an inductive approach (where themes emerge from the data itself). Completing content analysis requires careful attention to detail, consistency in coding, and reflective interpretation to ensure that the findings accurately represent the underlying meanings within the data.

The aim of this research was to identify stakeholder opinion on alterations to ARiS intervention protocols via the outputs of the IDG. When used in this study, content analysis allowed the researcher to sieve through trends and patterns in responses without necessarily providing the detailed inferences required within alternative qualitative analyses (Krippendorff, 2018). For example, the lead researcher was able to locate direct intervention alterations via comments provided in focus group transcripts or results of the qualitative survey. An inductive approach was employed to ensure revisions to the ARiS protocol were directly informed by the stakeholders themselves as opposed to pre-existing theory.

### **Findings: Co-Production with IDG**

During the co-production process, the IDG reflected on what had been developed to date and noted their initial thoughts and ideas for revisions across two iterative rounds of data collection.

## **Round 1**

### ***Stage 1: Needs Analysis and Observations***

Four revisions were suggested by stakeholders regarding needs analysis and observations. When asked about the proposed needs analysis section of ARiS, Sport Practitioner 3 enquired into “what would the further needs analysis look like” whilst Attribution Theory Researcher 2 provided advice on the use of CDS-II –

CDS-II is obviously a great measure, but athletes sometimes have difficulties interpreting some of the items (depending on age and stage). This would be useful to consider in terms of delivery - are you asking them to complete it online/on their own, is someone (i.e., you) present to help them? (Attribution Theory Researcher 2)

Continuing assessment of needs analysis tools within the current ARiS protocol, Coach 3 raised concerns that Think Aloud may not be an authentic way to capture attributions due to the athlete’s awareness of having a microphone attached. Instead, Coach 3 suggests using multiple streams to collect data during this time –

The main thing that springs to my mind here is the effect of a microphone being attached to an individual and the extent to which it changes their behaviour i.e. the athletes know the purpose of the research, so does this implicitly influence their attributions? Or at least the ones they verbalise. So, is there a way of using multiple streams to collect this data? Just to ensure it is not so influenced by the microphone. (Coach 3)

This point was echoed by Attribution Theory Researcher 2 who noted that visual recordings alongside audio-recording may capture body language and cues that would not be present using Think Aloud –

...if possible, I would use video recording as well as audio-recording to pick up on body language/cues that might not be present in the audio. This is particularly beneficial if you are looking at real-world effectiveness, or for meaningful significance. (Attribution Theory Researcher 2)

## ***Stage 2: Psychoeducation***

Seven revisions were made to Stage 2: Psychoeducation within the ARiS intervention protocol. The major addition to this stage was the creation of *cheat sheets*. Stakeholders were keen to present the use of infographics as a way of summarising key points in a takeaway format –

I think it is essential to be honest, I know we use quite a lot of infographics. Just here are the key points. Key takeaways in a nice pretty format for you to have on your phone and look back and reflect on if you kind of forget. (Sport Practitioner 3)

How these cheat sheets appear, who receives one, and how unique they are were also key discussion points. Recognising the need for different information for certain groups, Coach 3 suggested that having multiple different cheat sheets may serve a better purpose as part of the intervention –

...where you have perhaps had two or three words, which means a lot more [...] then that might be appropriate to a develop for an athlete, particularly a youth athlete. But then for a coach and maybe a parent, is it's maybe something that has a lot more justification for what the reason is behind why we would do X&Y. (Coach 3)

In response, three cheat sheets were created for (1) athletes, (2) coaches & support staff, and (3) parents/carers ahead of Round 2 of the IDG.

Focusing on the specific content of Stage 2: Psychoeducation itself, stakeholders desired further clarity on who would be attending Stage 2a: In-Class Workshop sessions: “I think it needs to be designed with, with coaches and athletes because obviously, I mean just through personality traits, people react to different things differently” (Athlete 3). Although encouraged, it is not a necessity for coaches and athletes to attend the same in-class workshop as per chapter 4 recommendations. This decision can be made on a group-by-group basis, but the recommendation is for the coaches to attend the in-class psycho-education workshops in unison. Stage 2a was also praised for the use of sport specific examples that athletes can relate to, including use of professional or well-known athletes in the relevant sports –

Stage 2a is well designed and makes sense. Seeing visual examples of both adaptive and maladaptive attributions makes a lot of sense, and if the participants already know the athletes it will be more impactful cognitively. (Social Identity Researcher 2)

The final revision of Stage 2a an in-class workshop was to ensure that the session is memorable. Considering the target audience for the intervention, the recommendation is that the in-class workshop will now include exercises or competitions to increase retention of information as well as enjoyment across the group –

But my experience, if it is not memorable and it is not fun and it is not something different, then they are going to forget about it and it is going to mean nothing by, you know, next week when the next exciting workshop whoever it might be, happens (Sport Practitioner 3).

In-practice education as part of Stage 2b was recommended to consider the deliverer organically developing opportunities that are co-produced with coaching staff to reduce risk of fake responses in purpose-built scenarios. For example, the intervention delivery team should not necessarily deliver the in-practice session but rather collaborate with members of the technical coaching team to highlight moments where maladaptive behaviours occur and consequently reminders on adaptive alternatives can be suggested. This is likely to be unique for each group –

I think we have to make it as organic as possible because my original thoughts when I was reading the pre reading material was anything that's solved, not organic, is probably going to elicit different fake response in the players (Coach 3)

Finally, Stage 2c received a name change to facilitate adolescent athlete who may not be supported by a parent but instead a carer or other family member. Social Identity Researcher 2 noted “At present, it is framed only around parents. What about children that live in care, with aunts / uncles, or other non-parental homes? Perhaps add parent or carer.”

### ***Stage 3: ARiS Leadership Group***

Assessing the creation of an ARiS leadership group in Stage 3, five revisions were made based upon IDG feedback. To incorporate Coach 3's suggestion for an introductory resource for ARiS leadership group members as a reminder of ARiS mechanisms, Revision

13 states that cheat sheets will be distributed once more to reinforce key points: “Think this is a very creative way of ensuring future success in Attribution Retraining. Perhaps again, the members of the group here are provided with some sort of resource to guide their future work” (Coach 3).

Use of the pre-existing group environment was praised by Attribution Theory Researcher 2, who recognised the role for internal support for implementation by highlighting: “What I like is that you are kind of trying to send to the continuance of the intervention in the group and get people within the group to lead it. I think that is great”. However, Social Identity Researcher 2 focused on considering who may form the ARiS leadership group and what influence this may have over the rest of the athletes and their support network –

I think that co-creation is working with players and with coaches, particularly identifying key players and key coaches who have influence over the rest of the group is going to be really important. (Social Identity Researcher 2)

Other revisions for Stage 3 raised by Attribution Theory Researcher 2 included “How much time is going to be required from members of the leadership team?” as well as “How many individuals are necessary for the group to be functional / how many might make it dysfunctional?”. A note has been added to clarify that length of time is expected to be minimal but could be flexible due to group demands, and number of members should be co-developed by the ARiS delivery team based on what is functional in each group.

#### ***Stage 4: Attribution Retraining***

Commenting upon the content and layout of Stage 4, the IDG suggested that four revisions were made clarifying aims of this section, the need for co-production of in-practice AR consolidation, consideration of psychological safety, and production of an example consolidation session. Revision 18 clarifies the purpose of ARiS to retrain attributions to enhance controllability as opposed to removal of all dysfunctional attributions –

Is the purpose of your intervention to retrain attributions (e.g., increase functional attributions, enable shifting of attributions) or is it around the removal of all dysfunctional attributions? i.e., a task asking players to call out team-mates dysfunctional attributions may be helpful for awareness, however, it is not necessarily possible to remove all dysfunctional attributions, therefore is the 'shame' that may be

attached to being called out by team-mates going to facilitate or hinder the re-training process? (Attribution Theory Researcher 2).

Following the comment of risk of “shame”, psychological safety was also discussed as a key consideration when implementing group-based consolidation sessions, where others may be aware of maladaptive and dysfunctional attributions. Sport Practitioner 3 emphasised that it is “...important to consider the group dynamics when asking individuals to identify peers with maladaptive attributions. Is the group psychologically safe enough to do so?”. To address these concerns surrounding psychological safety, and linking back to earlier suggestions regarding authentic delivery of in-practice tasks, Revision 19 highlights the need to consider context and buy-in from athletes and coaches –

In terms of the practice to make the players fail, I think this will be contextual to the athlete(s) and can be planned in accordance with their coach(es). In an ideal world, it is planned based around what we know the athlete is poor at (e.g. weak foot finishing), so then we are hitting two birds with one stone. We are exposing athletes to beneficial practice whilst also giving them a platform to work on their attributions. (Coach 3)

By considering the above, co-producing an AR consolidation task can enhance authenticity of group embedding of taught materials as well as re-emphasising ownership from the group. An increased group buy-in can bolster psychological safety within the group as athletes will have multiple avenues for support should they need it during the ARiS intervention. Enhanced authenticity in delivery of an ARiS intervention could, therefore, be developed with the ARiS leadership group or members of the coaching team to ensure purpose-built delivery and potentially address “two birds with one stone” as suggested by Coach 3.

The last revision for Stage 4 was based on language use. In ARiS protocol v.1, the example session provided is named “No Mal Pal”, although Social Identity Researcher 2 recommended that this phrase may not be received by the target audience in the way intended and instead groups should select their own phrase –

The only other thing that I thought about after did the survey is the “no mal pal”, and I wonder if the language that is used to identify or kind of note when maladaptive talk

is used should be decided at the group level. The term “pal” is not really used where I live apart from for dogs. I think it's probably, it might be worth thinking about the language for the group, because I think it is another way of the group having ownership over the way that they are. They label it. (Social Identity Researcher 2)

### ***Stage 5: Evaluation & Follow-up***

To conclude ARiS, Stage 5 provides the opportunity to capture post intervention assessment of progress, and three revisions were suggested for ARiS protocol v.2. Creation of a reflective log to capture post-performance attributions was recommended to support athletes notice adaptive and maladaptive tendencies. However, stakeholders were unsure about whether this would be best captured via mobile devices or considered in more traditional formats: “We are on our phones all the time, aren't we? So, I think that's probably the most suitable way that I would receive it” (Athlete 3). Coach 3 elaborated on Athlete 3’s recommendation –

We don't have to necessarily settle on one thing because I think again, from my experience, like some players are glued to their phone, some people don't bring their phone to training. Some girls perhaps don't have a phone, and so I think a variation in how they would prefer to engage it would be a good way to go. (Coach 3)

From a research perspective, Sport Practitioner 3 had concerns about the length of time between follow-up periods, and whether ARiS users would have lost interest, or attrition would be present if the time between evaluation and follow-up was too extensive: “This appears a lengthy process. I would be cautious not to ask too much from athletes, anticipating there may be a high dropout”.

### **Round 1 Revisions:**

After Round 1, 27 revisions were made to ARiS Protocol v.1 because of content analysis completed above (See Table 5.2). Some of the key revisions included: the creation of ‘cheat sheets’ for athletes, coaches, and parents to remind them of healthier attributions (Revisions 6, 13 and 24-26), the creation of an *attribution reflection log* (Revision 27), and a shift towards a more authentic delivery and assessment of ARiS stages (Revisions 4, 10, and 17).

### **Table 5.2**

*List of revisions from ARiS protocol v.1 to ARiS protocol v.2*

- 
1. Recommend the delivery of the ARiS protocol is in pre-season (where possible).
  2. Stage 1: A needs analysis section has been clarified although may require further alterations in future IDG cycles based on stakeholder feedback.
  3. Stage 1: Expert/support to be provided by intervention delivery team for when baseline assessment of Causal Dimensional Scale II is required to be complete.
  4. Stage 1: A caveat as to whether athlete's provided authentic thoughts when mic'd up in Think Aloud had been noted. The options of "video recordings" have been added to capture athlete organically although there still may need to be encouragement to verbalise thoughts during performance.
  5. Stage 1: Visual and audio recordings to be used to assess behaviours and oral feedback related to attributions in sporting scenarios via content analysis.
  6. Cheat sheets can now be found in the appendices. There is one for 'the athlete', one for the 'the parent/carer' in youth sport, and one for 'the athlete's support network': the latter of which being appropriate for coaching and support staff. These cheat sheets emphasise the important consideration for forming adaptive attributions.
  7. Stage 2a: In-Class Workshop - It has now been clarified that athletes and coaches should work together in this workshop and not in separate workshops.
  8. Stage 2a: In-Class Workshop - It has now been clarified that sport specific examples of attributions are to be provided dependent on population (e.g., golfers observe professional golfers' attributions/reflections).
  9. Stage 2a: In-Class Workshop - A note has been added that the session will include competition/exercises that will increase retention of information as well as enjoyment across the group. For example, splitting the room in two, name controllable vs. uncontrollable attributions for their most recent performance.
  10. Stage 2b: It has been clarified that in-practice education will occur organically as part of a training session already developed by the coaching staff. The job of the delivery team in charge of implementing ARiS will be to highlight moments of failure where maladaptive attributions can occur. This session is likely to be unique to each group, with the main aim to demonstrate maladaptive attributions existing in the athletes' sport specific scenarios organically.
  11. Stage 2c has been renamed "Parent/Carer Discussion" to capture the role of the carer.
  12. Stage 2c: Parent/Carer Discussion has had some ideas for potential topics clarified (e.g., parent/carer influence on attribution formation in adolescent athletes).
  13. Stage 3: Cheat sheet's will be shared again with relevant members of the ARiS Leadership group if required. These can be circulated by mobile device.
  14. Stage 3: A note has been added to indicate the ARiS Leadership Group will be created to support implementation of ARiS across the team/club depending on the scenario.
  15. Stage 3: A note has been added to indicate the ARiS Leadership Group will be identified by collaborating with the coaching staff and athletes to identify key personnel in the team.
  16. Stage 3: A comment has been provided on the length of time provided by members of the "ARiS Leadership Group" is likely to be flexible.
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17. Stage 3: Number of members has also been highlighted. In line with the above, this stage is very much co-developed with the club/team aiming to deliver/facilitate ARiS.
  18. Stage 4: A purpose has been provided to define clearly the aim of attribution retraining.
  19. Stage 4b: The session has been highlighted to be co-designed with the club's coaching staff to ensure an organic session can be created. This will also enhance coach buy-in.
  20. Stage 4b: Psychological safety has been considered with a note on potential assessment and observations of pre-existing conflicts or group dynamic issues.
  21. Stage 4b: "No Mal Pal" has been provided as an example although this phrase will be altered based on the athletes developing a phrase themselves.
  22. Stage 5: Athletes will now be encouraged to record their attributions post-intervention via a reflective log or notes. This can be done by the athlete in a way to suit them, but an example reflective prompt can be seen in the appendices.
  23. Stage 5: Length of time between follow-ups could be altered based on attrition rates between time points. A note has been provided that again this is subject to a case-by-case basis and that time frames are just recommendations.
  24. Appendix A: Athlete 'Cheat Sheet' has been created to be circulated by mobile device.
  25. Appendix B: Coach/Support Staff 'Cheat Sheet' has been created to be circulated by mobile device.
  26. Appendix C: Parent/Carer 'Cheat Sheet' has been created to be circulated by mobile device.
  27. Appendix D: Attribution Reflection Log has been created which can be circulated by mobile device.
- 

## **Round 2**

### ***Stage 1: Needs Analysis and Observation***

Two suggested revisions from the IDG focused upon delivery of organic observation and need for multidisciplinary collaboration to promote effective needs analysis prior to ARiS delivery. After raising concerns that Think Aloud was not an authentic form of assessing attributions, Coach 3 re-emphasised that they "appreciate the attempt at being organic in the data collection methods" with the addition of video observations to the ARiS protocol. Acknowledging the different requirements within needs analysis methods, a note was added to encourage multidisciplinary collaboration where possible to support with adherence in the absence of the ARiS intervention delivery team beyond Stage 1. For example, Social Identity Research 2 queries what may happen once the sport psychologist or delivery team were not present –

Implementation of the actual protocol would work and having come across this in different research environments, my main thing as a researcher involved in this would be adherence once you're not there or what adherence once the kind of the group needs to take over and lead and for me, that's that would be my biggest thing. (Social Identity Researcher 2)

### ***Stage 2: Psychoeducation***

During this revision cycle, members of the IDG had no direct feedback requiring revisions in relation to Stage 2: Psychoeducation.

### ***Stage 3: ARiS Leadership Group***

Two revisions were made in relation to ARiS intervention Stage 3: ARiS leadership group. Firstly, clarity has been added on how the ARiS leadership group is formed in –

I am still not 100% clear on the basis for people to be 'invited' to form an ARiS leadership group. If it is identity based, or to lead identity at the team-level, I think this needs to be fleshed out some more. (Social Identity Researcher 2)

Expanding on selection criteria, Social Identity Researcher 2 was also keen to establish what would happen if no one volunteered to be part of the ARiS leadership group –

...this leadership group you can have one or two things happen. Well, one of three things. I suppose the best outcome is that you get people that wanna be involved in it and will be involved in it. The second outcome is that you get everyone running the mile because no one wants to be involved in it, and you end up with someone having to lead it. [...] So, I mean, bearing in mind that that needs to come from kind of great resources that exist already, those kind of things. (Social Identity Researcher 2)

In response, a revision has been added to note that in the event there are no volunteers, the lead coach should work with the intervention delivery team or sport psychologist to identify relevant personnel that could hold responsibility for ARiS implementation.

### ***Stage 4: Attribution Retraining***

Four revisions were suggested by stakeholders relating to Stage 4: Attribution Retraining, including on clarity of content, working with adolescent athletes, and naming of tasks to encourage ownership. To encourage “open dialogue with parents and carers” a note

has been added to consult parents and carers of younger athletes prior to delivery of AR consolidation due to potential identification of failure in line with recommendations from NSO representative 2.

Despite revising the protocol to suggest that “No Mal Pal” was an example session, Social Identity Researcher 2 still raised an issue with the name, and suggested that this session should be renamed as a flagging exercise, where “No Mal Pal” is clearly labelled as an “Example Session” instead: “the language used should be developed by team members, rather than applied to groups as a part of the ARiS protocol” (Social Identity Researcher 2).

**Table 5.3**

*List of revisions from ARiS protocol v.2 to ARiS protocol v.3*

- 
1. A disclaimer has been added that the ARiS protocol is targeted at adult athletes. Adaptations for youth athletes will conform to the safeguarding policy employed by the recipient organisation of the protocol and may differ on a case-by-case basis.
  2. Stage 1: Emphasis on the need for observatory methods has been made. This will capture examples of maladaptive attributions within the group.
  3. Stage 1: A note regarding potential multidisciplinary collaboration at this stage has been added.
  4. Stage 3: A note has been added to highlight all relevant personnel will be invited to join an ARiS leadership group.
  5. Stage 3: If no one volunteers, a note has been added that the coach will work with the sport psychologist to identify potential personnel.
  6. Stage 4a has been noted that it is a refresher/extension from Stage 2a: Psychoeducation.
  7. If working with adolescents: Stage 4b a note has been added that parents will be consulted prior to delivery of this session due to the potential intended outcomes of failure identification.
  8. Stage 4b has been renamed *the flagging exercise* instead of No Mal Pal due to language differences.
  9. Stage 4b “No Mal Pal” example has been clearly labelled as *Example Session* for clarity that this could change depending on the group.
  10. Adherence in absence of sport psychologist will be dependent on accessibility of language use and implementation of cheat sheets.
  11. Consideration of Gender, Age, and Sport will all impact receipt of ARiS and adaptations to the protocol should be considered on a case-by-case basis.
- 

### ***Stage 5: Evaluation and Follow-up***

During this revision cycle, members of the IDG had no direct feedback requiring revisions in relation to Stage 5: Evaluation and Follow-up.

### **Round 2 Revisions:**

After Round 2, a further 11 revisions were made to ARiS protocol v.2 leading to ARiS protocol v.3 (See Table 5.3). Key revisions in this round included: clarification on additional terminology used (Revisions 8 & 9), adherence in the absence of a qualified sport psychologist (Revision 10), and a note that the protocol is designed for adult athletes although can be adapted for youth athletes (e.g., use of Stage 2c; Revision 1). Revision 11 also adds a provision to ARiS protocol v.3 that gender, age and sport may all impact receipt of an ARiS intervention in line with NSO representative 2 query “Will approach be the same for all genders?”.

### **Discussion**

After two rounds of iterative data collection, a total of 38 revisions were made (Round 1 = 27 revisions; Round 2 = 11 revisions), resulting in the development of ARiS protocol v.3. The suggested revisions support the use of five stages for intervention delivery, evidenced by the lack of revisions across two IDG cycles (Moffat et al., 2021). Additionally, the revisions underscored the importance of involving both athletes and their support networks in maintaining adaptive attributions.

Despite increased coach education in sport psychology, low coach engagement remains a challenge for practitioners, possibly due to insufficient knowledge and awareness of psychology among senior roles (Prior, 2022). Based on stakeholder feedback, the updated ARiS intervention protocol now includes a recommendation that both athletes and coaches attend the same psychoeducation workshops to ensure mutual awareness of how coaches can support the development of adaptive attributions in athletes. This approach aligns with Allen (2012), who argues that attribution education in sport must consider the role of others, particularly the coach. Jowett’s research on coach-athlete relationships further emphasises that these relationships are most successful when mutual care, trust, and communication are present, along with alignment to shared goals (Jowett, 2017; Lorimer & Jowett, 2014; Wachsmuth et al., 2017). This consideration is critical for ARiS, as healthier coach-athlete relationships may enhance the sustainability of intervention outcomes. Gearity et al. (2023) also highlight the value of simultaneously educating coaches and athletes to deconstruct subconscious power dynamics in coach-athlete relationships. Consequently, ARiS will aim to minimise hierarchical power within coaching teams, ensuring equal education for all on the role of adaptive attributions.

However, there may be situations where the presence of a coach during psychoeducation tasks could hinder progress, particularly if pre-existing coach-athlete relationships are negative. In these cases, having athletes and coaches work together might not support the sustainability of desired intervention outcomes (Lüdemann & Kleinert, 2023). To

address this, and in line with the research by Lara-Bercial and Bales (2022), the ARiS protocol will use Stage 1: Needs Analysis and Observation to assess any pre-existing interpersonal conflicts among athletes, coaches, and athlete's significant others (e.g., parents, peers, family members) before implementing the remaining stages. This approach will allow for tailored interventions, such as educating coaches and athletes separately if negative coach-athlete relationships are identified. This recommendation reflects stakeholder input on the importance of considering psychological safety in group dynamics before implementing ARiS.

A key focus throughout the co-production process with the IDG was the creation of cheat sheets and the emphasis on ease of engagement. A cheat sheet is a simple, easy-to-read resource that summarizes key intervention goals and outcomes, often used to help implement complex messages (Özer, 2021). For example, Wagner et al. (2023) used cheat sheets with health workers to present psychoeducation through clear instructions and visuals. This approach facilitated the transfer of intervention aims, especially for hard-to-reach populations. Similarly, Zhu et al. (2024) found that cheat sheets could aid in memory retrieval of key messages, which is crucial for recalling attributions related to past sporting performances as part of retraining the attribution process. This tool helps athletes understand what constitutes an adaptive attribution in lay language, within their sporting context. Based on revisions from Round 1 (Revisions 6, 13, and 24-26), the creation of ARiS "cheat sheets" for athletes, coaches, and their support networks led to the development of three additional resources to support the intervention protocol (See ARiS Protocol v.3 upon conclusion of this chapter). These cheat sheets focus on four key messages to promote healthier attributions, using short, simple sentences (e.g., "focus on controllable factors") and images to reinforce the content, like an abbreviated infographic. Fix (2020) used a combination of statistics and images in their mental health awareness cheat sheet for college athletic departments, which was displayed in hallways and shared via mobile communication applications (e.g., WhatsApp). ARiS could similarly use mobile applications to circulate cheat sheets, allowing athletes, coaches, and significant others to access important information on the go, especially when athletes are competing or training away from their usual locations (e.g., internationally). ARiS delivery teams should evaluate whether physical, virtual, or both versions of cheat sheets are most suitable for their intervention recipients.

Increasing the acceptability of psychoeducation from the athlete's perspective remains critical for ensuring the sustainability of intervention effects (Dias et al., 2024). Revisions to the ARiS protocol consider appropriate language use, the timing of interventions, and integration with existing training programs—all aimed at enhancing acceptability. The

challenge of communicating research to a lay audience, where academic language can create barriers, is well recognized (Halliwell, 1990). Martindale and Nash (2013) echo this, recommending that all future sport interventions consider presenting protocols in lay terms. These insights emphasise the need for future ARiS intervention users to be involved in the creation process, drawing on collaborative approaches (Frisby et al., 2005). By incorporating the expertise of stakeholders from applied sport settings, the ARiS protocol will be better tailored to relevant sporting terminology.

### **Applied Implications**

Integrating an ARiS intervention into existing sporting calendars and training programs will be fundamental for success. Whether this be in daily training (Henriksen et al., 2014), aligning to the sporting calendar (Poczwadowski et al., 1998), or individually integrating as a sport practitioner (Mosley et al., 2022), seamlessly positioning psychological support into an already functioning system would appear paramount for enhancing likelihood of successful outcomes. This aligns with previous AR research in applied settings suggesting integration into athletes sporting schedule is key for intervention success (Parkes & Mallett, 2011; Moffat et al., 2021). Future piloting of ARiS could consider the integration of the intervention delivery team and the timing of the implementing the intervention to further enhance likelihood for a successful intervention.

As highlighted in the discussion, implications for sport psychology interventions generally should consider the accessibility of intervention materials. Firstly, ensuring the intervention is delivered with appropriate language to suit the understanding of the target population is fundamental for athlete and coach buy-in. Secondly, providing short format summaries of taught content via cheat sheets or digital videos can provide enhanced likelihood of sustained intervention impacts because the resources become readily available (Özer, 2021). To do this, identifying already established communication channels with the athlete and their support network as part of initial discussions regarding intervention implementation would be helpful. For example, pre-existing group chat communication applications (e.g. WhatsApp) could be used to send out the short format psychoeducation materials (Singer et al., 2023) as highlighted in the discussion.

Finally, the timing of intervention delivery should be considered on a case-by-case basis. Singer and Anshel (2006) suggest that any sport intervention lasting 3–6 months should begin during the off-season (pre- or post-competition). For sports with shorter competition cycles, ARiS should be adapted accordingly. For example, ARiS protocol v.3 could be delivered in just four sessions (2x Psychoeducation, 1x Attribution Retraining Induction, and

1x Attribution Retraining Consolidation). However, time should be maximized for observations and needs analysis, especially if the person delivering the intervention is not already embedded in the setting (e.g., an external sport practitioner).

### **Strengths, Limitations & Future Research**

A strength of this study is the collaboration between researchers and those working within elite sport. With six different stakeholder groups represented, development of an ARiS protocol is underpinned by both research informed opinion as well as experience of those from an applied sport setting. This aligns with the aim of participatory research whereby knowledge and application are bridged between researchers and professionals working in applied sport settings (Smith et al., 2021).

In line with methodological challenges around co-production and the formation of an IDG, there can be difficulties organising the presence of all stakeholders at any one time (Hawkins et al., 2017). Attendance at both Focus Group 1 (n = 4) and Focus Group 2 (n = 3) was never achieved full attendance. Despite this, Hawkins et al.'s (2017) co-production guidelines do permit flexibility in methods deployed to ensure opinion and experience is shared from each stakeholder. Future research, in both co-production specifically and qualitative research generally, could consider flexibility in data collection to expand research connections within typically difficult to recruit populations (Khoa et al., 2023). For example, a semi-structured interview could be conducted via a qualitative questionnaire or via ad-hoc voice messages to allow flexibility for completion at the participants earliest convenience (Dimond et al., 2012).

It was challenging to ensure equitable representation of each stakeholder group in focus group discussions due to inconsistent attendance beyond feedback questionnaires. Although each participant did provide feedback in each round of data collection, lower attendance during focus groups did mean conversation was not representative of all six stakeholder groups which may have generated further revisions based upon discussions. For example, certain stakeholders felt they were not equipped to discuss certain topics (e.g., the Social Identity Stakeholder not having an opinion on whether cheat sheets should be circulated via physical copies or mobile devices). Future co-production research may consider whether an individual representative is sufficient for focus group discussions to warrant use in data collection if attendance is not present throughout.

### **Conclusion**

In this study, 6 stakeholders shared their expertise and opinions to inform the development of ARiS intervention protocol v.3. Individual (e.g., qualitative feedback survey)

and collective (e.g., focus groups) feedback received from the IDG helped to develop a novel motivation-enhancing intervention protocol appropriate for use in applied settings. Key revisions through Stage 2 included enhancing accessibility, collaboration between the athlete and their support network, and integrating ARiS into pre-existing sporting calendars. Stage 3 of co-production will look to consolidate these changes with the opinion of expert stakeholders who can offer domain expertise in both research and applied settings.

## **ARiS Protocol Development**

**A 5-Stage ARiS Intervention Protocol v.3 produced after Stage 2 of co-production for  
Stage 3 of co-production.**

### **ARiS Protocol v.3**

Co-produced with the intervention development group in Stage 2, ARiS intervention protocol v.3 was created. Changes from v.1 focus upon creating a more lay friendly protocol, with the introduction of key terms, example sessions and cheat sheets. Below is the ARiS protocol v.3 document that was shared with stakeholders in Stage 3. Please note that this was not the final ARiS protocol and therefore errors may be present that are part of later refinements in Stage 3.

#### **Key Terms Defined**

**Attribution:** Thoughts that allow you to control or predict future motivation in similar events. They often occur when reflecting on performance.

**Maladaptive/Dysfunctional Attribution:** A negative thought that will not improve motivation to a similar stimulus in the future. Attribution Research would suggest this is a thought that is out of a person's control or external to them. An example of this would be the officials, the weather, the opponents.

**Adaptive/Functional Attribution:** A positive thought that will improve motivation towards a similar stimulus in the future. Attribution Research would suggest this is a thought that is in a person's control and internal to them. An example of this would be effort levels, technique used, or preparation to perform.

**Think Aloud:** A method of data collection that is currently popular within sport. Participants will wear microphones whilst performing in their chosen sport and be instructed to voice their cognitions as they perform. This has been used previously in Attribution Retraining research (Moffat et al., 2021).

**Social Identity Mapping:** A method to identify social ties and connections around an individual. This is often used to indicate to an athlete the importance and relevance of each social group/category that they identify within.

#### **The 5-Stage ARiS Protocol**

The ARiS Pilot Protocol is made up of 5 stages and is recommended to be delivered during pre-season where possible. This is to ensure appropriate time can be dedicated to installing healthier attribution processes for athletes prior to the strain of the competitive season commencing.

**Please note:** The below protocol may require adaptations when working with youth athletes to conform to the safeguarding policy employed by the recipient. This will differ on a case-by-case basis and as a result the below intervention presents guidelines for implementation.

## **Stage 1: Baseline Assessment & Needs Analysis**

In Stage 1, prior to baseline assessment, a needs analysis will be completed to assess viability of delivering the ARiS intervention with intended recipients. Initial conversations with key personnel or a contact point within the sports team will be organised to assess suitability to the intervention. If issues are identified surrounding maladaptive attribution processes or negative reflections, then Baselines assessment will commence. Athletes will be required to complete the Causal Dimensional Scale II (CDS-II), a questionnaire to assess current attribution levels. Capturing the athlete's live attributions via Think Aloud or Video Recordings will also take place. These video recordings will also be part of an observation where the sport psychologist should record or note maladaptive examples within the team – these can be later used as anonymous vignettes in psychoeducation. This could also be done by working with the performance analysts to review recent performances which could identify instances of maladaptive attributions or behaviours. Participants who need assistance in completing the assessment can contact Tom Doncom (ARiS Researcher) for support.

## **Stage 2: Psychoeducation**

Psychoeducation will work across three main strands: in-class workshop, in-practice education, and education of external influences (i.e., the coach, the peer, the parent). ‘Cheat Sheets’ can also be found in the appendices providing an infographic for ‘the athlete’, ‘the coach/support staff’, and ‘the parent/carer’ on forming healthier attributions (See Appendix A, B, & C).

### **Stage 2a: The In-Class Workshop**

In the psychoeducation stage, athletes and coaches will participate in 1 x 60-minute workshop to educate them on how and why sport psychology impacts performance. The workshop will conclude with an exploration into what attributions are, how they work, and why they are important for future performance. This workshop will use excerpts collected in Stage 1 observation to increase relevance of the issue at hand via a vignette task discussed below. Athletes and coaches will also be required to complete group and individual tasks based on example attributions relevant to the specific sport of the population. These tasks may include dividing vignettes into adaptive or maladaptive examples and viewing videos relating to famous athletes attributing their success or failure before being required to divide the examples into adaptive or maladaptive. Competition and exercises to increase enjoyment in this session will be at the forefront of delivery.

### **Stage 2b: In-Practice Education**

An in-practice education will also be created to transfer classroom-based learning into the athlete's sporting environment. Working with the coach(es), this is likely to be built into existing training sessions organically, where identification of maladaptive attributions is emphasised and initial probes to reframe attributions is introduced. The contents of each session are likely to be unique to each group and may involve increasing the likelihood of failure which will supplement the generation of maladaptive attribution (e.g., only scoring with a weaker foot in a small-sided game of football). The job of the staff member in charge of implementing ARiS will be to highlight moments of failure where maladaptive attributions have or could occur based on the in-class education in Stage 2a. An example session could be a small-sided game where a member of each opposing team is paired up. If their partner scores, there may be a forfeit, which will in turn provoke failure related attributions for in-practice education to occur.

### **Stage 2c: Parent/Carer Discussion (If in Youth Sport)**

As a round table discussion, parents/carers will be invited to participate in education around attributions in their young athlete. The role of the parent/carers in, for instance, the pep talk in the car to matches, the car journey home, and the feedback from the side-lines will be covered in round table discussions. Further potential topic areas will be identified in the needs analysis of Stage 1 or informed by the coach/athletes themselves. The intervention lead will facilitate discussion whilst interspersing education around the differences between adaptive and maladaptive attributions, the influence of the parent on their young athlete, and top tips to enhance their young athletes' soon to be formed adaptive mindset.

### **Stage 3: Development of "ARiS Leadership Group"**

A leadership team consisting of coaches, athletes, and other external influences (i.e., members of the club hierarchy, parents, sport practitioners) will be invited to form an "ARiS Leadership Group". The ARiS Leadership group will take ownership over the implementation of this process throughout the club beyond the initial psycho-education sessions in Stage 2. The ARiS Leadership Group can be supported by cheat sheets received in Stage 2 and further information regarding support they can offer will be available on their responsibilities on a scenario-by-scenario basis. Members of the ARiS Leadership Group will be identified by collaborating with the coaching staff and athletes to identify key personnel. This may be done via a network analysis approach or by inviting relevant personnel to join. If no one steps forward, the coach may be asked to nominate an athlete representative to work alongside a nominated non-athlete member of staff.

Responsibilities of the Leadership Group include supporting athletes develop an adaptive attribution process, reporting issues with the ARiS Intervention to the Sport/Performance Psychologist (if available) and ensuring sustainability of adaptive thought process beyond the initial intervention. Time expected to be given for supporting the delivery of ARiS will likely vary on a scenario-by-scenario basis (No more than 2 hours).

It may be that one member of staff takes more responsibility for integrating or embedding of taught ARiS content, and others act as information sharers, but this will be distinguished by each team/club. Number of members will also vary depending on availability, suitability, and internal availability of potential ARiS Leadership Group representatives.

#### **Stage 4: Attribution Retraining**

The Attribution Retraining stage will be split into two parts: ARiS induction and ARiS consolidation. The purpose of Attribution Retraining is to increase functional attributions, creating a shift from maladaptive to adaptive attributions, which these two parts supports.

##### **Stage 4a: ARiS Induction**

Athletes will participate in 1 x 60-minute ARiS Induction workshop to educate them on the difference between adaptive attributions and maladaptive attributions in their sporting context. They will be provided with video examples of fellow athletes displaying adaptive and maladaptive attributions and the outcomes associated with each. All materials will be made available on demand to suit scenarios where classroom sessions are not available. This will act as a refresher/extension to psycho-education.

##### **Stage 4b: ARiS Consolidation – The flagging exercise**

Athletes will take part in a training session co-designed with the club's coaching team to increase the likelihood of failure. Failure is most likely to generate negative, uncontrollable, external attributions otherwise known as 'Maladaptive Attributions'. By increasing the likelihood of failure, athletes will have an opportunity to put into practice the taught content of ARiS Induction. The ARiS Leadership Group and coaching staff, alongside the sport psychologist, will ensure the group are "psychologically safe" to carry out this exercise: parents will also be consulted if in youth sport. This means that group dynamics may need to be assessed, and timing of the intervention considered depending on the atmosphere of the group. For example, identification of any potential conflicts should be noted prior to delivering a failure provoking task or task that require "calling out" peers mistakes. The session is recommended to be delivered in the presence of a sport psychologist for group safety.

##### ***Example Session:***

Athletes will be encouraged to identify peers who continue to make maladaptive attributions in a task labelled “No Mal Pal!”. The purpose is to identify live attributions for performance and identify the difference between maladaptive and adaptive attributions. The task “No Mal Pal!” is short for “No Maladaptive Attributions Pal”. This name is subject to change to suit the language and buy-in of the group, and is only used for example purposes in this protocol. If an athlete is caught attributing their failure maladaptively or in a situation which may potentially provoke a maladaptive attribution, then the team must shout “No Mal Pal”. Not only will this exercise include athletes supporting their peers, but there is also an opportunity where those identifying maladaptive attributions will also develop their own understanding of when these are likely to occur. Failure task will be organised between the coach and sport psychologist to ensure both are happy with the practicality of the task. For example, in soccer, a sport psychologist may advocate that in a small-sided game, one team can only score with their weaker foot whilst their opponents do not have the same restrictions.

**NOTE:** This is a separate in-practice session to that of 2b: In-Practice Education. This session will be focused on athlete involvement and flagging demonstrating and consolidating attribution retraining knowledge acquired from 4a: ARiS Induction.

### **Stage 5: Evaluation & Follow-Up**

Stage 5 will include an Evaluation process, recommended to take place three months after Stage 4 has concluded. After six months, a follow-up process can commence. Athletes will also be encouraged to keep reflective logs after a game or competition on their attributions. An example of this can be seen in Appendix D: Reflective Log for Attributions. Time frames provided below are recommendations and can be altered to suit groups accordingly.

#### **Stage 5a: Evaluation (3 months on)**

This stage will mirror the contents of Stage 1: Assessment and Needs Analysis. The CDS-II will be redistributed to assess pre- and post-intervention progress alongside the use of Think Aloud/Video Recordings to capture live attributions. These data will be used to assess the level of adaptive vs. maladaptive attributions present compared to pre psychoeducation and ARiS intervention stages.

#### **Stage 5b: Follow-Up (6 months on)**

In the follow-up stage, athletes will be required to complete the CDS-II for a third time. The ARiS Leadership Group will also be consulted on sustainability of the ARiS intervention and next steps will be developed on a case-by-case basis. Next steps may include revisiting Stage 2: Psychoeducation or Stage 3: ARiS Intervention depending on the level of maladaptive attributions present.

## **Appendices**

Please see ARiS **Appendix A, B, and C** for ‘Cheat Sheets’ to be handed out during Stage 2: Psychoeducation. Please also see ARiS **Appendix D** for a ‘Attribution Reflection Log’ example that athletes could use post-performance.

## 4 WAYS YOU CAN CREATE HEALTHIER ATTRIBUTIONS

01

### FOCUS ON ATTRIBUTIONS IN YOUR CONTROL



Remember, attributions that are in our control are easiest to change. When reflecting on your performance, think about your technique, effort, strategy - how could these change to enhance our future performances?

02

### FOCUS ON ATTRIBUTIONS SPECIFIC TO YOU



As well as attributions in our control, we know that focusing on attributions specific to you will also help future motivation. Avoid focusing attention on external factors, and focus on attributions that are controllable and specific to you!

03

### REDUCE ATTRIBUTIONS THAT ARE UNCONTROLLABLE



Uncontrollable attributions such as external influences (officials, spectators, opponents), weather conditions, and performance environment are all factors we cannot change for future performance improvements: so don't let your attributions focus on it!

04

### REDUCE ATTRIBUTIONS THAT ARE EXTERNAL



Often uncontrollable too, attributions that are external will effect all athletes performing in the given environment. For example, focusing on the weather conditions or task difficulty is something that effects all competitors, and cannot be changed by your attributions. Remember: internal and controllable attributions for the win!

## **4 WAYS YOU CAN SUPPORT CREATION OF HEALTHIER ATTRIBUTIONS**

**01**

### **FOCUS ON INTERNAL & CONTROLLABLE ATTRIBUTIONS**



Remember, attributions that are in our control are easiest to change. When supporting your son/daughter reflect on their performance, challenge them to think of attributions related to strategy, technique, or effort. These are factors in their control.

**02**

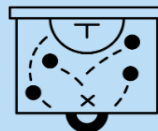
### **REDUCE EXTERNAL & UNCONTROLLABLE ATTRIBUTIONS**



Uncontrollable attributions such as external influences (officials, spectators, opponents), weather conditions, and performance environment are all factors your son/daughter cannot change for future performance improvements: so encourage them reduce attributions that focus on it!

**03**

### **THE POST PERFORMANCE REVIEW...**



It can be frustrating observing a performance from the side-lines, but remember what you say post performance can effect your athlete's attributions. If you can form healthier attributions to reflect on your athlete's performance, then it is likely they will generate healthier attributions too!

**04**

### **QUESTIONS ARE HEALTHY ... BUT NOT TOO MANY!**



Supporting your athlete(s) generate healthy attributions after performance can be important. The timing, the type, and the approach to questions requires consideration. The answer to those consideration are often unique to the individual. However, you can remember to focus on factors in their control and specific to the athlete's performance.

## 4 WAYS YOU CAN SUPPORT CREATION OF HEALTHIER ATTRIBUTIONS

01

### FOCUS ON INTERNAL & CONTROLLABLE ATTRIBUTIONS



Remember, attributions that are in our control are easiest to change. When supporting your son/daughter reflect on their performance, challenge them to think of attributions related to strategy, technique, or effort. These are factors in their control.

02

### REDUCE EXTERNAL & UNCONTROLLABLE ATTRIBUTIONS



Uncontrollable attributions such as external influences (officials, spectators, opponents), weather conditions, and performance environment are all factors your son/daughter cannot change for future performance improvements: so encourage them reduce attributions that focus on it!

03

### THE CAR JOURNEY HOME...



It can be frustrating observing the ones we love perform, but remember what you say on the journey home can influence future performance. If you can form healthier attributions to reflect on your son/daughter's performance, then it is likely they will generate healthier attributions too!

04

### QUESTIONS ARE HEALTHY ... BUT NOT TOO MANY!



Supporting your son/daughter generate attributions after performance can be important. The timing, the type, and the approach to questions requires consideration. The answer to those consideration are often unique to the individual. However, you can remember to focus on factors in their control and specific to their performance.

## ARiS Appendix D: Attribution Reflective Log Example

In a few words, describe your performance today:

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Are your performance explanations above maladaptive (negative), adaptive (positive), or both? (Circle answer below)

Maladaptive

Adaptive

Both

Explain why you have circled the answer above:

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If you circled *Maladaptive* or *Both*, how could you reframe these to become adaptive attributions? **HINT: Look back at your ARiS Cheat Sheets for support!**

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Have any of your social support provided feedback on your performance? If so what?

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If the above feedback was maladaptive, how could you reframe this feedback to improve your future performances via adaptive attributions?

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Your attribution reflection log is complete! You can repeat this log again if you have further attributions you wish to reframe. Alternatively, you can complete this again when you next perform.

Remember, attributions that are in your control and specific to you are more likely to generate positive performance outcomes in the future!

## **Chapter 6: Study 3**

### **Stage 3: Expert Stakeholder Approval**

## Introduction

Having collated initial ideas for protocol development in Chapter 4 and co-produced an initial ARiS protocol with an Intervention Development Group in Chapter 5, Chapter 6 concludes Hawkins et al (2017) three stages of intervention development co-production via Stakeholder Approval. Stage 2 of co-production in Chapter 5 provided refinement and adaptation to co-produce ARiS protocol v.3 (See previous section). Using both individual and collaborative forms of feedback, the six stakeholders provided 38 revisions over 2 iterative rounds of data collection. Revisions included aesthetic, content and terminology changes as well as additional integration support for future product users. In Chapter 6, use of expert opinion to finalise revisions to an ARiS intervention protocol will conclude co-production.

Co-production as a method generally requires stakeholders to be “experts in their own rights and capable of making decisions” (Realpe & Wallace, 2010, p. 8). However, Hawkins et al. (2017) recognises the need for Stage 3: Stakeholder Approval to be fulfilled by a higher level of expertise than what has previously been used thus far in intervention development. Rationale for this decision noted a higher level of expertise brings further experience and knowledge to critically examine intervention development thus far. For example, in Hawkins et al. (2017) research to co-produce a medical intervention, Stage 1: Stakeholder Consultation featured discussions with nurses and future product users, whereas Stage 3 recruited lead authors in the field of medical research, head of licensing companies, and lead trainers of future nursing staff. In the medical domain, this was deemed as an increase in level of expertise due to the positions held. These experts were used to create an evidence review panel whereby they were consulted on what has already been done as opposed to developing from a blank canvas. This hierarchical step-up creates an expert review panel who may have increased stature, decision-making abilities, and experiences they can call upon when providing feedback (Horgan et al., 2018). Conclusively, no guidance has been provided on how experts should be selected as part of Hawkins et al. (2017) guidelines in Stage 3, but it would appear from previous research that this should be based on expertise requirements within the domain in which ARiS will be delivered (Niedderer et al., 2020). For example, working in sport, relevant expertise assessments from research should be used to categorise potential participants accordingly (e.g., Coaching qualifications, playing level). As a result, this chapter should recruit expert opinion from all stakeholder groups used thus far in co-production using relevant research and domain criteria to measure expertise.

## Aims and Objectives

The purpose of Stage 3: Stakeholder Approval was to finalise co-production of the ARiS protocol ahead of piloting the output in Chapter 7. To achieve this, Chapter 6 had two main objectives –

1. To evaluate and refine the ARiS intervention protocol v.3 based on expert opinion
2. To co-produce an ARiS intervention pilot protocol based on expert opinion for future piloting of the intervention

## Method

### Participants

In Table 6.1, demographic information for each of the six expert stakeholders included in Stage 3 of co-production is provided.

**Table 6.1**

*Demographic Information for Stage 3 Expert Stakeholders*

| Stakeholder                           | Gender | Age   | Location | Additional Information                 |
|---------------------------------------|--------|-------|----------|----------------------------------------|
| Expert Athlete                        | Female | 26-34 | England  | International Gymnast                  |
| Expert Coach                          | Male   | 35-49 | England  | Professional Football Coach            |
| Expert National Sporting Organisation | Male   | 35-49 | England  | Physical Performance Director          |
| Expert Sport Practitioner             | Male   | 50-65 | Tenerife | Sport and Exercise Psychologist (HCPC) |
| Expert Attribution Theory Researcher  | Female | 35-49 | Canada   | Lecturer in Sport Psychology           |
| Expert Social Identity Researcher     | Male   | 35-49 | England  | Lecturer in Sport Psychology           |

Participants are referred to as stakeholders due to their role in this co-production study as a contributor to materials and a representative for an area of expertise of one of the six stakeholder groups (Parent, 2016). For the purpose of Stage 3, expert stakeholders were recruited to ensure a level of expertise and experience that was not necessarily required from stakeholders thus far in line with co-production Stage 3 guidelines for intervention

development (Hawkins et al., 2017). Distinctions between expertise levels of sport related stakeholders (athlete, coach, sport practitioner, and national sporting organisation representative) in Stage 1 and 2 compared to expert stakeholders in Stage 3 were made using the classification system of Swann et al. (2015). Using systematic review principles and assessing 91 relevant studies, Swann et al. concluded that there are four categories for expertise of an athlete: semi-elite, competitive-elite, successful-elite, and world-class elite. Semi-elite are athletes whose highest level is below the top standard possible in their sport (e.g., talent development programs). Competitive elite are athletes who regularly compete at the highest level of their sport (e.g., top league, or competing in the Olympic games) but have yet to have success at this level. Successful-elite athletes have competed at the highest level and have experienced some success at that standard. Finally, world-class elite athletes have experienced sustained success at the highest level over a prolonged period.

All representatives in Stage 1 and 2 were representative of semi-elite environments, where the athletes compete at the highest level below the top standard possible (International). Conversely, expert stakeholders in Stage 3 either represent or work with competitive-elite athletes, regularly competing at the highest level of their sport, or successful-elite athletes, who regularly compete at the highest level and have won competitions, medals or trophies. Distinctions between research stakeholders (social identity theory and attribution theory) in Stage 1 and 2 compared to expert stakeholders in Stage 3 were defined via relevance to future ARiS output and number of publications. For example, the expert attribution theory researcher stakeholder required 5 publications using attribution theory, of which 1 or more had to include attribution retraining, and include research in sport. Stakeholders in Stage 1 and 2 only required 1 publication in the respective research areas.

Expert stakeholders were recruited through purposive sampling via the research team's network (Campbell et al., 2020). Inclusion criteria for recruitment of expert stakeholders can be seen in Appendix B. A total of 6 expert stakeholders participated indicating their primary representation in one of the following areas: athlete ( $n = 1$ ), coach ( $n = 1$ ), sport practitioner ( $n = 1$ ), national sporting organisation representative ( $n = 1$ ), attribution theory researcher ( $n = 1$ ), or social identity theory researcher ( $n = 1$ ). All expert stakeholders were recruited based on the primary representation of one of the six stakeholder types. Expert coach had also experienced elite professional sport and consequently offered opinion from their time as an athlete.

## **Measures and Materials**

### ***Semi-Structured Interview Schedule***

Based upon stakeholder opinion on the pilot protocol developed over Stage 1 and 2 of co-production, a semi-structured interview schedule was developed. The interview was based upon Strengths, Weaknesses, Opportunities, and Threats (SWOT) principles to evaluate acceptability, feasibility, and quality of the proposed ARiS intervention (Ponsford et al., 2021). This method provided an evaluation of content delivered thus far as opposed to creation or refinement that was required in previous stages. Example questions included “What do you think the main strengths are of the ARiS pilot protocol?” and “What do you think the main weaknesses are of the ARiS pilot protocol?”. To capture future recommendations for developments, stakeholders were also asked “What do you think can be improved in the ARiS pilot protocol?” and “What do we need to consider when implementing the ARiS pilot protocol?”. Finally, stakeholders operating in applied sport were asked “If this was to arrive in front of you tomorrow, what would be your first questions or concerns with the current ARiS pilot protocol?”. This question was asked to anticipate any potential push back to implementation of the protocol from stakeholders familiar with applied sporting environments. Prompts and appropriate follow-ups were also used at the interviewer discretion if needed to encourage elaboration on interviewee responses where required.

### ***Qualitative Feedback Survey***

Due to a lack of availability, the interview schedule was provided in written format for the purpose of accessibility for the expert attribution theory researcher stakeholder. This adaptation was taken in line with co-production guidelines that encourage methodologies to adapt to suit recruitment of relevant stakeholders (Smith et al., 2022). Written responses provided were still analysed alongside semi-structured interview transcripts and an additional prompt for any further information was added to encourage elaboration where possible.

## **Procedure**

Upon receipt of ethical approval from General University Ethics Panel at the University of Stirling, recruitment of stakeholders began via email and social media. For any potential stakeholders that were interested, a consent form was forwarded along with an outline of expectations of participation in this research. This included a note on the requirement to meet Swann et al.’s (2015) criteria to be classified as an expert stakeholder in this research if in applied settings, or the required contributions to research if representing social identity theory or attribution theory stakeholder groups which required confirmation. Upon receipt of completed consent forms, semi-structured interviews were then organised at the stakeholder’s

earliest convenience. Five stakeholders completed semi-structured interviews lasting between 42 and 65 minutes. These interviews were conducted in-person or online via Microsoft Teams, depending on the preference and availability of the expert stakeholder. All interviews were audibly recorded using a mobile recording device and collected between July 2023 and October 2023. For the expert Attribution Theory stakeholder, a qualitative feedback survey was circulated upon confirmation that they were unable to participate in an interview due to personal circumstances. Upon completion, expert stakeholders were provided with debrief information and invited to stay in contact regarding development of the proposed ARiS intervention protocol.

### **Data Analysis**

Data from the audio recordings and qualitative survey were transcribed verbatim and analysed using thematic analysis. Specifically, to analyse the transcripts, the lead researcher, alongside co-authors, conducted an iterative approach to reflexive thematic analysis (Braun & Clarke, 2021). Reflexive thematic analysis occurs over six steps: (i) familiarisation with the data, (ii) generating initial codes, (iii) searching for themes, (iv) reviewing themes, (v) defining and naming themes, and (vi) producing the report.

Similarly to Stage 1b, the lead author conducted a line-by-line, verbatim analysis of each interview transcript to generate initial codes. These codes were then organised in relation to the study's research aims and questions. From this process, four overarching themes were developed, based on the grouping of codes across all six transcripts. After completing the initial coding, the lead author revisited the initial transcripts to ensure no relevant codes had been overlooked. Once the preliminary themes were established, the supervisory team again reviewed the associated quotations to confirm alignment with the study's aims and objectives. At this stage, the themes were refined, clearly defined, and named in preparation for the results section.

### **Findings**

Expert stakeholder responses were thematically analysed generating 4 themes: Enhancing Use of Lay Language in the ARiS Intervention Protocol, Creating Applied Tasks within the ARiS Intervention Protocol, Content Reduction to Avoid Learning Fatigue through ARiS, and A Focus on Controllability to Support Justification of an ARiS Intervention Protocol.

#### **Enhancing Use of Lay Language in the ARiS Intervention Protocol**

At the core of suggested alterations was the focus on the ARiS intervention recipients understanding of attributions, and the need, therefore, to create a layperson's version of the

ARiS intervention protocol. Feedback from different expert stakeholders has highlighted the necessity of ARiS being created in lay terms –

...you could have two versions. One is you could have an academic proposal like you are doing here. The reality is you are communicating with lay people. [...] you know take out the psychological concepts, if you can use colloquial terms, can use everyday language in a sense of well, that is suitable for the recipients you know, because sometimes the sort of academic language can scare people off or frighten them or dissuade them from engaging. (Expert Sport Practitioner)

An adapted ARiS protocol to suit a lay persons understanding may include key terms being defined prior to delivery of the intervention, or use of simple terms to ensure consistent understanding. For example, the term ‘attributions’ may be replaced by ‘explanations’ or ‘causes’ to simplify terminology for the lay audience. Providing the translation of an ARiS intervention from paper to delivery is the same, this language could be adapted to suit groups from different sporting backgrounds –

In some places you use language more geared for athletes who are new to the content (e.g., “explanations” or “causes” of outcomes instead of outright saying “attributions”). I would encourage more of this so your athletes can really grasp that you are talking about the reasons or explanations they make for event/outcomes and not get lost in what an “attribution” is. (Expert Attribution Theory Researcher)

### **Content Adaptation Towards an Applied ARiS Intervention**

To further address issues translating research into applied sporting contexts, specific adaptations were also recommended regarding the consumption of the ARiS intervention materials to suit differing athletic populations. As part of ARiS, Think Aloud has been suggested to capture live attributions with success across a variety of indoor (Lee et al., 2019; Welsh et al., 2018) and outdoor sports (Birch et al., 2022; Elliott et al., 2020; McGreary et al., 2020; Whitehead & Jackman, 2021). However, ARiS protocol v.3 has not considered sports where physical demands may mean athletes are unable to ‘Think Aloud’ whilst performing –

...the thinking aloud thing. I do not know how it works. We obviously could not have microphones attached to us because if we fall that would be dangerous for us. So, I just

do not know how. We would not be able to speak as we are doing skills or straight away after because of the like situation (Expert Athlete).

The physical challenges associated with thinking aloud, as well as the potential issues of having a microphone attached, may pose barriers to data collection in future iterations of the ARiS protocol. Alternative methods to the Think Aloud technique could include more traditional observational approaches, such as video analysis or post-performance debriefs. These alternatives may provide valuable insights while avoiding the limitations of the Think Aloud method.

Intake and understanding of materials with minimal time or athlete effort would also appear key to successful implementation. Reduction in information consumed may lead to more effective outcomes, particularly when it comes to visual aids or cheat sheets developed in Stage 2 with the intervention development group: “You would not have time to read the paragraphs. So, I think it would be just the main, the pictures and the bold stuff,” (Expert Athlete). This was also acknowledged by Expert Attribution Theory Researcher who stated –

I like that there are different ways of teaching the content that may be amenable to different learners (e.g., in classroom setting, in practice setting, through a trusted mentor, and in a real-life example session). The cheat sheets are a great take-away too to help consolidate the main message.

Varying the way information is delivered could also be effective in sporting environments. Moving away from reading documents and towards shorter videos or voice notes may provide another effective way to communicate with some athletes and coaches –

...most people don't even read things now. So, you might think about, well, actually I might do a 2-minute video explaining it that you can send to people's phones rather than having to a worksheet, you know again, so it is modes. (Expert Sport Practitioner)

### **Content reduction to avoid learning fatigue through ARiS**

ARiS protocol v.3 includes delivery via 5 stages over 6 weeks with a follow up assessment period at a time relevant to each recipient group. Content across those 6 weeks includes observations, questionnaires, in-class education, in-practice education, social identity mapping (SIM), flagging exercises, and evaluations. As a result, concerns were raised around

the amount of content being delivered and the impact this has on both delivering and receiving the intervention. The removal of SIM was suggested to ensure content is appropriate for athletic populations and concurrently reducing likelihood of learning fatigue amongst athletes –

If it were me, I think I wouldn't bother (with SIM) because that is another thing you would have to introduce. I mean, I have only seen it, you know, when you can use that online stuff and that is quite complex [...] Personally, I would not get bogged down. I think, I think that's adding way too much to an Attribution Retraining intervention. (Expert Social Identity Researcher)

ARiS can be adapted for athletes who may consider learning fatigue over the course of a 6-week period if content is highly concentrated. Following the reduction in content recommendations, working with adolescent athletes is likely to require less content and shorter delivery times to ensure information is obtained by participants (Earl et al., 2023) –

If it is highly concentrated in a short amount of time, particularly for younger participants, I worry about fatigue and consequently reacting to negative effects. I would just be careful about timing and keeping things as concise as possible, without losing the value of the lesson if that can be achieved. (Expert Attribution Theory Researcher)

A caveat to the reduction of taught content could be to provide additional materials for those interested. This would then provide an ARiS protocol with reduced content as per previous suggestion, with the opportunity to extend knowledge in attributions upon request. For example, if an athlete, coach, or parent wishes to engage in further reading around the foundations of ARiS then this information could be provided as supplementary material –

...so maybe even like links like to further reading, like they (parents) are probably not bored up there, but they probably read anything that they can. Anything they can help their kids, they would probably be interested in reading and doing. (Expert Athlete)

### **A Focus on Controllability to Support Justification of an ARiS Intervention Protocol**

Expert stakeholders across all disciplines provided feedback on the main aims and outcomes of an ARiS intervention. A common theme of translating attribution theory into the

domain of sport via intervention research was the idea of harnessing Weiner's concept of controllability within attributions (Parker et al., 2018). The expert Social Identity Researcher highlighted that ARiS aims should focus athletes on "Just going to control the controllables and all that stuff. That's easier said than done". The focus on controllability continues with Expert Attribution Theory Researcher "I think focus should definitely be on the controllable" and translated into sport by Expert NSO Representative highlighting "riders can easily look at and get confused between controllable and uncontrollable. [...] I think it is more to do with acceptance that you can control some things you cannot control those". Previously within ARiS protocol development, there was no focus specifically on any of Weiner's theoretical subdimensions of attributions. In Stage 3, controllability was recognised as the most prominent dimension of attribution theory in applied settings by the expert AT researcher. However, this was equally identified by those with little to no experience of attribution literature, suggesting controllability would appear to be most common in translation to lay contexts.

In relation to evaluation and outcomes, the opportunity to develop a healthier mindset for performance was at the forefront of justifications for use of ARiS in sport: "(ARiS) is creating a mindset where this is purely about opportunity to learn. Opportunity to grow. Opportunity to gain more experience. Opportunity to get better and put things in place" (Expert NSO representative).

Despite aiming to generate alterations and adaptations to ARiS, Stage 3 of co-production also sought to retrieve subjective approval and justification for developments from experts in applied and research domains. This moves the research from development and refinement to evaluation in line with thesis aims. Expert stakeholders acknowledged the importance of psychology and psychologists being accepted by an individual or group before implementation of an intervention like ARiS in applied settings –

I think they I think they probably need to see the face around the training ground around the ground a little bit before they actually would open up to (ARiS) [...] (athletes) were afraid to open up and afraid to be vulnerable and to sort of show their hand, if you like, because they do not want to be tripped up and have it used against them. (Expert Coach)

Expert stakeholders were also quick to praise the social context in which ARiS aims to intervene by educating more than just the athlete. Both research (Allen et al., 2012) and stakeholder responses so far in the PhD thesis have highlighted the need to explore

psychoeducation that involves the support network of the athlete. Expert Attribution Theory Researcher summarised ARiS by stating “it is very comprehensive and incorporates cognitive, behavioural, social, and contextual aspects that make it really well-rounded (as an intervention). I think this may help for the uptake of the lessons”. Expert Athlete also noted the importance of coach involvement during education –

I think it's great that the coach is being involved in the education and not just the athlete because a lot of the time the coach doesn't know what's going on, doesn't know what the athletes been told, and then you get the conflict in training.

Finally, in line with the role of others to support an athlete’s attributions, a focus on the role of a leadership group were discussed to engineer a sustainable implementation of the ARiS intervention –

I think you want a, probably want a broader horizon on who you have in that group. So, it should just be probably a leadership group, not a senior leadership group, because you want the thoughts and feelings of sort of the balance of the group. (Expert Coach)

Conversely, it can also be noted that certain group dynamics may restrict athletes and coaches to express vulnerabilities. An alternative to this may be taking an individual approach, where delivery of ARiS can educate both athlete and their support network separately before bringing them together to conclude: “it would be better doing players and staff in different groups and getting them to an understanding before you bring them together” (Expert Coach). Expert Athlete progressed this notion one step further by discussing how other athlete’s knowing your weakness may be a hinderance in other circumstances - “but you almost don't want your team mates to know your weaknesses, that might not be the most comfortable thing to do in front of your team”. However, being aware of your own and other’s weaknesses may present opportunities to improve your own performance by focusing on

Upon conclusion of analysis, 10 alterations were made in relation to content, design, and implementation (See a summary below in Table 6.1).

### **Table 6.1**

*List of revisions from expert stakeholders to ARiS protocol v.3*

- 
1. Stage 1: Suggestions for use of video analysis where Think Aloud is not physically possible during performance. This could be reflecting with the athlete on their video footage of their performance with them still using Think Aloud techniques.
  2. A note has been added that delivery of ARiS should be considered for implementation during off-season.
  3. Cheat sheets have had information reduced to summarise short points and relevant pictures where information can be obtained quickly.
  4. A note has been added to state additional reading is available should participants or their support network be interested. This includes previous research studies that have used Attribution Retraining in Sport, as well as recommended readings surrounding theoretical underpinning.
  5. Stage 2: Psychoeducation may consider alternatives examples of attributions in sport (e.g., athletes own lived experiences or made-up vignettes) as opposed to currently presenting famous professional athlete examples as some athletes may not relate.
  6. A note has been added to consider attributions as “explanations” or “causes” as much as possible to support readability for lay audience members.
  7. Stage 3: Removal of Social Identity Mapping as a requirement. This is still an optional activity should the intervention delivery team have the resources to deliver.
  8. Audio recording across all stages of the intervention is encouraged to capture live attributions for performance. This may provide vignettes for stages relating to education that are relatable for athletes to understand in their own sporting context.
  9. Reduction in the use of ‘failure’ to prevent repetition of this word has been considered.
  10. Simplified bullet points in the ARiS protocol itself have been introduced to enhance readability.
- 

## **Discussion**

Chapter 6 provides the opinions of expert stakeholders on the co-produced ARiS protocol developed throughout this PhD. After stakeholder’s qualitative feedback, a further 10 revisions were made to conclude co-production: in turn creating a final ARiS intervention protocol ahead of piloting in Chapter 7. Using a reflexive thematic analysis, four themes were concluded informing suggested changes and comments for future ARiS delivery to address aims of the research: Enhancing Use of Lay Language in the ARiS Intervention Protocol, Creating Applied Tasks within ARiS Intervention Protocol, Content Reduction to Avoid Learning Fatigue through ARiS, and A Focus on Controllability to Support Justification of an ARiS Intervention Protocol.

Acknowledging use of lay terms and reduction of academic language, expert stakeholders highlighted the need to break down complex terminology if ARiS is to be successfully implemented. This aims to improve the appeal, as ensuring that sport psychology

interventions resonate with a lay audience has been a frequent topic of discussion in research (Halliwell, 1990; Smith & Sparkes, 2009). Reduction in academic language was highlighted by Martindale and Nash (2013) who used perceptions of UK coaches on sport science interventions to recommend that all future interventions in applied sport should consider presenting a version of the protocol in lay terms. There are two possible ways to enhance lay audience understanding of an ARiS protocol: (1) create a lay summary to appeal to the athletes' and their support network who can support future ARiS delivery, and (2) adapt the language of ARiS to ensure content and intended outcomes are understood. To address (1), a recent move from published research is to present a lay summary as an abstract for the intended audience (Bell et al., 2022; Thrower et al., 2024). Within the ARiS protocol in this thesis, a definition of key terms is provided on the opening page of the intervention to clarify key terms for the lay audience. Although this may appeal to those working in applied settings, this does not necessarily address (2) in adapting language of intervention delivery. Stakeholders considered attributions to be better suited for a lay audience as "explanations" or "causes" to avoid "scaring off" participants with academic language. Cropley et al.'s (2020) study on sport practitioners noted how intervention deliverers should consider the understanding of participants when creating content. In line with suggestions, the involvement of experts to evaluate and make refinements to the co-produced ARiS protocol ahead of future piloting was essential. As a result, a future ARiS protocol should consider either a lay summary, a breakdown of key terms, or two separate versions to operate within academic and applied settings appropriately.

Concluding the theme of refinement in line with thesis and chapter aims, expert stakeholders recommended revisions to adapt tasks within the ARiS protocol. Think Aloud provides an opportunity to capture live attributions for performance (Ericsson, 1993). Although this can provide insight into the explanations of athletes during performance, Think Aloud may not be possible depending on the sport or performance type in question due to the demand of verbalising cognitions whilst completing physically demanding tasks. For example, completing a tumble in gymnastics would not allow for the athlete to verbalise their cognitions during performance. As a result, more traditional alternatives to capture live performance feedback could be used. Video recordings have been overlooked in recent sport psychology delivery, and still remain a prudent data collection technique for both practitioner and participants to assess athlete behaviours (Holder & Winter, 2017; Law et al., 2018). Although this would not necessarily focus on an individual, nor be as consistent as Think Aloud in picking up every verbalisation, it does provide an alternative form of capturing attributions during performance.

Video footage would require accompanying audio but does present a less invasive method of capturing live attributions for performance without athletes needing to wear microphones. Otherwise, attributions can still be collected via traditional post-performance methods, such as recorded interviews (Erten, 2015), diaries (Michońska-Stadnik, 2012) or quantitative questionnaires (Parker et al., 2021). However post-performance attribution collection may be influenced by social desirability where athletes have time to answer with what they perceive to be the right attributions (e.g., everyone else blames the conditions so I am going to).

Expert stakeholders also considered what elements of the ARiS intervention protocol they deemed essential should reduction in time to deliver the intervention be needed. Reduction in time during intervention delivery is one of the frequent challenges faced when working in applied settings (Britton et al., 2024). As part of this, removal of some additional tasks was recommended to prevent intervention effects, to enhance adaptive attributions, from becoming diluted. Reduction in content can provide a solution to reduce eventual time consumption of intervention delivery and likelihood of learning fatigue amongst ARiS recipients. In ARiS protocol v.3, social identity mapping was included to support creation of an ARiS leadership group. However, given comments on using lay appropriate terms and tasks, as well as ensuring appropriateness to applied settings, removal of this task and instead allowing participants to populate the leadership group independently (e.g., without a formal task or intervention to create the group) simplifies this step in the intervention. Social identity mapping has been used in applied sport psychology delivery previously could support future research exploration of the role of social identity and attributions, (Coffee et al., 2020). However, for the purpose of retraining attributions to become more adaptive, social identity mapping is not essential. Removal of social identity mapping and reduction in additional tasks has aided creation of a streamline approach to support the delivery of ARiS across applied settings without impacting the outcome to improve generation of adaptive attributions.

Clarification on the aims associated with ARiS were clear from expert stakeholders in both research and applied settings: controllability is understandable and effective. Initial research evidence in this area identified controllability as the domain of attribution theory that positively predicts performance (Green-Emrich & Altmaier, 1991). Simply put, if an explanation or cause is positive, and deemed controllable, then an athlete can attempt to repeat similar outcomes as it is in their own control (e.g., effort to achieve a personal best). If an explanation or cause is negative, but still deemed controllable, then an athlete can enact change to prevent a negative outcome in the future (Murray et al., 2021). For instance, if an athlete uses the wrong technique during a golf swing, they can correct it with their next swing. An

absence of controllability in an athlete's attributions for performance likely means a focus on uncontrollable explanations: already highlighted to be negative for future motivation (Weiner, 1985). Attribution retraining research in performance settings has continued to focus on controllability as the gold standard to measure attributions on (Perry et al., 2010). Aligning expert stakeholder opinions with previous research in attribution theory, an ARiS protocol enhances understanding of controllable attributions for performance. Consideration for locus of causality (e.g., whether the explanation for performance is specific to the individual or effects multiple people) will still be present in line with previous research identified in Stage 1b, although ARiS will be both motivational and control enhancing to appeal to the interest of lay audience readers.

Delivery of ARiS with or without the presence of an athlete's significant others continue to be a discussion point. Expert stakeholders praised the novelty of educating both athlete and their significant others, however, caution was noted on whether this would be appropriate with all groups. Psychological safety refers to the perception that one is protected from, or unlikely to be at risk of, psychological harm in sport (Vella et al., 2022). Increasing in prominence, psychological safety has been highlighted as a mechanism to improve mental health and performance in sport (Henriksen et al., 2020). Recent systematic review findings have recommended psychological safety is considered throughout sport and exercise psychology interventions (Vella et al., 2022). Psychological safety should be considered by the intervention delivery team prior to any intervention taking place (Edmondson, 1999). This may include observations of team dynamics, assessment of relationships (e.g., athlete to athlete, coach to athlete) and clarity of psychological support avenues in the absence of a sport and exercise psychologist. Consequently, it can be deduced if the group is deemed psychologically safe, then ARiS can proceed to consider educating athletes and their significant others in unison should it be feasible and desired by the recipient population. However, if the group is not deemed psychologically safe, then the intervention delivery team should consider first educating both parties (athlete and their significant others) independently, as opposed to only educating athletes. The latter would still allow for the intervention to be delivered and both athlete and coach receiving education on the importance of how we explain performances for sustained motivation in the future. Educating both parties is a unique strand of a successful ARiS intervention which has been underpinned by theory and expert stakeholder opinion.

### **Strengths, Limitations and Future Research**

A key strength of the work in this chapter is the completion of a co-production intervention development cycle, which supports the creation of a robust ARiS intervention protocol.

Aligning with Hawkins et al. (2017) guidelines provided theoretical underpinning to support the development of the intervention. This was also complimented by use of an integrated knowledge translation approach to co-production. IKt is particularly apparent in Stage 3 of this approach, where experts can offer their extensive expertise in their relevant fields to review development thus far and provide recommendations for improvement.

A second strength of this chapter is recognised through the methodological flexibility of co-production methods to enhance stakeholder engagement and recruitment in collaborative research (Smith et al., 2022). Some methodological underpinnings may restrict authors to only use the same data collection method across all participants in qualitative research to ensure equitability. For example, if a participant is unable to complete a semi-structured interview due to events beyond their control, then traditionally their future participation would be lost. However, co-production offers a flexibility to encourage recruitment of stakeholders beyond methodological barriers faced by traditional one-dimensional qualitative research. In the current study, by offering the interview questions in written format, expert AT Researcher was able to participate in Stage 3 and provide insightful expertise for the ARiS intervention development. As a result, this research was able to work with experts that may otherwise have been unreachable – enhancing the expertise level of stakeholders overall. Ultimately, restrictions such as locations, time difference, connectivity issues and more can all be addressed by flexibility in the approaches deployed.

This chapter presented has some limitations to consider. Firstly, one expert per stakeholder group was interviewed, and consequently the results may not be representative of the stakeholder group collectively. However, the aim of Stage 3 of co-production was to culminate the process of revisions to the ARiS intervention protocol developed thus far using expertise of stakeholders as opposed to creating generalisable opinions until saturation. Findings and outputs of Stage 3 are still appropriate to stakeholder groups represented in co-production throughout the theses where multiple individuals have contributed to the research. This includes the differing perspectives of experts in Chapter 6 alongside participants in co-production who have provided representation of stakeholder groups in Chapters 4 and 5.

A second limitation of the research is that recruitment of stakeholders was via the lead researchers' network of contacts. Although transparency in recruitment and purpose of research was presented, a risk of bias was prominent given the pre-existing relationships with some of the interviewees. For example, one of the participants had a present awareness of the ongoing development of the ARiS through attendance at a conference presentation delivered by the lead researcher. However, the research process for recruitment of stakeholders, eligibility, delivery

of data collection interviews, and analysis was consistent across all six expert stakeholders recruited and risk of coercion reduced.

For the purpose of the thesis, future research could firstly gather insight into the practical delivery of the ARiS intervention protocol and whether it successfully improves formation of adaptive attributions. Other considerations may include subjective or objective performance, social support, and mental well-being in line with previous AR research findings noted in Chapter 4. Measuring these may enhance application of ARiS across different teams and populations further extending effectiveness to bridge the knowledge-do gap in applied sport settings (Smith et al., 2021). As a pilot intervention study, data should also be collected on acceptability and adherence from participants in line with alternative intervention development guidelines (Skivington et al., 2021). This approach will further develop ecological validity by assessing participant experience of the intervention which can inform final revisions to the ARiS protocol.

To pilot an intervention, a case-study approach can offer personable experience and feedback that may be most appropriate for the intended audience in receipt of the intervention. In line with intentions to both pilot the ARiS intervention and assess acceptability from perspectives of future users, use of a case-study approach would directly offer individualised experience, further contributing to intervention development by collecting different perspectives. A case study approach can continue thesis aims with in-depth exploration into the effectiveness of ARiS within a team environment aiming to bridge the knowledge-do gap between research and applied sport settings. Although acceptability and adherence will be important to complete co-production, a case study approach can provide contextual relevance to ARiS in applied sport as opposed to seeking statistical rigour through alternative methods (e.g., a randomised control trial).

## **Conclusion**

Chapter 6 provided the final opportunity for refinement via co-production as expert stakeholders moved towards evaluation and approval in line with thesis aims. 10 refinements were made because of expert stakeholder opinion leading to a proposed ARiS intervention focusing on enhancing controllability and performance. To ensure sustainability of these intervention outcomes, the role of the support network in sustaining adaptive attributions in practice will be fundamental to the success of future AR interventions in sport. Therefore, ARiS will educate both the athlete and their support network in unison where possible and alternatively educate both parties independently if collaboration is not psychologically safe to proceed.



## **Chapter 7: Study 4**

### **Attributional Retraining in Sport: A Case Study Approach Piloting a Novel, Co-produced Intervention**

## **Introduction**

Chapter 4, 5, and 6 presented the development and refinement of an ARiS intervention protocol. Across three studies, three versions of the ARiS intervention were developed and 48 total revisions made prior to the creation of an ARiS intervention protocol. In line with the thesis aims, the final steps for ARiS protocol development are to pilot and evaluate the effectiveness of the intervention within the domain of sport.

Whilst summarising attribution theory literature in sport within Chapter 2 and Chapter 4, key links between the formation of attributions and the influence of significant others were noted (Allen et al., 2012; Coffee et al., 2021). Previously, presence of the athlete's support network has been demonstrated to enhance generation of adaptive attributions in sport previously (Rees et al., 2005). In relation to the co-produced ARiS intervention protocol, the athlete's significant others will be encouraged to attend and engage with ARiS psychoeducation sessions in Stage 2 and 4 if psychologically safe and feasible to deliver (Allen et al., 2012). In delivery with adolescence, the co-produced ARiS intervention protocol provides a round table discussion of attributions for parents, guardians and trusted adults to attend. As a result, an assessment of significant others in relation to ARiS intervention delivery would be appropriate for all populations who receive ARiS. Specifically, as the athletes will be the participants completing questionnaires, a measure of received social support (Steffens et al., 2016) will assess athletes' perceptions of their support network's involvement pre and post ARiS intervention. Results can assess whether the co-produced ARiS intervention enhances received social support amongst athletes as this has also been noted to improve athletes' performance (Arnold et al., 2018) and well-being (Katagami & Tsuchiya, 2017).

In Chapter 4, a systematic scoping review highlighted how measuring performance has long been the gold standard for evaluating attribution retraining interventions (Perry et al., 2014). Whether that is improving academic performance via in-class tests (Hamm et al., 2014; Parker et al., 2016; Parker et al., 2018; Sukariyah & Assaad, 2015; Van Yperen et al., 2019), or observing physical performance changes during novice sport tasks (Rasclé et al., 2019; Rasclé et al., 2008; Simonton & Garn, 2020), attribution retraining research has almost always measured performance using objective markers. However, given the range of objective markers that can be assessed in team invasion sports (e.g., goals, saves, tackles, assists), the challenge of consistently combining these markers across all participants and time points can lead to potential inconsistencies. For example, clearly defining the difference between a tackle and an interception may present subjective opinion whereby statistics are no longer comparable. Objective markers also fail to account for context or situational factors (e.g., quality of

opposition, weather conditions) and are often restricted to exploring either individual or team performance as opposed to both concurrently. As the aim of ARiS is to enhance adaptive attributions such as effort and task execution, it would also not align to form objective measures for performance whereby some attributions cannot be objectively measured. Instead, subjective performance is a consistent measurement format for rating self-referenced performance (Totterdell, 2000). The present study will also aim to assess athletes during non-competitive periods where objective performance markers are not available (e.g., training sessions). As a result, subjective performance provides an appropriate assessment for players to complete reflectively when required (Schweickle et al., 2023).

Finally, research presented in Chapter 2 highlighted how attribution retraining interventions have been prominent in improving psychological well-being in performance and achievement settings (McLoughlin, 2024). Parker et al. (2022) enhanced perceived control, a key subdimension of attribution theory, through attribution retraining to improve psychological well-being associated with physical inactivity. Findings concluded that attribution retraining could be a valuable tool to improve well-being relating to mental health via enhanced controllability. This enhancement in controllability through attribution retraining stems from the research of Infurna et al. (2013) who highlighted that controllability is tied into psychological and affective health by improving a person's cognitive ownership over different situations. Therefore, it would be pertinent to explore whether delivery of the co-produced ARiS intervention enhances psychological well-being amongst athletes.

### **Aims and Objectives**

The main aim of this pilot study in Chapter 7 is to assess the impact of a five stage ARiS intervention pilot protocol on enhancing adaptive attributions. Within this study, secondary outcomes (received social support, subjective performance and psychological well-being) will also be assessed in relation to broader attribution theory. All data collection for primary and secondary objectives will be conducted at baseline (T1) and post-intervention (T2). As a result, two hypotheses were created –

H1: ARiS will positively increase adaptive attributions, specifically the sub-tenets of controllability.

H2: ARiS will positively increase received social support, mental well-being, and subjective performance.

In relation to the broader PhD aims, this pilot study also aimed to assess effectiveness of the proposed ARiS protocol by measuring acceptability and athlete adherence. This aligns with previous co-produced intervention protocol research (Matheson et al., 2023) and provides an evaluation of the co-produced ARiS intervention developed within the PhD thesis.

## **Method**

### **Design**

Use of an case study design has increased in popularity as a viable, accountable method to assess and evaluate intervention delivery effectiveness (Barker et al., 2020). In this study, an exploratory case study design was used to explore the effectiveness of a new co-produced ARiS intervention. This case study type is often conducted at the beginning stages of a larger research project when a researcher seeks to develop hypotheses or gain preliminary insights into a phenomenon or concept (e.g., piloting ARiS: Yin, 2018). Alternative options to pilot ARiS were explored, such as traditional randomised control style designs, but it was deemed inappropriate in relation to the broader aims of the thesis whereby individual experience and opinion had been emphasised throughout.

One of the primary criticisms of case study research broadly is that research of this type often cannot establish clear cause-and-effect relationships due to the lack of control over variables and the focus on specific, unique cases. In contrast to large-scale experimental studies, traditional case studies typically provide a more observational or descriptive approach: relevant for thesis aims and development of ARiS. Although questioned on assessment of causality and issues with research design, case-study approaches have aided intervention development through experimental designs (Harwood & Steptoe, 2013). For example, systematic repeated measurements over time with a single group and the inclusion of experimental controls as baseline measurements present methodological rigour often required in research.

This study will also work with a single sports team represented as a single-case experimental design which provide a viable means of maintaining scientific rigour in applied settings whilst assessing intervention effects with individuals and groups (Barker et al., 2020). Single-case experimental designs allow for exploration of research amongst small populations (e.g., sports teams) to understand different perspectives on a small scale whilst still maintaining methodological rigor. Further meta-analytical evidence for single-case experimental designs noted the method as appropriate to detect meaningful outcomes, and “assist in refinement of intervention protocols” (Barker et al., 2011; Barker et al., 2020, p. 9). As a result, application

of an exploratory case study design provided an appropriate method to evaluate the effectiveness of ARiS within applied sport settings via a university futsal team.

The university futsal team were made up of 10 players and 4 coaching staff. Players were all full-time undergraduate students at the university with a range of futsal experience from 6 months to 8 years. The coaching team were made up of a lead coach, and three assistant coaches who were also all undergraduate students at the university, with experience of futsal ranging from 6 months to 10 years. The team played in the British University College Sport (BUCS) premier division for futsal and competed in the BUCS national futsal league cup. The team trained twice on-court each week, with two 30-minute classroom sessions based on analysis and psychology preceding each training session. The team played their matchday fixtures on Wednesday, with occasional fixtures on Sunday.

### **Researcher Reflexivity**

Underpinned by a single-case experimental design allowed the lead researcher to immerse themselves into the environment as an addition to the futsal coaching team as opposed to a researcher on the outside. As the lead researcher has an extensive background in playing futsal and holds a Level 1 qualification in coaching futsal, integration into the set up was completed as a support staff member to the lead coach. This meant attending training sessions and matchdays to carry out observations from courtside alongside the coaching team. Therefore, the lead researcher fulfilled multiple roles to aid intervention integration: neophyte practitioner, support coach, and PhD researcher. The purpose of the lead researcher integrating into the team was made clear to all players and coaching staff: to pilot the ARiS intervention for the purpose of future research. The integration of the research into a pre-existing system, scenario, or schedule recognises the pragmatic philosophy adopted by the lead researcher whereby the most appropriate delivery method for ARiS intervention content was selected. For example, education sessions were delivered in 30 minutes due to room bookings, training schedules and player availability to enhance overall attendance.

Having knowledge and a combination of different roles during intervention delivery allowed the researcher to better establish an understanding of athlete needs and therefore adapt content or style of ARiS delivery to suit. For example, engaging with athletes demonstrating my playing background in futsal presented a dual-pronged approach for my value from an athlete perspective. This is reflected in Otte et al.'s (2020) research, who highlighted that members of the coaching team are best placed to support or deliver psychological interventions. Coaches involvement has also been demonstrated to effect integration within university sports teams (Sánchez, 2020). This may be due to the rapport already built with athletes – particularly

in university sports teams where Sanchez highlights that coaches are frequently students within the university themselves. There was careful consideration about issues of bias during ARiS delivery if I became too involved beyond the needs of the research. For example, would athletes feel obliged to say certain responses if they felt I influenced team selection for the next fixture. As a result, my position was distinguished clearly: I was a researcher piloting a psychological intervention, with a background in playing and coaching futsal, who could redirect athletes to, psychological support as a neophyte practitioner. No issues were raised during intervention delivery or within acceptability and adherence questionnaires to note an issue with the fulfilment of the above.

## **Measures and Materials**

### ***Observations***

The use of observation is recognised as a useful technique to assist in gaining performance-related information for future improvement (e.g., re-watching training footage to improve future technique; Tod, 2022). Using video observations, athlete behaviour associated with attributions can be assessed during performance. For example, negative body language in response to an attribution out of an athlete's control (e.g., an incorrect refereeing decision). Use of a permanently fitted 4K PTZ IP Camera from Analysis Pro provided full court visual access for future observation via video recordings. Video recordings were then analysed and aligned with Think Aloud audio recordings to observe initial behaviours associated with attributions for performance. This was conducted during Stage 1: needs analysis and observation, and Stage 4: attribution consolidation to capture changes in physical response that may display behaviours exemplifying change in attributions. Limitations of observations have been raised due to the inability to capture invisible factors such as cognition or intention (Holder & Winter, 2017). However, video observations were used to complement Think Aloud recordings in turn overcoming the limitation presented.

### ***Think Aloud***

Ericsson and Simon's (1993) Think Aloud (TA) framework allows athletes to verbalise their cognitions during performance. TA has also been used in previous AR intervention delivery successfully depicting an improvement in adaptive attributions (Moffat et al., 2021). Employment of TA also provides a unique opportunity to capture live attributions during sport performance as opposed to traditionally where attributions are assessed retrospectively post-performance. TA is presented with three levels: Level 1: verbalisation, Level 2: vocalisation of thoughts, and Level 3: vocalisation of thoughts with explanation. Within this study, TA Level 2 was deemed most appropriate to assess attributions as verbalisation of text (Level 1) would

not provide insight into athlete's attributions and vocalisation of thoughts with explanation would place too much demand on the athlete during sporting competition. To train athletes on how to Think Aloud, athletes undertook a brief cognitive task (Can you name 10 players from your favourite football team and explain your thought process out loud?) to prepare them for verbalising their cognitions in line with guidance from previous research. During this training process, athletes were reminded to verbalise their thoughts alongside their responses to the question. For example, "can you talk me through how you are going from one answer to another?". Once athletes were comfortable with the process of Think Aloud, the lead author then attached a microphone on to the collar of the athlete's t-shirt for 20 minutes of a training session. If the athlete started to go quiet during a period of the recording, a prompt from the lead researcher on the sideline was provided. A total of 5 players and 1 coach were randomly selected to complete TA pre and post ARiS intervention.

### ***Quantitative Measures***

To assess study aims and objectives, a series of quantitative questionnaires were used. Table 7.1 details each specific variables being assessed within Chapter 7 alongside the relevant measurement tool and their respective assessment data. Each measurement tool is then explained in their own section below.

**Table 7.1**

#### ***Pilot Outcomes and Measures***

| Outcome                     | Measure                                      | No. Items | Score Range |
|-----------------------------|----------------------------------------------|-----------|-------------|
| Attributions                | Causal Dimensional Scale II (CDS-II)         | 12        | 12-108      |
| Mental Well-being           | Warwick Edinburgh Mental Well-being Scale    | 14        | 14-70       |
| Received Social Support     | Received Social Support Measure (RSSM)       | 4         | 4-28        |
| Subjective Performance      | Singular Subjective Performance Question     | 1         | 1-10        |
| Acceptability and Adherence | Theoretical Framework of Acceptability (TFA) | 15        | 15-75       |

#### ***Causal Dimensional Scale II (CDS-II: McAuley et al., 1992)***

McAuley and colleagues (1992) revised the original causal dimension scale to consolidate a measure of attributions through subscales of controllability (external and internal), locus of causality, and stability. After providing a reason for their most recent

performance, participants complete the CDS-II, a 12 question 7-point Likert scale questionnaire on attributions for their provided reasons. Within the 12 questions, each subscale (e.g., internal controllability, external controllability, locus of causality and stability) is represented by 3 questions that are provided in random order. Subscales for external control and stability are reverse scored to provide a scoring continuum where maladaptive attributions are scored as 1 and adaptive attributions are scored as 7.

***Received Social Support Measure (RSSM: Steffens et al., 2016)***

This 4-item questionnaire was developed by Steffens and colleagues to assess received social support in sporting domains. Originally adapted from Jetten et al. (2012), the four items are measured on a 7-point Likert scale including questions such as “Do you get the emotional support you need from other people?” or “Do you get the help you need from other people?”. Alternatives to assess social support were explored (Rees et al., 2007). By educating the athlete's support network, it is reasonable to assert that they will be better equipped to provide the athlete with useful support and advice, and thus, it might be reasonable to assume that the athlete might perceive higher levels of support to be given to them (or available).

***The Warwick–Edinburgh Mental Well-being Scale (WEMWBS: Tennant et al., 2007)***

WEMWBS, developed by Tennant et al (2007), assesses thoughts and feelings of the participant within the previous 2 weeks. A 14 question, 5-point Likert scale questionnaire covers topics such as confidence, optimism, mood, and enjoyment. Each statement is scored on a 1–5 Likert Scale (1 = “none of the time”, 5= “all of the time”). A global score ranging between 14 and 70 is then calculated by adding up item scores. The higher the score, the higher the level of psychological well-being. Used in sport intervention research (Carson et al., 2019; Grimson et al., 2023), WEMWBS was opted for as an appropriate measure of well-being as it covers both the hedonic (e.g., pleasure and enjoyment) and eudaimonic (e.g., meaning and purpose) aspects of well-being, and has excellent levels of reliability, with a Cronbach alpha of 0.90 (Tennant et al., 2007). Use of WEMWBS in this research will help explore whether improved attributions are positively correlated with an improvement in mental well-being.

***Subjective Performance***

Participants subjectively rated their performance via a singular satisfaction-based question on their overall performance in training and matchday fixtures from 1 “totally dissatisfied” to 10 “totally satisfied” (Biddle, Hanrahan, & Sellars, 2001; Nicholls, Polman & Levy, 2010). Although objective measures of performance were available (e.g., win or loss), subjective performance reviews provide individual assessment of progress in line with overall assessment of individuals attributions in this research. Questionnaires relating to subjective

performance were also completed after training where performance outcomes were not consistently available or equitable in importance (e.g., a small-sided game concluded one training session whereas timepoint 2 was a friendly fixture against an external team).

### **Acceptability and Adherence Questionnaire**

The Theoretical Framework of Acceptability (TFA) was initially conceptualised to address a methodological gap in design and evaluation of healthcare interventions (Sekhon et al., 2017) and has since been used within sport to evaluate intervention effectiveness (Barkoukis et al., 2022; Palsola et al., 2020). Aiming to assess acceptability, TFA consists of five component constructs assessed by 15 Likert scale questions: affective attitude, burden, perceived effectiveness, ethicality, and self-efficacy. Firstly, affective attitude refers to an individual's emotional response or feelings toward an intervention or behaviour. Secondly, assessment of burden refers to the perceived effort, time, and resources required to implement or engage with an intervention or behaviour. Thirdly, perceived effectiveness involves an individual's belief in the intervention's ability to achieve the desired outcomes. Fourthly, ethicality refers to the perceived moral soundness of the intervention or behaviour, including considerations of fairness, justice, and respect for individuals' rights and dignity. Finally, Self-efficacy refers to an individual's belief in their ability to successfully perform the behaviours required by the intervention. These Likert scale questions are followed by five open ended questions to assess core content, additional content, clarity of outcomes, user definition, and any additional feedback. Two items were reversed scored ("Engaging with the intervention was too troublesome" and "Engaging with the content of the intervention was too difficult") to allow for consistent directional analysis. Unlike other measures of acceptability regarding intervention materials and implementation, the TFA presents a tool to assess statistical adherence to intervention design as well as capturing user experience for future amendments or changes in delivery. Alternative options for measuring acceptability have been used in sport (Minkler et al., 2021), but these approaches do not provide statistical consensus alongside subjective opinion like the TFA framework. For evaluating ARiS in line with thesis aims, subjective opinion may provide further revisions to conclude intervention development in line with Hawkins et al. (2017) co-production guidelines.

### **Pilot Procedure**

Upon receipt of institutional ethics approval, the lead researcher approached the first team coach of a university futsal team to discuss piloting the ARiS intervention. After an initial meeting, the coach fed back the idea to the team (futsal players and other coaching staff) and invited them to participate in this research study. The first team coach and the lead researcher

then met a second time to assess how best the ARiS intervention could be integrated within the university futsal team's current schedule and collect gatekeeper consent. Consent was then also sourced from athletes and other members of the coaching team prior to intervention delivery.

As single case experimental designs should have a longer baseline period to enhance quality and stability of research findings (Barker et al., 2013), delivery of the pilot intervention involved carrying out three weeks of baseline visual and audio observations prior to collecting the initial pre-intervention questionnaire. The lead researcher attended training sessions ( $n = 6$ ), match days ( $n = 2$ ) and classroom-based sessions ( $n = 6$ ) over the three-week period to observe existing practices relating to attributions within the group. This also gave the lead researcher the opportunity to assess group dynamics and whether the coach and athlete could receive education together. Upon completion of the final classroom observation, futsal players completed the initial pre-intervention questionnaires to assess their attributions, subjective performance, received social support, and mental well-being. Think Aloud was also used to capture live attributions during training sessions and match days.

After completing the observation, needs analysis, and initial assessment in Stage 1 of the ARiS protocol, Stage 2 involved two psycho-education sessions. The first session followed a traditional classroom-based format, while the second session was co-delivered with the lead futsal coach on the court during training. The first session was a 30-minute introduction to sport psychology, focusing on its relevance to futsal, and concluded with an overview of attributions in practice. In the second session, the group's usual 20-minute warm-up was adapted with a psycho-educational focus. Athletes participated in various "keep the ball" warm-up activities, incorporating conditions from the classroom session to encourage different attributions, such as playing with one less player or responding to incorrect officiating decisions.

Stage 3 of the ARiS protocol involved confirming an intervention leadership group, consisting of three players and one lead coach, to help ensure the sustainability and consolidation of the material taught. Stage 4 employed a traditional two-phase attribution retraining approach, beginning with an AR induction session in the classroom, followed by an AR consolidation task assessed during a training match against a national futsal league team. Finally, Stage 5, led by the researcher, concluded the ARiS intervention by repeating the data collection methods, including questionnaires, observations, and Think Aloud protocols (See full ARiS procedure in Appendix C).

Upon conclusion of intervention delivery, study aims were revisited. Acceptability and adherence questionnaires were collected from all participants in the research in line with thesis

aims to evaluate the ARiS intervention. In relation to study hypotheses, preliminary analysis of pre post intervention results for attributions revealed inadequacies with the data in line with intended hypotheses due to performance outcomes being significantly different at the time of questionnaire completion. As a result, and in-line with research recommendations for single case experimental designs to include a follow-up data collection point (Barker et al., 2013), a third data collection point was collected for attributions based on the original reason for performance provided at baseline. For example, pre-intervention, all futsal athletes provided explanations for their most recent performance via the CDS-II. At the follow-up point, all athletes completed the CDS-II based on their explanations for performance provided pre-intervention. The aim was to assess whether the understanding of attributions (e.g., what makes an attribution maladaptive or adaptive) had improved and therefore increased likelihood of constructing healthier attributions in the future to aid positive performance outcomes. This was collected 7 weeks post-intervention aligning with the end of the futsal season. Full data analysis was then completed, and all participants reminded that a copy of their results was available via email should they wish to see them.

### **Data Analysis/Statistical Methods**

Statistical analyses were conducted using Microsoft Excel and JASP statistical analysis software. For statistical significance, alpha levels were set at  $p < 0.05$  in line with suggested quantitative guidelines. Difference of means were assessed via percentage of non-overlapping data (PND) between baseline and post intervention timepoints to provide an assessment of change in attributions, received social support, mental well-being, and subjective performance.

Using pooled standard deviations, Cohen's  $d$  suggested a value of 0.20 as small, 0.50 as medium, and 0.80 as large to measure effect sizes. However, in-line with guidelines for interpreting single case study design research, effect sizes have been interpreted with the following revisions:  $< 0.87$  is small,  $0.87-2.67$  as medium and  $> 2.67$  as large (Parker and Vannest, 2009). To address changes in effect size calculations based on recommendations for case study research, PND was calculated to aggregate data where a single-subject experimental design was used. PND (Scruggs et al. 1987) is calculated by counting the number of intervention data points that exceed the most extreme value in the baseline condition (T1) in the expected direction determined by whether the intervention increased (or decreased) the target behaviour. This number was then divided by the total number of post- intervention (T2) data points and provided as a percentage. For example, when using PND for assessment of the CDS-II responses, an example calculation would look as follows: Number of post-interventions scores (2) that exceed highest baseline value (7), divided by number of post-intervention scores

(3), multiplied by 100. This would calculate a PND of 66%. Scruggs and colleagues suggested the following ranges for the interpretation of PND scores: 0–50 % ineffective, 50–70 % questionable, 70–90 % effective and 90 % or greater very effective (Scruggs & Mastropieri, 1998). In practical terms, this presents alternative assessment of intervention effectiveness and a score of 66% should be interpreted cautiously.

Think Aloud responses were analysed collectively using thematic analysis, where an initial exploration of the verbal responses was used to identify any patterns or themes (Best & Kahn, 2006). Change in attribution style was then assessed via manual inductive coding through content analysis. This analysis categorised tenets of adaptive and maladaptive attributions in quotational extracts and presented as a change in verbalised attributions between T1 and T2 (See Table 7.7). Five athletes and one coach were randomly selected to take part in the pre post think aloud assessment, as a sample representation of the whole group.

Acceptability and adherence data were analysed using mean scores overall and across the five subdimensions in line with previous research (Sekhon et al., 2022). Qualitative responses were analysed manually using content analysis to extract relevant comments related to what ARiS does effectively, alterations for intervention development and any further comments that can be useful for future development. Inductive coding allowed the lead author to drive data analysis to systematically process all athletes ( $n = 10$ ) and some members of the coaching team's ( $n = 2$ ) responses. Like reflexive thematic analysis, all codes and themes were reviewed by the lead authors supervisory team to check for appropriateness in relation to study aims and objectives, as well as reviewing for overlaps, contradictions or gaps amongst themes (Birch et al., 2022). Quantitative and qualitative findings of the TFA questionnaire are presented in the Intervention Fidelity section of the results.

## **Results**

### **Attributions**

During the ARiS intervention delivery period, change of means analysis of CDS-II data between T1 and T2 revealed 3 out of 10 athletes showed an increase in overall adaptive attributions, with the largest increase from Athlete 4 (+46.67%) and smallest increase from Athlete 6 (+12.42%) with an average increase of 27.28%. However, the results showed that the remaining 7 athletes showed a decrease in adaptive attributions, with largest decrease from Athlete 5 (-26.79%) and smallest decrease from Athlete 9 (-7.90%) and an average decrease of -14.33%. PND scores for three athletes that increased in adaptive attributions were all interpreted as questionable (50-70%) whereas seven athletes results showed a decrease in adaptive attributions suggesting no significant effect (0-50%).

### ***Attributions – Locus of Causality***

Pre-post intervention findings indicated 8 out of 10 athletes showed a positive increase in locus of causality, with the largest increase from Athlete 4 (+90.00%) and smallest increase from Athletes 1,2,9 and 10 (+4.70%) with an average increase of 18.84%. This would indicate that athletes are more likely to explain performance based on attributions specific to themselves (e.g., their own technique) as opposed to being based on others (e.g., the level of their opponents). However, the results for the remaining 2 athletes detailed a decrease in locus of causality, with largest decrease from Athlete 8 (-15.80%) and smallest decrease from Athlete 7 (-14.30%) and an average decrease of -15.05%. PND scores for athletes that increased in locus of causality ranged from ineffective ( $n = 5$ ) to questionable ( $n = 3$ ). The two athletes that both detailed a decrease in adaptive attributions via locus of causality both had a floor baseline figure for PND of 0%, showing that no associated scores increased.

**Table 7.2**

*Percentage change in means and percentage of non-overlapping data for Overall Attributions, Locus of Causality, External Control, Internal Control and Stability between T1 and T2.*

| Participant          | 1     | 2      | 3      | 4      | 5      | 6     | 7      | 8      | 9     | 10     |
|----------------------|-------|--------|--------|--------|--------|-------|--------|--------|-------|--------|
| Overall Attributions |       |        |        |        |        |       |        |        |       |        |
| T1 <i>M</i>          | 6.92  | 6.17   | 6.58   | 3.75   | 6.83   | 4.67  | 6.50   | 4.75   | 6.33  | 7.92   |
| <i>SD</i>            | 1.78  | 1.59   | 2.15   | 2.09   | 2.55   | 2.50  | 1.45   | 1.96   | 1.83  | 1.78   |
| T2 <i>M</i>          | 6.33  | 5.50   | 5.33   | 5.50   | 5.00   | 5.25  | 5.83   | 5.83   | 5.83  | 6.58   |
| <i>SD</i>            | 1.61  | 2.07   | 0.89   | 1.78   | 3.54   | 3.19  | 1.64   | 1.59   | 1.19  | 1.93   |
| <i>d</i>             | 0.35  | 0.36   | 0.76   | 0.90   | 0.59   | 0.20  | 0.43   | 0.61   | 0.32  | 0.72   |
| %                    | -8.53 | -10.86 | -19.00 | 46.67  | -26.79 | 12.42 | -10.31 | 22.74  | -7.90 | -16.92 |
| PND                  | 33.00 | 17.00  | 8.00   | 66.00  | 33.00  | 58.00 | 33.00  | 58.00  | 17.00 | 33.00  |
| Locus of Causality   |       |        |        |        |        |       |        |        |       |        |
| T1 <i>M</i>          | 7.00  | 7.00   | 5.00   | 3.33   | 7.00   | 6.33  | 7.00   | 6.33   | 7.00  | 7.00   |
| <i>SD</i>            | 0.00  | 0.00   | 3.61   | 1.53   | 2.00   | 2.31  | 0.00   | 1.15   | 1.00  | 2.00   |
| T2 <i>M</i>          | 7.33  | 7.33   | 5.33   | 6.33   | 8.00   | 7.67  | 6.00   | 5.33   | 7.33  | 7.33   |
| <i>SD</i>            | 1.15  | 0.58   | 0.58   | 1.15   | 1.00   | 1.15  | 1.00   | 1.53   | 0.58  | 0.58   |
| <i>d</i>             | 0.41  | 0.82   | 0.13   | 2.22   | 0.63   | 0.73  | 1.41   | 0.74   | 0.41  | 0.23   |
| %                    | 4.70  | 4.70   | 6.60   | 90.00  | 14.30  | 21.00 | -14.30 | -15.80 | 4.70  | 4.70   |
| PND                  | 66.00 | 33.00  | 33.00  | 66.00  | 33.00  | 66.00 | 0.00   | 0.00   | 0.00  | 33.00  |
| External Control     |       |        |        |        |        |       |        |        |       |        |
| T1 <i>M</i>          | 4.33  | 5.00   | 7.00   | 1.00   | 7.67   | 2.33  | 6.33   | 2.67   | 4.67  | 9.00   |
| <i>SD</i>            | 4.33  | 5.00   | 7.00   | 1.00   | 7.67   | 2.33  | 6.33   | 2.67   | 4.67  | 9.00   |
| T2 <i>M</i>          | 6.00  | 3.33   | 5.67   | 5.00   | 1.67   | 2.33  | 5.67   | 5.00   | 5.00  | 7.00   |
| <i>SD</i>            | 6.00  | 3.33   | 5.67   | 5.00   | 1.67   | 2.33  | 5.67   | 5.00   | 5.00  | 7.00   |
| <i>d</i>             | 0.32  | 0.39   | 0.21   | 1.11   | 1.08   | 0.00  | 0.11   | 0.58   | 0.07  | 0.25   |
| %                    | 27.80 | -34.00 | -19.00 | 400.00 | -78.20 | 0.00  | -10.40 | 87.30  | 7.10  | -22.20 |

|                  |        |        |        |        |        |        |        |        |        |        |
|------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| PND              | 66.00  | 0.00   | 0.00   | 100.00 | 0.00   | 33.00  | 33.00  | 100.00 | 33.00  | 100.00 |
| Internal Control |        |        |        |        |        |        |        |        |        |        |
| T1 <i>M</i>      | 8.00   | 7.33   | 7.33   | 4.67   | 6.33   | 6.67   | 6.67   | 5.67   | 7.67   | 9.00   |
| <i>SD</i>        | 0.00   | 0.58   | 1.53   | 0.58   | 2.52   | 0.58   | 2.31   | 1.15   | 0.58   | 0.00   |
| T2 <i>M</i>      | 7.67   | 7.33   | 4.67   | 5.67   | 8.67   | 8.67   | 7.33   | 6.00   | 6.00   | 8.33   |
| <i>SD</i>        | 0.58   | 0.58   | 1.53   | 1.15   | 0.58   | 0.58   | 1.15   | 1.00   | 1.00   | 0.58   |
| <i>d</i>         | 0.80   | 0.00   | 1.74   | 1.10   | 1.28   | 3.45   | 0.36   | 0.31   | 2.04   | 1.63   |
| %                | -4.10  | 0.00   | -36.30 | 21.40  | 37.00  | 30.00  | -9.90  | 5.80   | -21.80 | -7.40  |
| PND              | 0.00   | 33.00  | 0.00   | 66.00  | 66.00  | 100.00 | 33.00  | 33.00  | 0.00   | 0.00   |
| Stability        |        |        |        |        |        |        |        |        |        |        |
| T1 <i>M</i>      | 8.33   | 5.33   | 7.00   | 6.00   | 6.33   | 3.33   | 6.00   | 4.33   | 6.00   | 6.67   |
| <i>SD</i>        | 0.58   | 2.08   | 2.00   | 1.00   | 4.62   | 2.52   | 1.00   | 2.52   | 3.00   | 2.52   |
| T2 <i>M</i>      | 4.33   | 4.00   | 5.67   | 5.00   | 1.67   | 2.33   | 4.33   | 7.00   | 5.00   | 3.67   |
| <i>SD</i>        | 1.15   | 1.00   | 0.58   | 3.61   | 0.58   | 1.15   | 2.31   | 2.65   | 1.00   | 1.15   |
| <i>d</i>         | 4.39   | 0.81   | 0.90   | 0.38   | 1.42   | 0.51   | 0.94   | 1.03   | 0.45   | 1.53   |
| %                | -48.00 | -25.00 | -19.00 | -16.70 | -73.60 | -30.00 | -27.70 | 61.70  | -16.70 | -45.00 |
| PND              | 0.00   | 0.00   | 0.00   | 33.00  | 33.00  | 33.00  | 0.00   | 100.00 | 33.00  | 0.00   |

*Note.* *M* = Means, *SD* = Standard Deviations, T1 = Timepoint 1, T2 = Timepoint 2, *d* = Cohen's *d* effect size, % = Percentage change in means between T1 and T2, PND = Percentage of non-overlapping data.

### ***Attributions – External Control***

Change of means analysis identified four out of 10 athletes showed an increase in external control, with the largest increase from Athlete 4 (+400.00%) and smallest increase from Athlete 9 (+7.10%), with an average increase of 130.55%. This means that athletes were more focused on controllable explanations that may include other influences (e.g., team effort). Results for five out of 10 athletes detailed a decrease in external control, with largest decrease from Athlete 5 (-78.20%) and smallest decrease from Athlete 7 (-10.40%), and an average decrease of -32.76%. Athlete 6 responses revealed neither an increase nor decrease in external control pre-post intervention. PND revealed three athletes had a 100% very effective interpretation (n = 2 were increases in adaptive attributions, n = 1 decrease in adaptive attributions). Three athletes PND revealed a 0% PND for external control scores pre-post intervention.

### ***Attributions – Internal Control***

Internal control positively increased in four out 10 athletes. Athlete 5 reported the largest increase (37.00%), Athlete 8 with the smallest increase (5.80%), and an average increase change of means across athletes of 23.55%. This means that athletes were able to focus more on explanations within their own control (e.g., individual effort). Five out of 10 athletes detailed a decrease in internal control, with Athlete 3 the largest decrease (36.30%) and Athlete 1 with the smallest decrease (4.10%) and an average decrease across athletes of 15.90%. Athlete 2 responses revealed neither an increase nor decrease in external control pre-post intervention. PND revealed that athletes with an increase in internal control varied between ineffective (n = 1), questionable (n = 2), and very effective (n = 1) interpretations. Athletes detailing a decrease all detailed ineffective interpretations through PND. These summaries indicate that internal control was subscale with the most effective change in means pre and post intervention indicating ARiS had the largest effect on internal control.

### ***Attributions – Stability***

Pre-post intervention findings revealed Athlete 8 showed an increase in adaptive attributions through stability (61.70%). This means that Athlete 8 was able to focus on changeable explanations for their performance (e.g., effort) as opposed to focusing on aspects that could not change (e.g., the result). The remaining athletes' results (n = 9) detailed a decrease in stability, with largest decrease from Athlete 5 (-73.60%) and smallest decreases from Athletes 4 and 9 (-16.70%) with an average decrease of -33.52%. PND indicates that all decreases were ineffective (0-50%), however Athlete 8, who's stability increased in adaptive attributions, had 100% PND which was deemed very effective.

### ***Attributions – Think Aloud***

Think Aloud findings revealed an increase in adaptive attributions across all four athletes, and their head coach, pre-post ARiS intervention. Increases were assessed by a change in valence noted through content analysis of transcripts. Recordings revealed a tendency to attribute maladaptively during performance if outcomes were predominantly negative. Adaptive attributions were still present pre-ARiS, however there were noticeably more in the recording post ARiS intervention.

**Table 7.3**

*Attributions excerpts recorded pre (T1) and post (T2) ARiS intervention via Think Aloud demonstrating a shift from maladaptive to adaptive attributions during performance.*

| Athletes   | T1 ARiS-Attribution                                | T2 ARiS-Attribution                                          |
|------------|----------------------------------------------------|--------------------------------------------------------------|
| Athlete 1  | Never! Never! That is never their ball!            | Athlete 5 react, react! It is done now you cannot change it! |
| Athlete 2  | Are you ***** serious, ref get a hold of the game! | Come on boys, let's go, raise it (effort)!                   |
| Athlete 3  | Why are we doing this with the flanks?             | That was a bad touch, I can improve that Athlete 3!          |
| Athlete 4  | The court is way too small; it is ridiculous       | Stand him up Athlete 4, that's it, good concentration.       |
| Head Coach | They cannot score if they do not have the ball     | Recover and shape early. Quick lets go, organise!            |

At time point 1, Athlete 1 focused on outcomes that were externally influenced during performance, that may suggest a loss in concentration or attentional control: “Never! Never! That is never their ball!”. Officiating decisions are a common maladaptive attribution in invasion sports, and often an easy outlet to blame when things are not going well. This was further exemplified at this stage by Athlete 2: “Are you \*\*\*\*\* serious, ref get a hold of this game”. Athlete 3 and Athlete 4 further exemplified maladaptive tendencies through frustration with the surface and dimensions of play. This is another common area of displeasure for athletes to blame due to size of the court being “too small” (Athlete 4) or having restrictions in training activities “why are we doing this with the flanks?”.

As highlighted previously, the role of the athlete's support network in formation of attributions is influential. As a result, a coach who displays maladaptive attributions may create

a climate that fosters maladaptive reasons for performance: such as a focus on the opposition as opposed to what is in the team's control themselves "they cannot score if they do not have the ball".

Post ARiS intervention, all four athletes and the coach detailed an increase in adaptive attributions. Athlete 1, who had displayed tendencies of lack of attentional control, was able to focus on effort and stability despite previously fixating on what they perceived as incorrect decisions pre-intervention: "Athlete 5, react! It is done now; you cannot change it". Athlete 2 focused on supporting their teammates, which can be maladaptive if frequently the focus, however a note on increasing effort all round is adaptive and easily changeable "Come on boys, let's go! Raise it (effort)". Athlete 3 was able to assess their performance based on their own ability, an adaptive attribution, during AR consolidation "That was a bad touch, I can improve that Athlete 3!". Athlete 4 also appeared to take more of a self-reflective view post ARiS intervention by also commenting on their own performance as a form of motivation "Stand him up Athlete 4, that's it, good concentration". Finally, the head coach was able to focus their feedback on their own team's effort as opposed to the inability or ability of the opposition "Recover and shape early, quick let's go, organise!".

### **Received Social Support, Mental Well-being, and Subjective Performance**

Change in means revealed a positive increase in received social support (18.18%), mental well-being (7.14%), and subjective performance (20.97%) pre-post ARiS intervention. Received social support reported a small effect size ( $d = 0.62$ ) using adjusted Cohen's  $d$  for case study research and PND findings were interpreted as ineffective (60.00%). Mental well-being also reported a small effect size ( $d = 0.47$ ) using adjusted Cohen's  $d$  for case study research, but PND findings were interpreted as effective (80.00%). Finally, subjective performance reported a small to moderate effect size ( $d = 0.83$ ) using adjusted Cohen's  $d$  for case study research - however PND findings were interpreted as ineffective.

**Table 7.4**

*Changes in received social support, mental well-being, and subjective performance between T1 and T2.*

| <b>Outcomes</b>         | <b>N</b> | <b>T1 <i>M</i></b> | <b><i>SD</i></b> | <b>T2 <i>M</i></b> | <b><i>SD</i></b> | <b>%</b> | <b><i>d</i></b> | <b>PND</b> |
|-------------------------|----------|--------------------|------------------|--------------------|------------------|----------|-----------------|------------|
| Received Social Support | 10       | 18.70              | 6.90             | 22.10              | 3.41             | 18.18    | 0.62            | 60.00      |
| Mental Well-being       | 10       | 28.00              | 5.14             | 30.00              | 3.13             | 7.14     | 0.47            | 80.00      |
| Subjective Performance  | 10       | 6.20               | 1.69             | 7.50               | 1.43             | 20.97    | 0.83            | 60.00      |

*Note.* *M* = Means, *SD* = Standard Deviations, T1 = Timepoint 1, T2 = Timepoint 2, *d* = Cohen's *d* effect size, % = Percentage change in means between T1 and T2, PND = Percentage of non-overlapping data.

### **T1-T3 Results**

#### **Attributions**

Comparisons between pre intervention and the follow up data collection period revealed 5 out of 10 athletes results showed an increase in adaptive attributions, with the largest increase from Athlete 8 (+80.60%) and smallest increase from Athlete 3 (+21.60%), with an average increase of 38.92%. Conversely, 5 out of 10 detailed a decrease in adaptive attributions, with largest decrease from Athlete 10 (-23.70%) and smallest decrease from Athlete 7 (-5.10%), and an average decrease across athletes of -10.52%. PND scores for increases in adaptive attributions were interpreted as ineffective (Athlete 4), questionable (Athlete 1, 3, and 6) and very effective (Athlete 8). All athletes detailing a decrease in adaptive attributions were interpreted as ineffective (0-50%).

#### ***Attributions – Locus of Causality***

Analysis of pre to follow up intervention findings revealed seven out of 10 athletes showed an increase in locus of causality, with the largest increase from Athlete 3 (+53.40%) and smallest increase from Athlete 2 (+4.70%), with an average increase of 21.99%. Two athletes detailed a decrease in locus of causality, with largest decrease from Athlete 9 (-23.90%) and smallest decrease from Athlete 5 (-9.60%). Athlete 6 neither increased nor decreased in locus of causality between T1 and T3. PND scores for athletes that increased in locus of causality varied from ineffective (*n* = 2) to questionable (*n* = 2) and very effective (*n* = 3). Changes in locus of causality were suggestive of no effectiveness based on PND.

**Table 7.5**

*Percentage change in means and percentage of non-overlapping data for Overall Attributions, Locus of Causality, External Control, Internal Control and Stability between T1 and T3.*

| Participant          | 1      | 2      | 3     | 4      | 5     | 6      | 7      | 8      | 9      | 10     |
|----------------------|--------|--------|-------|--------|-------|--------|--------|--------|--------|--------|
| Overall Attributions |        |        |       |        |       |        |        |        |        |        |
| T1 <i>M</i>          | 6.92   | 6.17   | 6.58  | 3.75   | 6.83  | 4.67   | 6.50   | 4.75   | 6.33   | 7.92   |
| <i>SD</i>            | 1.78   | 1.59   | 2.15  | 2.09   | 2.55  | 2.50   | 1.45   | 1.96   | 1.83   | 1.78   |
| T3 <i>M</i>          | 8.08   | 5.75   | 8.00  | 4.58   | 6.25  | 7.17   | 6.17   | 8.58   | 4.83   | 7.25   |
| <i>SD</i>            | 0.79   | 2.01   | 0.95  | 1.24   | 1.76  | 1.75   | 1.70   | 0.90   | 1.64   | 1.82   |
| <i>d</i>             | 0.84   | 0.23   | 0.85  | 0.48   | 0.26  | 1.16   | 0.21   | 2.51   | 0.86   | 0.37   |
| %                    | 16.80  | -6.80  | 21.60 | 22.10  | -8.50 | 53.50  | -5.10  | 80.60  | -23.70 | -8.50  |
| PND                  | 58.00  | 24.00  | 58.00 | 42.00  | 33.00 | 67.00  | 33.00  | 100.00 | 17.00  | 17.00  |
| Locus of Causality   |        |        |       |        |       |        |        |        |        |        |
| T1 <i>M</i>          | 7.00   | 7.00   | 5.00  | 3.33   | 7.00  | 6.33   | 7.00   | 6.33   | 7.00   | 7.00   |
| <i>SD</i>            | 0.00   | 0.00   | 3.61  | 1.53   | 2.00  | 2.31   | 0.00   | 1.15   | 1.00   | 2.00   |
| T3 <i>M</i>          | 8.00   | 7.33   | 7.67  | 4.00   | 6.33  | 6.33   | 7.67   | 9.00   | 5.33   | 7.67   |
| <i>SD</i>            | 0.00   | 0.58   | 0.58  | 1.00   | 1.15  | 2.31   | 0.58   | 0.00   | 2.08   | 0.58   |
| <i>d</i>             | 0.00   | 0.80   | 1.03  | 0.52   | 0.41  | 0.00   | 1.63   | 3.27   | 1.02   | 0.46   |
| %                    | 14.30  | 4.70   | 53.40 | 20.10  | -9.60 | 0.00   | 9.60   | 42.20  | -23.90 | 9.60   |
| PND                  | 100.00 | 33.00  | 66.00 | 33.00  | 33.00 | 0.00   | 66.00  | 100.00 | 0.00   | 100.00 |
| External Control     |        |        |       |        |       |        |        |        |        |        |
| T1 <i>M</i>          | 4.33   | 5.00   | 7.00  | 1.00   | 7.67  | 2.33   | 6.33   | 2.67   | 4.67   | 9.00   |
| <i>SD</i>            | 4.33   | 5.00   | 7.00  | 1.00   | 7.67  | 2.33   | 6.33   | 2.67   | 4.67   | 9.00   |
| T3 <i>M</i>          | 7.33   | 3.67   | 7.67  | 4.33   | 7.33  | 6.00   | 5.00   | 7.67   | 5.00   | 8.00   |
| <i>SD</i>            | 1.15   | 1.53   | 1.53  | 2.31   | 0.58  | 1.73   | 1.00   | 1.53   | 2.65   | 0.00   |
| <i>d</i>             | 0.95   | 0.36   | 0.13  | 1.87   | 0.06  | 1.79   | 0.29   | 2.30   | 0.09   | 0.16   |
| %                    | 69.30  | -26.60 | 9.60  | 333.00 | -4.30 | 157.50 | -21.00 | 187.30 | 7.10   | -11.10 |

|                  |       |        |       |        |        |        |        |        |        |        |
|------------------|-------|--------|-------|--------|--------|--------|--------|--------|--------|--------|
| PND              | 66.00 | 0.00   | 33.00 | 100.00 | 33.00  | 100.00 | 33.00  | 100.00 | 33.00  | 0.00   |
| Internal Control |       |        |       |        |        |        |        |        |        |        |
| T1 <i>M</i>      | 8.00  | 7.33   | 7.33  | 4.67   | 6.33   | 6.67   | 6.67   | 5.67   | 7.67   | 9.00   |
| <i>SD</i>        | 0.00  | 0.58   | 1.53  | 0.58   | 2.52   | 0.58   | 2.31   | 1.15   | 0.58   | 0.00   |
| T3 <i>M</i>      | 8.33  | 7.67   | 8.33  | 5.00   | 6.33   | 7.33   | 7.67   | 8.67   | 4.33   | 8.00   |
| <i>SD</i>        | 0.58  | 0.58   | 1.15  | 0.00   | 1.53   | 0.58   | 0.58   | 0.58   | 1.53   | 0.00   |
| <i>d</i>         | 0.80  | 0.59   | 0.74  | 0.80   | 0.00   | 1.14   | 0.59   | 3.29   | 2.89   | 0.00   |
| %                | 4.10  | 4.50   | 13.60 | 7.10   | 0.00   | 10.00  | 15.00  | 52.90  | -43.40 | -11.10 |
| PND              | 33.00 | 33.00  | 66.00 | 33.00  | 33.00  | 33.00  | 33.00  | 100.00 | 0.00   | 33.00  |
| Stability        |       |        |       |        |        |        |        |        |        |        |
| T1 <i>M</i>      | 8.33  | 5.33   | 7.00  | 6.00   | 6.33   | 3.33   | 6.00   | 4.33   | 6.00   | 6.67   |
| <i>SD</i>        | 0.58  | 2.08   | 2.00  | 1.00   | 4.62   | 2.52   | 1.00   | 2.52   | 3.00   | 2.52   |
| T3 <i>M</i>      | 8.67  | 4.33   | 8.33  | 5.00   | 5.00   | 9.00   | 4.33   | 9.00   | 4.67   | 5.33   |
| <i>SD</i>        | 0.58  | 0.58   | 0.58  | 1.00   | 3.00   | 0.00   | 0.58   | 0.00   | 0.58   | 3.21   |
| <i>d</i>         | 0.59  | 0.65   | 0.90  | 1.00   | 0.34   | 3.18   | 2.04   | 2.62   | 0.62   | 0.46   |
| %                | 4.00  | -18.80 | 19.00 | -16.70 | -21.00 | 170.30 | -27.80 | 107.90 | -22.20 | -19.90 |
| PND              | 33.00 | 33.00  | 66.00 | 0.00   | 66.00  | 100.00 | 0.00   | 100.00 | 33.00  | 0.00   |

*Note.* *M* = Means, *SD* = Standard Deviations, T1 = Timepoint 1, T3 = Timepoint 3, *d* = Cohen's *d* effect size, % = Percentage change in means between T1 and T3, PND = Percentage of non-overlapping data.

### ***Attributions – External Control***

Change of means analysis identified six out of 10 athletes showed an increase in external control between T1 and T3, with the largest increase from Athlete 4 (+333.00%) and smallest increase from Athletes 9 (+7.10%), with an average increase of 127.30%. Four out of 10 athletes detailed a decrease in external control between T1 and T3, with largest decrease from Athlete 2 (-26.60%) and smallest decrease from Athlete 5 (-4.30%). There was an average decrease of -15.75%. Changes in three athletes suggested the intervention was very effective in increasing external control. The remaining three that increased in external control detailed questionable ( $n = 1$ ) and ineffective ( $n = 2$ ) results via PND analysis. For athletes that decreased in external control, PND interpretations were ineffective ( $n = 4$ ), with two athletes recording baseline scores of 0%.

### ***Attributions – Internal Control***

Internal control positively increased in seven out 10 athletes between T1 and T3. Athlete 8 results detailed the biggest increase (52.90%), Athlete 1 with the smallest increase (4.10%), with an average increase change of means of 15.31%. Two out of 10 athletes detailed a decrease in internal control, with Athlete 9 the largest decrease (43.40%) and Athlete 10 with the smallest decrease (11.10%). Athlete 5 responses revealed neither an increase nor decrease in external control pre-post intervention. PND revealed that athletes with an increase in internal control varied between ineffective ( $n = 5$ ), questionable ( $n = 1$ ), and very effective ( $n = 1$ ) interpretations. Both athletes detailing a decrease detailed ineffective interpretations through PND with one recording a baseline score of 0%.

### ***Attributions – Stability***

T1 to T3 intervention findings revealed four out of 10 athletes showed an increase in adaptive attributions through stability. Athlete 6 displayed the largest increase in stability between T1 and T3 (170.30%), whilst Athlete 1 recorded the smallest change in increased stability (4.10%) resulting in an average increase across athletes of 75.33%. Six out of 10 athlete results reported a decrease in adaptive attributions for stability, with largest decrease from Athlete 7 (-27.80%) and smallest decreases from Athlete 4 (-16.70%), with an average decrease of -21.07%. Athlete 6 and 8, who's stability increased in adaptive attributions, suggested the intervention was very effective via PND interpretations. The remaining two athletes who increased in stability between T1 and T3 were interpreted as questionable using PND analysis. All six athletes who decreased in stability of attributions were interpreted as ineffective, with three athletes recording baselines scores of 0%.

### Intervention Fidelity: Acceptability and Adherence

TFA findings revealed an overwhelmingly positive response to the pilot intervention. 10 athletes and two coaches completed the 15 Likert scale items, before responding to five open-ended questions. On a Likert Scale of 1-5, with 1 being strongly disagree (negative), and 5 being strongly agree (positive), the group responded with an overall average of 4.57. No respondent averaged lower than 4.00, with two respondents completing the questionnaire with an average of 5.00. Subdimension findings revealed the group believe the intervention was both ethical ( $M = 4.72$ ) and effective ( $M = 4.70$ ). The lowest TFA subdimension score, despite being positive, was burden of the intervention to participants ( $M = 4.36$ ). See Table 7.14 for full results.

**Table 7.6**

*Theoretical Framework of Acceptability (TFA) average scores across 5 subdimensions and total score in response to ARiS delivery.*

| Participant | Affect Att | Burden | Ethicality | S-Efficacy | Effectiveness | Total |
|-------------|------------|--------|------------|------------|---------------|-------|
| 1           | 5.00       | 4.00   | 4.67       | 5.00       | 5.00          | 4.73  |
| 2           | 5.00       | 5.00   | 5.00       | 5.00       | 5.00          | 5.00  |
| 3           | 4.67       | 3.33   | 4.67       | 4.33       | 4.00          | 4.20  |
| 4           | 5.00       | 4.67   | 5.00       | 5.00       | 5.00          | 4.93  |
| 5           | 5.00       | 4.33   | 5.00       | 5.00       | 5.00          | 4.87  |
| 6           | 3.67       | 4.33   | 4.33       | 3.67       | 4.67          | 4.13  |
| 7           | 4.00       | 4.00   | 4.00       | 4.00       | 4.00          | 4.00  |
| 8           | 4.33       | 4.00   | 5.00       | 4.00       | 4.00          | 4.27  |
| 9           | 4.33       | 4.67   | 4.67       | 5.00       | 5.00          | 4.73  |
| 10          | 3.67       | 4.67   | 5.00       | 4.33       | 4.67          | 4.40  |
| Coach 1     | 5.00       | 4.33   | 4.33       | 4.00       | 5.00          | 4.53  |
| Coach 2     | 5.00       | 5.00   | 5.00       | 5.00       | 5.00          | 5.00  |
| <i>m</i>    | 4.56       | 4.36   | 4.72       | 4.53       | 4.70          | 4.57  |

*Note.* Affect Att = Affective Attitude, S-Efficacy = Self Efficacy, Effectiveness = Intervention Effectiveness.

The qualitative findings revealed a highly positive user experience with ARiS, with participants praising the content for being “really easy to understand” (Athlete 4), “clear and well presented” (Athlete 6), and “helpful for in-game scenarios” (Athlete 10). The intervention's content was appreciated for its broad and futsal-specific approach, which enhanced the integration of taught materials. Athlete 1 noted, “I would say it is sports-specific, not just one applied across all sports. The content was something new but not difficult to

understand and makes a massive difference once you know it.” Athlete 3 shared a similar sentiment: “The content of this intervention has changed my mind set when it comes to sports and life situations. Most importantly, I’ve been able to use this in the other sports I play. It has been a wonderful life experience.”

Athletes also highlighted the intervention’s emphasis on controllability. Athlete 10 explained, “ARiS is about being able to focus on controllables and helps with a clear mind,” while Athlete 2 stated, “This intervention involved focusing on things you can control, like your own performance, and not worrying about things like the referee.” Athlete 6 added that ARiS “reinforces positive thinking and builds resistance to negative thinking.”

The intervention was seen as both impactful and adaptable. Coach 2 acknowledged that while the content did not need to be futsal-specific, it was tailored to the futsal audience, making it easier to follow: “The thought process was easy to follow and made sense.” Participants noted the intervention’s simplicity in delivery despite its complex theoretical underpinning, with Athlete 1 sharing, “It’s an easy and simple intervention but complex in a way. It’s very good for morale and helps the team environment a lot.”

Beyond individual growth, the intervention fostered positive changes in the futsal team’s performance. Coach 2 observed, “The intervention’s goal is to create positive reflection on actions in the game, which leads to more positive feedback. For example, players now celebrate tackles instead of just goals – they engage in more tackles.”

Praise for the intervention’s overall effectiveness came from both athletes and coaches. Athletes noted the experience as “smooth” (Athlete 9), “helpful and supportive” (Athlete 4), and “a really good experience that definitely makes me a better person” (Athlete 7). Coach 1 praised the improvement in the team’s performance, noting, “The team was struggling for positivity at the bottom of the table and managed to reach the quarterfinals of the play-offs and beat two strong teams they may have lost to before.”

Further feedback on the intervention’s practical application came from Athlete 7, who appreciated the classroom tasks and activities, such as those involving phrases on small pieces of paper, and Athlete 3, who benefited from the support of a sports and exercise psychologist. However, some areas for improvement were noted. Coach 2 suggested that additional physical resources, like a booklet of resources, would have been beneficial for ensuring the sustainability of the intervention's effects post-delivery. Overall, the intervention was seen as valuable in both enhancing individual performance and contributing to team success.

## Discussion

In line with study aims Chapter 7 assessed two hypotheses. Firstly, whether ARiS can effectively enhance generation of adaptive attributions. Secondly, whether ARiS impacts on other variables associated with adaptive attributions including social support, mental well-being, and subjective performance. In line with the aims of the PhD to develop a rigorous and ecologically valid intervention, acceptability and adherence were also assessed to evaluate the delivery of ARiS.

Assessing the primary aim of increasing adaptive attributions pre and post interventions, pre-post intervention findings revealed limited effectiveness via responses to the CDS-II. However, results of subdimensions suggest there may be a larger methodological issue with the use of CDS-II as opposed to what would appear to be an unsuccessful intervention. The CDS-II is a 12 item 7-point Likert scale questionnaire based on causal attributions for performance. Prior to completion of the questionnaire, participants must provide explanations for their recent performance in as much or as little detail as they wish. As a one-off measure, the performance outcome associated with the explanations provided would serve as a singular reason to be assessed. However, when applying this method over a longer period, the results of this research suggest that performance outcomes take precedence over the neutral assessment of attributions. For instance, after a win, athletes may desire further success, leading to attributions that emphasise stability. However, increased stability in these attributions can become maladaptive, as it may cause motivation to decrease when winning shifts from being an achievement to an expectation. This finding is not uncommon, with performance outcomes acknowledged to influence subjective ratings across research (Woods, 2012). Due to the limitations of the CDS-II being related to performance outcomes, follow-up data collection required athletes to recomplete the questionnaire based on their attributions for performance formed pre-intervention. Athletes were provided with an empty questionnaire that had pre-completed explanations and participant numbers on to ensure they could reassess their pre-intervention attributions. As a result, the responses were directly comparable as the explanations(s) being scored had not changed between pre-intervention and follow-up. Despite this there are considerations that the follow-up intervention data collection was retrospective as opposed to pre-intervention where the reason was generated for their most recent performance.

Prior to T1, the futsal team had just suffered their biggest loss of the season, and as a result the explanations provided were overwhelmingly negative. At T2, the team had just

recorded their best result of the season, and as a result the explanations provided drastically different. However, the limitations of using the CDS-II is that it is contingent on a reason being provided on an athletes' recent performance. For example, an athlete stating it was the best performance of their season would then likely score this high on stability: meaning that they do not want this feeling to go away. However, from an attribution perspective, ARiS aims to reduce fixations on attributions (stability), both negatives and positives, as this can link to inconsistencies in future performance motivation (Matteuci, 2017). So, despite the ARiS intervention aiming to increase adaptive attributions overall, nine out of 10 athletes showed a decrease in adaptive attributions associated with stability between pre-intervention and post intervention. Although it cannot be confirmed, there is evidence to suggest that performance outcome outweighs intervention effect when measuring attributions via CDS-II. For example, when asked to assess the same attribution between T1 and T3, all 10 athletes detailed an improvement in adaptive attributions within one of the subscales. In conclusion, this study contributes to attribution theory research by highlighting the limitations of the CDS-II in assessing performance-related attributions.. As a result, future research should consider the creation of a new measure of attributions for participants in performance contexts, where outcome of performance does not significantly interfere with measurability of attributions.

Alternative subdimensions, such as locus of controllability (both internal and external), did demonstrate an increase in adaptive attributions. Findings revealed athlete's improved adaptive attributions associated with controllability. For example, athletes were able to explain performance using controllable elements (e.g., effort) as opposed to uncontrollable elements (e.g., officiating decisions). Despite a change of performance outcomes, athletes were increasingly likely to take responsibility for explanations provided, demonstrating intervention effectiveness enhances controllability. This reinforces findings from Dryden et al. (2021), where participants reported enhancement in controllability were 55% more likely to outperform non-AR counterparts. This also compliments the findings of Parker et al. (2018) who noted student athletes with lower perceived academic control saw enhancement in performance on an in-class test as a result of AR delivery. This aligns with previous findings presented within the thesis where a focus on the subdimension of controllability has been widely received by the lay audience and acknowledged as key for implementation in Chapter 6: Stakeholder Approval.

Locus of causality also revealed an enhancement in adaptive attributions between pre-intervention and follow-up. Used in ARiS Stage 4a: AR Induction, the attributional matrix (Perry et al., 2011) provides a continuum to assess adaptive and maladaptive attributions based on where the cause lies (locus of causality), and whom is in control (controllability). The

continuum for locus of causality lies from the cause being internal, specific to the athlete, to external, being part of the wider scenario as an explanation for our attribution. It is recommended that athletes form internal attributions, as these are controllable and likely to change (e.g., effort, mood, technical execution). Evidence from the co-produced ARiS intervention protocol, and previous research, would indicate athletes will take internal responsibility when the outcome of performance is positive (Simonton & Garn, 2020). Athletes want to praise or credit successful performance down to their own internal actions, as opposed to a negative performance outcome which is typically distanced by forming external attributions such as blaming the weather, the officials, or the other external personnel (e.g., the coach, the peer, the opponent). Considering the above provides some explanation as to how performance outcome may again outweigh intervention effects.

Critically reflecting on ARiS intervention content may suggest a lack of information on the subdimension of stability in contrast to controllability and locus of causality through the discrepancy in findings across timepoints. As highlighted in the results, stability mean scores conflicted with directional change at T2 and showed minimal enhancement in adaptive attributions at T3. As the attributional matrix frequently referred to in classroom sessions covers controllability and locus of causality in detail, it could be conceded that lack of understanding of stability was demonstrated by the lack of directional change in adaptive attributions across timepoints. Matteucci (2017) assessed 125 college students who were randomly assigned to AR focusing on controllability, AR focusing on stability, and a control group. Findings revealed that AR focusing on stability was effective in reducing self-defeating attributions to encourage more adaptive attributions in the future. Pre-post intervention comparison also revealed significant improvement in the formation of adaptive attributions for academic events by reducing attributions unlikely to change (e.g., stable). The findings of Matteucci (2017) can aid justification of inclusion of stability in AR materials. Polman et al. (2007) also recommend future AR research to focus upon educating how stability impacts our explanations for performance. However, research on this dimension is still limited.

Qualitative findings support an enhancement in adaptive attributions with an increase in healthier explanations for performance. Use of vignettes to enhance embedding of taught content has been used previously in AR research (Hall et al., 2007). It was also recognised as a key element of integration to use attributions for performance that would relate to by the athletes participating in the interventions. Therefore, with anonymisation and permission from the five participants in Think Aloud, vignettes collated from transcripts directly related to the group and the sport were essential for group understanding of adaptive and maladaptive

attributions. Using Think Aloud within ARiS, findings revealed an increase in adaptive attributions during performance, which complemented anecdotal evidence from semi-structured interviews, and quantitative findings demonstrating significant change in means for adaptive attributions over three time points. These findings encourage future attribution retraining researchers to capture attributions during task performance as opposed to retrospectively to specifically assess the impact of attribution retraining content. For example, the use of athlete's mic'd up excerpts as vignettes for AR consolidation visibly increased athlete buy-in within the psychoeducation sessions as athletes were invested in what they were thinking during performance. Limitations with the practicalities of being able to think aloud during some physical sports should be considered and as a result future ARiS users can still carry out traditional observation methods if think aloud is physically restricted.

Addressing the secondary aim of the research, increases in received social support, mental well-being, and subjective performance were all present in the delivery of ARiS.

In line with previous research, findings from this study extend the recommendation of Coffee et al. (2020) who highlighted the need to consider the role of social support and social identity in formation of attributions. This is indicated by the positive enhancement in received social support because of undergoing the ARiS intervention and echoed by the self-reflected benefits of the lead researcher being integrated as a member of the in-group to aid intervention integration. Not only proven to enhance performance for athletes previously (Fogaca, 2021), improving perception of received social support can aid sustainability of intervention effects for athletes in the future (Burns et al., 2019). Delivery of the ARiS intervention collaboratively with athlete and their coaching team demonstrated an increase in both attributions primarily and received social support from the perspective of the athlete. This may be due to increased education of how significant others can facilitate construction of adaptive attributions. As a result, future ARiS delivery should continue to educate the athlete and their significant others to aid sustainability of intervention effects regarding healthier attributions and perceptions of received social support from the athlete's perspective. Critically, findings from this study recommend that researchers employing attribution retraining interventions should consider educating the support network to their participants (e.g., teachers if delivering AR to students; see x)

From a social identity perspective, the role of an integrated researcher also aided intervention implementation. Previous research from Rascle et al. (2019) noted that buy-in to attributional retraining education was reduced when participants perceived the intervention to be delivered by a member of the "outside group" (Minkler et al., 2019). The role of the in-

group was also considered important for attribution feedback by Le Foll et al. (2008), who noted the athlete support network could influence cognitive, behavioural, and performance outcomes based on their perceived identity from their athletes. For example, when delivering ARiS the lead researcher was invited to wear a tracksuit jacket of the futsal team associated with athletes receiving the intervention. This aligns with previous research findings where attribution retraining education encourages delivery of education from an in-group member, although no data were collected to verify effectiveness or prevalence of social identity. Therefore, future ARiS delivery may consider assessment of social identity when implementing AR interventions to enhance motivation or sporting performance.

Mental well-being of athletes is fundamental for effective sporting performance (Breslin & Leavey, 2019; Clough & Strycharczyk, 2015; Rice et al., 2016). Although improvement in mental well-being overall was minimal (7.14%), a positive improvement highlights the role of attributions in enhancing healthier reflections post-performance, which can aid positive mental well-being overall. Parkes and Mallett's (2011) research revealed AR enhanced mental toughness by increasing mental well-being relating to optimism, resilience and confidence. Considering both study findings alongside those of previous research, future research may consider ARiS to enhance cognitions associated with improved mental well-being and mental toughness. ARiS should still be considered primarily as control, motivation, and performance enhancing, however results demonstrate the effectiveness of ARiS as a mental well-being enhancing intervention.

Findings of the current study also highlighted that there was an increase in subjective performance pre post intervention. However, it could be suggested that responses to subjective performance were affected by mood associated with performance outcomes. For example, At T1, performances for the team were poor, and they had just suffered their biggest defeat of the season. At T2, the team were amid their best performance run of the season and had just qualified for the quarterfinals of BUCS futsal league competition. Although this could not be considered when implementing ARiS, and is purely coincidental, findings for subjective performance may wish to be considered prudently in consideration of performance affected mood at time of completion (Totterdell, 2000). For example, to remove the influence of results from assessment of subjective performance, athletes could complete the subjective performance questionnaire in relation to their most recent training session where success and failure is not measured.

Finally, acceptability and adherence measured using the TFA evaluated acceptability of content and mode of delivery of the ARiS intervention in line with thesis aims. Findings of

the current study revealed successful elements of ARiS surrounding ethicality and implementation effectiveness as well as positive scores for self-efficacy, and burden. Qualitative data also highlighted a successful pilot of the intervention, with athletes noting the easy of understanding content, integration into pre-existing routines, and application to futsal and broader sport as major strengths of the intervention. Notes for future intervention improvements include adding additional resources for the support network to aid sustainability of intervention effects, as well as presence of a sport psychologist to support delivery where possible.

### **Applied Implications**

AR interventions are effective in reducing maladaptive attributions and increasing adaptive attributions. This study shows that the co-produced ARiS intervention reduces maladaptive attributions by educating individuals on reducing negative reflections and explanations, such as external blame or focusing on the uncontrollable. This occurs to emphasise the importance of adaptive attributions which can enhance future motivation for similar events in the future (Perry, 1993). To support this process, delivery of ARiS provides an intervention to enhance adaptive attributions, providing the recipient with understanding of the importance of controllable thoughts relating to themselves. This shift from maladaptive to adaptive attributions via ARiS delivery aims to create healthier explanations for performance, which has also been demonstrated within this chapter to link with positive increases well-being, received social support, and subjective performance.

The greatest improvements are observed in attribution retraining when the performance-related outcome is linked to failure, which in turn increases likelihood to generate maladaptive attributions (Perry, 1993). Conversely, minimal improvement is noted if the most recent performance prior to ARiS intervention delivery is positive or successful and therefore likely generating adaptive attributions. Subjective ratings have been demonstrated to be contingent on performance outcomes. Hakanen and Schaufeli (2006) revealed that athletes who had positive objective performance markers (e.g., a win) were more likely to score higher on subjective performance assessment. Conversely, the same trend was noted for athletes who had recorded negative objective performance markers (e.g., a loss) associated with negative subjective performance assessment. This trend, although not officially explored using objective performance markers, appears accurate given the associated objective results at T1 and T2 noted previously.

As a result, one of two considerations could be made for interventions using subjective measures of assessment. Firstly, individuals should complete subjective ratings (e.g., CDS-II)

based on non-competitive performances (e.g., training) as opposed to subjective ratings with direct performance outcomes attached (e.g., last competitive futsal performance). This is like Moffat et al. (2021), where tennis players completed the CDS-II based on performances in training or non-competitive matches.

Secondly, future interventions that rely on subjective measures might benefit from a dual-pronged approach to data collection, incorporating qualitative assessments or external observations to provide alternative metrics that are less influenced by performance outcomes. For example, use of TA during performance within the ARiS intervention was used to identify increases in adaptive attributions in the moment as opposed to capturing reflective attributions that may be influenced by eventual performance outcome. Future interventions studying cognitions should consider using TA where tasks permit during physical performance. As research continues to evolve using TA as a method to capture real time qualitative data in sport (Stodter & Whitehead, 2024), ARiS delivery should consider this element fundamental to gain insight into attribution formation during performance and not just post reflection. Evolving with recommendations for usage of TA, alongside traditional video observations where TA is restricted by physical demands, ARiS can continue to present novel insights into psychological performance during competition. This is important as it allows for understanding of cognitions during performance as opposed to retrospectively.

Finally, summarising the key points of ARiS for the purpose of a coach may be appropriate when gaining access to athletes. For example, a short form of the intervention directed to what is required of the coach and when, would allow them to support integration, in turn enhancing likelihood of positive intervention outcomes. For ARiS, this could mean a week-by-week synopsis of the 5 stages and how much time is required and when. This would include collaborating on the practical consolidation with use of coach's sport-specific expertise as well as making them aware of additional time requested for the intervention to be successful. Prior to delivery, an initial discussion with a coach or gatekeeper to the intervention recipients is recommended to encourage successful integration of intervention materials.

### **Strengths, Limitations and Future Research**

Findings through use of ARiS have revealed a successful intervention in enhancing attributions, coinciding with improvements to mental well-being, subjective performance, and received social support. Integration of the researcher as part of the coaching team was beneficial for successful implementation of the intervention. The integration allowed for relationships to be built amongst the athletes and their support network in turn increasing the personalisation of ARiS intervention content. For example, the teams' self-generated motto

was integrated into ARiS education presentations which enhanced collective buy-in of athletes and their support network (Athlete 5). Future research should consider integration as a key element for delivery of sport psychology interventions. ARiS delivery would also benefit from pre-existing relationships or integration of an applied researcher amongst the coaching team whereby athlete buy-in is increased because of the ‘in-group’ status attached to the researcher. For example, future research could assess whether social identity extends or limits ARiS intervention outcomes depending on in-group vs. out-group status in line with Coffee et al. (2021). Further research around the importance of social identity theory in delivery or receipt of sport psychology interventions generally would also be beneficial to assess impact of in-group status on intervention outcomes.

A second strength of this research is the evaluation of acceptability and adherence via TFA questionnaire data in line with recommendations to include this during intervention development (Sekhon et al., 2017, 2022). This provided opportunities for athletes to assess and provide opinion on the delivery and content of the ARiS intervention to support with development of a novel intervention. Although the TFA questionnaire was conceptualised in healthcare, rigorous assessments of ecological validity and rigour using social validation data supports intervention development via co-production. This also aligns with the origins of co-production in healthcare where future product users feedback helps ensure interventions meet needs of the target audience rather than what is expected to be needed (Pettican et al., 2023). Conclusively, future intervention development should continue to collect social validation data as part of developing and adjusting pilot intervention protocols as opposed to once the intervention has been fully developed.

A final strength of this research is the inclusion of a follow-up assessment. Recommended by research in co-production (McLean et al., 2023), single case experimental designs (Kilgour et al., 2024), and attribution retraining (Russo & Oliveros, 2024), follow-up assessments were fundamental to demonstrate ARiS intervention effectiveness. The period between post-intervention assessment and follow-up assessment could be considered in advance of intervention delivery and decided on a case-by-case basis. Although a follow-up in delivery of ARiS was introduced because of T1 to T2 data collection issues, further timepoints allow for assessment of intervention outcomes sustainability which is encouraged. Future research using ARiS, and other sport psychology interventions generally, should continue to use follow-up assessments to demonstrate sustainability of intervention effects in turn enhancing positive outcomes for longer.

Limitations of the traditional pre-post intervention findings was revealed by use of CDS-II in relation to assessing changes in attributions. As noted in the findings, the CDS-II is a 12 question, 7-point Likert Scale questionnaire that provides scores for attributions overall and Weiner's dimensions of controllability (internal and external), stability, and locus of causality. However, as also revealed in the findings, there were limitations of the questionnaire and its use. Specifically, explanations provided as part of completion of the questionnaire have a significant influence on the consequential questionnaire scoring, minimising the assessment of any ARiS impact. For example, an athlete who had a successful performance was likely to score highly on stability as they wish for these reasons to be permanent, but this instead creates maladaptive habits. Conversely, an athlete who had an unsuccessful performance was likely to score low on stability as they wished for these reasons to change in line with a desire to win, indicated adaptive habits. To reduce the likelihood of this occurring again in future research, three recommendations are put forth: (1) complete the CDS-II in relation to the athletes' most recent non-competitive performance (e.g. a training session), or (2) explore other means of assessment for attributions that may reduce emphasis on attributions for most recent performance such as CSGU (Coffee & Rees, 2008), or (3) creation of a purpose-built attribution assessment when retraining.

Methodological considerations when delivering ARiS as a SCED may have also combatted identified issues relating to objective performance influencing intervention outcomes. To reduce methodological shortcomings like so, Barker et al. (2020) recommend applied researchers should be encouraged to take stable and lengthy baselines of dependent variables to enhance SCED quality, and in turn enhance reliability of intervention effects. They also suggest that researchers use multiple measurement points during both baseline and intervention phases to better capture variability and trends. This approach not only helps to establish a clearer relationship between the intervention and observed changes but also mitigates the risk of misattributing changes to extraneous factors.

## **Conclusion**

The case-study design outlined the successful pilot implementation, and aided evaluation of effectiveness via acceptability and adherence, of an ARiS intervention with a university futsal team ( $n = 10$ ) and their support network ( $n = 4$ ). Findings suggest that a co-produced ARiS intervention protocol can successfully enhance adaptive attributions in athletes. Findings also demonstrated that prevalence of adaptive and maladaptive attributions are contingent on the competition outcome (e.g., win or loss). This was further highlighted by assessing the same attribution at T1 and T3, and therefore removing a change in objective

performance outcome, indicated an increase in adaptive attributions across all 10 athletes via controllability, stability or locus of causality. Overall, the findings of this study highlight that the ARiS intervention can be an effective motivation, control, and performance enhancing intervention. The intervention can also improve generation of adaptive attributions, received social support, mental well-being, and subjective performance.

## **Chapter 8**

### **General Discussion**

## Summary of Thesis

The purpose of the thesis was to co-produce a novel attribution retraining in sport intervention. Chapter 1 provided an introduction and overview of the relevance of this work to knowledge contribution around attribution theory and attribution retraining. Chapter 2 presented an extended review of literature on attribution theory and its application as an intervention both within and beyond sport. The literature review highlighted limitations in previous findings (e.g., a dearth of AR literature in sport). Findings of the literature also highlighted the opportunity to explore attribution retraining methods with an athlete and their support network in line with the influence of social identity theory (Allen et al., 2012; Coffee et al., 2020). Chapter 3 explored the underpinning methodology of co-production, and associated methods for intervention development via collaboration with stakeholders. A section discussing research philosophy was also provided.

Chapters 4, 5 and 6 present the methodological development of the co-produced Attribution Retraining in Sport (ARiS) intervention protocol. Using Hawkins et al. (2017) co-production guidelines for intervention development, three stages are reflected in three chapters, one for each stage (i.e., Chapter 4: Stage 1, Chapter 5: Stage 2, Chapter 6: Stage 3). Chapter 4 is presented in two parts: (a) a systematic scoping review into attribution retraining methods in line with requirements of an evidence review (Hawkins et al., 2017), and (b) consultation with stakeholders from six stakeholder groups: athletes, coaches, support staff (e.g., sports psychologist), national sporting organisation representatives, attribution theory researchers, and social identity theory researchers. The systematic scoping review provided evidence of attribution retraining interventions which have been developed since the last systematic review in 2000. Conclusions highlighted a gap in sport research and emphasised the need for a sport-specific attribution retraining intervention to support future studies, as suggested by Rees in 2005. In Stage 1b in Chapter 4, Stakeholder interviews further supported co-production of an attribution retraining interventions specifically, with consideration to the role of the support network in sustainability of intervention outcomes. Chapter 4 concluded with the co-production of ARiS intervention protocol v.1 based on both systematic scoping review of existing evidence and opinions of stakeholders on the development of an AR in sport intervention in the future.

Chapter 5 presents the development of an intervention development group (IDG) to further refine an ARiS intervention protocol. Chapter 5 concluded with the output of ARiS intervention protocol v.3 based on two iterative rounds of data collection. The final stage of co-production, which was outlined in Chapter 6, required expert stakeholders to suggest final

refinements to the ARiS intervention protocol v.3. Interviews were conducted with a new expert from each of the six stakeholder groups (Athletes, Coaches, Sport Practitioners, National Sporting Organisation Representatives, Social Identity Theory Researchers, and Attribution Theory Researchers). The co-production process resulted in the development of a pilot-ready ARiS intervention protocol. Chapter 7 provided the final primary findings of the thesis, with a case study outlining the piloting of the ARiS intervention with a university futsal population.

Considering the above, this thesis makes an original and unique contribution to knowledge by presenting the first body of work which involves creating an attribution retraining intervention protocol purpose built for applied settings in sport. Although two previous studies have used AR in applied sport, neither study applied a consistent intervention protocol nor identified the role of performance outcomes on attributions (Parkes & Mallett, 2011; Moffat et al., 2021). However, building upon the findings and methodologies of Moffat's recent contribution, ARiS provides a five-stage approach to retraining attributions with flexibility to be applied across different sporting environments and over different time durations. Receipt of the ARiS intervention was also widely accepted by athletes and their support network, demonstrated through feedback in Chapter 7's acceptability and adherence quotations and results.

Thesis findings also uniquely revealed that performance outcomes (i.e., whether an athlete won or lost) outweighed the influence of attribution retraining interventions. However, when performance outcomes were reduced from influencing questionnaire completion at the follow-up stage, results indicated that ARiS was successful in enhancing adaptive attributions for all ten futsal players. Moffat et al. (2021) acknowledged the potential of results influencing attributions by completing data collection during competitive friendly matches where performance outcome was not as prominent. But no research prior to this thesis had assessed and acknowledged that performance outcomes can affect associated post-performance attributions. The findings of this thesis highlight how multiple timepoints for measurement of attributions can reduce influence of performance outcomes at the time of completion of the CDS-II. This evidence should be noted beyond sport specific attribution theory research (e.g., academic performance; Parker et al., 2018) whereby performance significantly influences construction of attributions. This method of multiple timepoints to assess attributions is not uncommon in education research (Ruthig et al., 2006; Hall et al., 2006), however, longitudinal assessment of ARiS in future research using the CDS-II could be considered to reduce effects of performance outcomes on assessment of intervention impact.

The co-production of an ARiS intervention continues to bridge the knowledge-do gap between sport and research, specifically with consideration to translation of content into practice. This is demonstrated via delivery of psychoeducation and attribution consolidation via non-traditional (e.g., on a football pitch) methods, as well as engaging athletes and their significant others with “cheat sheets” and encouragement for use of mobile devices to capture post-performance reflections.

The development of the ARiS intervention advances psychoeducational practices in sport by recognising the importance of involving the athlete's support network as an integral part of the intervention. Unlike traditional approaches, ARiS simultaneously educates both athletes and their significant others to reinforce key concepts and promote the long-term sustainability of intervention goals, even in the absence of the delivery team. When pre-existing relationships allow, the intervention facilitates joint psychoeducation sessions, enhancing the athlete's perception of social support through shared understanding and consistent messaging around healthier attributional styles. This would also likely enhance the significant other's competence in providing effective support post-performance with knowledge of constructing healthier attributions themselves. As demonstrated in Chapter 7, this collaborative approach strengthens the impact of psychological support. Findings extend research from Allen et al. (2011) who emphasised the value of involving both athletes and their significant others in fostering healthier attributions for more lasting outcomes. However, at the time of writing, no attributional retraining interventions had directly targeted both primary recipients (e.g., athletes or students) and their significant others (e.g., coaches, teachers, or parents). Thus, ARiS fills this gap by translating attribution theory into a practical, applied framework that not only supports athletes but also educates their significant others to sustain intervention effects.

### **Theoretical Implications**

This thesis uses attribution theory to support the development of an ARiS intervention, addressing recent shortcomings in attribution theory literature (See Chapter 4). The ARiS intervention protocol developed within this thesis provides an appropriate AR intervention that can be integrated within, and used across, sport. This thesis has key theoretical implications for attribution theory, with additional considerations for social identity theory and social support.

The first theoretical implication is the direct development of an AR intervention for sport. Sport has been frequently highlighted throughout this thesis as a domain with a dearth of AR research with almost five times as many AR interventions been published in education (See Chapter 4). Of the eight research articles that have used AR interventions in sport, only two

have worked directly in applied sport settings with sports teams to enhance adaptive attributions (Parkes & Mallett, 2011; Moffat et al., 2021). Although delivering AR, neither of the two research articles used an AR specific intervention protocol to aid enhancement of adaptive attributions. Moffat et al. (2021) employed AR within a WISE intervention design, whilst Parkes & Mallett (2011) integrated AR into a psychoeducation programme design based on the Optimistic Swimmer (See Chapter 4 for further information). This thesis, therefore, becomes the first to create an AR intervention protocol specifically designed for use in sport settings.

With co-production of a control and performance enhancing AR intervention, the thesis also provides theoretical advancements for future AR researchers to consider both within and beyond that of sport. Firstly, AR researchers generally should consider whether the traditional positivistic experimental design used previously in research is appropriate for use in sport and applied settings. This may be due to the rigorous structure employed in those positivistic AR intervention preventing authentic participation from athletes in sport (e.g., all delivery takes place in a classroom with no application in sporting environments). Secondly, AR researchers may consider whether use of the ARiS intervention may be a more appropriate and flexible solution to use in both sport and research settings in the future in comparison to other AR alternatives (e.g., three-phase protocol). For example, future research deploying AR in education could use methods within ARiS to collect attributions during an in-class test as opposed to reflectively (e.g., attach a microphone during an in-class test).

Following on from the first theoretical implication, this thesis presents an alternative, qualitatively supported, AR intervention design underpinned by attribution theory research. AR research has been dominated by positivist designs, with much of the focus on experimental quantitative research, particularly within education (See Chapter 4). However, assessment of qualitative attributions can demonstrate intervention effects during real time performance, as opposed to statistically via traditional methods to assess changes in attributions (e.g., CDS-II). To capture this, Think Aloud has been used previously in AR research (Moffat et al., 2021) and demonstrated to be effective in Chapter 7 of this thesis. Researchers exploring the presence of attributions in the future, particularly within applied research settings, should consider capturing attributions via Think Aloud and other qualitative forms of assessment to compliment traditional questionnaires that have already been proven effective for AR intervention analysis. This can provide further evidence via verbal extracts to support statistical demonstration of a move towards healthier attributions for performance.

A third theoretical implication is how attributions and performance outcomes interact to influence findings of the ARiS pilot intervention. Findings revealed that performance outcomes outweighed intervention benefits when athletes reviewed explanations for their most recent performance via the CDS-II. For example, if a performance outcome was positive, athletes would not want their attributions to change in the future (stability), which attribution theory research would indicate to be maladaptive. As a result, the tenet of stability disrupted assessment of intervention outcomes between T1 and T2 for this reason. These findings demonstrated that performance outcomes (e.g., a win or loss) outweighed intervention effectiveness. Therefore, two conclusions can be made for future research to consider. Firstly, removal of performance outcome attached to CDS-II completion is recommended. Like Moffat et al. (2021), future researchers using ARiS could invite participants to complete the CDS-II in relation to their most recent non-performance outcome related activity (i.e., training session with no performance outcome). Secondly, researchers should consider developing a sport-specific measure of attributions. For example, creating an instrument that adapts based on the performance outcome associated with the attribution may help address some of the limitations identified in this thesis. However, Chapter 7 does demonstrate the value of assessing the same attribution provided at T1 longitudinally via the CDS-II to prevent influence of performance outcome on completion of the questionnaire.

Fourth, this thesis continues to extend the work of researchers in AR to move interventions outcomes towards control-enhancing as opposed to motivation-enhancing. Originally as a strand of research tied into motivation theory, attribution retraining was viewed as a motivation-enhancing intervention. However more recent research has shown that AR treatments lead to adaptive changes in students' causal attributions, shifting them away from uncontrollable attributions and towards controllable attributions (Murphy et al., 2023). Consistent with feedback of stakeholders in Chapter 6, the co-produced ARiS intervention focuses on controllability as the main form of attributions that can be retrained. This is due to being the most lay-friendly tenet of attribution theory compared to stability and locus of causality (e.g., controllable and uncontrollable are commonly used in sport). Encouraging athletes to think about explanations that are in their own control as opposed to those that are uncontrollable forms the foundations of ARiS content. Aligning with co-production recommendations in the thesis, Chapter 7 pre-follow-up results indicated an increase in average change of means across overall group scores for both internal and external control. AR interventions in domains where participants are unfamiliar with attribution theory should

consider a control-enhancing approach to translate research into practice, as shown by feedback in Chapter 7.

The fifth theoretical implication present throughout the thesis is the continued exploration of social identity theory and social support in relation to attributions. Building on the idea that “attributions are never formed in vacuum” (Coffee et al., 2019), the thesis demonstrates the crucial role of others in helping athletes retrain and sustain healthier performance attributions. As the thesis progressed, it became evident that the presence of significant others and the support they provide was more influential than the specific identities of those individuals, suggesting that social support played a more central role than social identity. This emphasis likely stems from co-production feedback; for instance, Social Identity Researcher 2 recommended removing social identity mapping from ARiS protocol v.2 to reduce cognitive load, while Coach 2 emphasised educating both coaches and athletes simultaneously to ensure healthier attributions were central to ARiS delivery. This does not imply that social identity theory is irrelevant to attribution theory, but rather that ARiS’s early development was more distinct in educating athletes and their support networks than in uniquely integrating attribution retraining with social identity theory. Future research should consider examining attribution retraining more broadly, or the ARiS intervention specifically, in relation to social identity theory, especially considering Coffee et al.’s findings on the saliency of intervention effects when delivered by in-group versus out-group members. Chapter 7 findings supported this, revealing improved social support for all 10 athletes during ARiS delivery, aligning with Perry et al. (2010), who found that the identity of the attribution retraining facilitator influenced the effectiveness of the intervention. The Stage 1a evidence review also emphasized the necessity of involving others to promote and maintain adaptive attributions for long-term ARiS effectiveness. Educating an athlete’s significant others about adaptive versus maladaptive attributions appears to aid in sustaining healthier post-performance attributions. Therefore, future research should continue examining the role of significant others in AR interventions and assess whether sustained effects are linked to perceived social support, potentially including the influence of social identity within the intervention delivery team and the impact of in-group versus out-group dynamics on attribution outcomes, as suggested by Coffee et al. (2020).

The final theoretical implication from this thesis is the recommendation to use co-production in future development of interventions in sport. Use of participatory, collaborative approaches was at the forefront of developing the ARiS intervention protocol. Following Hawkins et al. (2017) co-production guidelines for intervention development, 22 different

stakeholders from applied sport and research backgrounds were involved in the co-production of the ARiS. Stakeholders contributed to providing opinion via interviews (n =15), focus groups and qualitative surveys (n = 6), and email chains (n = 1). Co-production with stakeholders in sport and research was essential for the refinement and formation of the final ARiS pilot protocol. The benefit of using co-production is the equitability of researchers and applied stakeholders on providing amendments and opinion to inform intervention development. Hawkins et al. (2017) guidelines specifically could be considered broadly across intervention development in sport, where protocols could consider further the needs of those in sport (e.g., athletes and coaches) as opposed to prioritising only empirical research direction. In turn, future research that involves athletes and their support networks in developing interventions is likely to increase athlete buy-in during future delivery.

### **Applied Implications**

The findings presented within this thesis have several applied implications. The first applied implication to consider upon conclusion of the thesis is the encouragement for researchers to integrate and embed sport psychology within sports teams. Thesis findings conclude that integration of interventions within the participant's day to day routine is fundamental for intervention buy-in. To aid integration, this may include physical delivery of the intervention beyond a traditional classroom environment, use of appropriate learning technologies to consolidate intervention content, or embedding of the intervention delivery team within the current staffing structure. Firstly, delivery of ARiS was integrated within the target populations' training schedule. ARiS did not require any attendance or commitment beyond the futsal players pre-existing schedule as all content was integrated into pre-existing sessions. Although this may not be possible in all sporting environments, future intervention deliverers in sport could consider adapting intervention delivery to integrate with the pre-existing regime of the recipients. To support this, use of appropriate technology to consolidate intervention content can enhance engagement with the intervention itself. For example, recognising the increase in mobile technology, Jordana et al. (2023) note how traditional rational emotive behavioural therapy (REBT) interventions have modernised to use mobile applications to allow athletes to have access on the go and on demand. Within thesis findings specifically, stakeholders highlighted during co-production the value of sharing information via messenger groups (e.g., WhatsApp) to share information regarding the ARiS intervention (e.g., delivery schedule or cheat sheets). Future ARiS research specifically, and sport psychology interventions broadly, should consider the value of developing a mobile friendly

intervention that may further support usability on demand. For example, ARiS could consider using an artificial intelligence (AI) driven mobile application that supports athletes categorise their inputted attributions as either adaptive or maladaptive. Considered the future of sport psychology delivery (Raab et al., 2024), algorithms could then direct users to further education dependant on their assessment of their attributions.

The second applied implication is the adaptation of intervention content to be sport or team specific. Although not necessarily novel in approach, ensuring an intervention is relevant to the participant's particular sport was noted in thesis findings as a reason for adherence to ARiS intervention delivery. This could be a consideration when incorporating sporting examples into psychoeducation content or demonstrating intervention purpose to recipients. Further investing time prior to intervention delivery to adapt content to suit the team or athlete specifically is recommended to enhance buy-in. For example, in the current thesis, the ARiS protocol was adapted to consider futsal as a sport and adapted to use the teams' motto, logo, and fixture schedule. As a result, athletes noted that they felt like the intervention was designed specifically for them. This was acknowledged by their coach within regards to engagement in both classroom and practical sessions. Conclusively, personnel delivering psychological interventions within sport and exercise settings should prioritise adaptation of content to suit sport specific needs and contexts.

Third, embedding of the intervention deliverer(s) was integral to the acceptance and adherence of the intervention protocol in the current thesis. Embedding the intervention deliverer(s) is emphasised by Woods et al. (2022), who highlight how interventions should be undertaken by researchers who act as deeply embedded inhabitants of the contexts they study. This could be a researcher as part of the coaching team as per ARiS delivery, or by empowering members of the pre-existing multidisciplinary teams to deliver elements of the intervention itself (e.g., delivery of ARiS on a futsal court was co-delivered with the coach themselves). Future intervention delivery in sport psychology should consider who is delivering the intervention and whether they can be embedded as part of the pre-existing staffing structure to enhance acceptability and adherence.

The final applied implication of this thesis extends calls to educate the athlete's significant others alongside athletes themselves when delivering sport psychology interventions. Significant others could include coaches, sport practitioners, and parents or guardians who may influence sustainability of intervention outcomes. Chapter 4 explained how stakeholders highlighted the influence of others on an athlete's attribution process. Chapter 5 progressed this notion where the IDG identified the need to educate both the athlete and coach

across the duration of the intervention. Finally, Chapter 6 findings indicate a consideration to educate both the athlete and coach in unison should it be psychologically safe to do so. Previous research has indicated the need to educate both athlete and their support network when retraining attributions (Allen, 2012). Findings from this thesis support recommendations to include the support networks of athletes via education of intervention content during psychoeducation of attributions. Education of significant others can both enhance sustainability of intervention effects by facilitating an adaptive attribution environment (e.g., performance debriefs are focused on adaptive attributions) as well as an increase in athlete's perceptions of received social support (See Chapter 7). Significant others may also feel more competent in providing social support for athlete's post-performance because of their own psychoeducation (Knight et al., 2018). Further, ARiS Stage 2c: Round table discussion with parents and care givers could be altered for adult athletes towards inclusion of all significant others (e.g., the partner, the coach, the physio) where education is provided around formation of healthy attributions in sport. As a result, those responsible for delivery of sport psychology in sport and exercise settings should involve the participant and their support network in education during intervention delivery, where possible (e.g., providing an education resource or 'cheat sheet' like those used in ARiS). This will further enhance the sustainability of intervention effects (e.g., the athletes support network has an understanding of what constitutes adaptive and maladaptive attributions and therefore can form better attributions themselves).

### **Strengths and Limitations**

A strength of this thesis is the rigorous methodological underpinning to intervention development using Hawkins et al. (2017) co-production guidelines. Methodological issues in sport and exercise psychology intervention literature focus on implementation and evaluation. Notably this includes lack of details on how interventions were operationalised (Whitley et al., 2019), inadequate or no use of theory (McEwan et al., 2019), heavy reliance on self-reported data (Gill et al., 2023), and lack of intervention fidelity measurement (Bates, 2022). This thesis extensively details the interventions' development via Chapter 4, 5, and 6, alongside operationalisation in Chapter 7 via the pilot study addressing limitations outlined above. Underpinned by 40 years of empirical research, ARiS is built upon a rigorous theory, proven to be effective in the domain of sport (Rees et al., 2005). Although 99.4% of previous attribution related research is traditionally reliant on quantitative research (Allen, 2012), ARiS addresses the limitation with use of Think Aloud to capture attributions during performance, following recent AR research in sport. Incorporating this method into the intervention protocol

also provides examples of live attributions during performance, a unique addition to attribution research from Moffat et al. (2021). Utilising athletes' audio recordings provided verbalisations to assess impact of ARiS and supported integrated delivery of psychoeducation sessions by using the team's own quotations as materials.

The second strength of this thesis is the co-production of a sport specific attribution retraining protocol. Despite previous calls for an increased use of retraining attributions to enhance sporting performance (Miserandino, 1998), only two studies since have used attribution retraining methods in applied sport settings (Moffat et al., 2021; Parkes & Mallett, 2011). This thesis contributes to attribution retraining research by extending successful implementation of AR in sport to improve subjective performance, as well as mental well-being, and received social support. Uniquely, co-production of a flexible ARiS intervention protocol aims to reignite research interest in use of AR in sport by providing an applied sport specific intervention with a focus on integration and engagement.

The final strength of this thesis is the importance of qualitative methods to determine intervention effectiveness beyond the normative method for measuring attributions. Developed through a rigorous qualitative co-production process, the intervention emphasised individual experiences in delivery and assessment of acceptability and adherence. Alternative guidelines would suggest the importance of statistical significance, quantitative validity, and large effect sizes to determine intervention effectiveness (Cumming, 2014). However, this thesis details ecological validity, qualitative rigour, and intervention effectiveness through consistent use of qualitative methods and the present evolution of ARiS protocol development throughout the thesis. Given the lack of qualitative research on attributions in sport, this thesis demonstrates effectiveness of methods such as Think Aloud to provide further insight into how attributions are operationalised during performance. Verbalisation of cognitions during performance allows exploration of live processes for attributions as opposed to capturing data retrospectively post-performance.

A limitation of the thesis is the potential risk of biases and influence from the lead researcher's input. With use of participatory methods, the transformation of power from researcher to participant can be influenced by desirability of outcomes or the researchers personal biases (Turnhout et al., 2020). With the potential challenges highlighted, there has been numerous actions taken to try and reduce risk of bias. During co-production, all revisions were suggested by stakeholders and completed by the lead researcher. The lead researcher acted in a position of facilitator as opposed to a co-researcher making alterations. To reduce risk of bias, recruitment in co-production also excluded potential stakeholders working at the same

institute where the lead researcher was connected. Ultimately, co-production is methodologically critiqued for the risk of bias in delivery with researcher presence, but this can be reduced with role clarity and transparency of influence on eventual results (Flinders et al., 2016; Williams et al., 2020). For example, acknowledgement to my role as lead researcher, neophyte practitioner, and part of the coaching team in Chapter 7 should be considered a factor that could have influenced eventual findings (e.g., engineering healthier attributions through coaching the players outside of intervention delivery). Conclusively, qualitative research methods do not intend to fully alleviate bias or factors such as social desirability, and this should be considered when interpreting the results in a quantitatively dominated field of research such as attributions (Patton, 2002).

### **Future Directions**

As part of this thesis, only one pilot study of the co-produced ARiS intervention was conducted with a university futsal population. Given the small sample size already discussed, findings from Chapter 7 may not be transferrable across the domain of sport and exercise. As a result, this novel intervention requires further research to enhance and assess efficacy, as well as considering validity and reliability from a quantitative perspective to enhance methodological rigour. Researchers should consider implementing ARiS in different sports to assess different barriers to data collection and intervention delivery. This could include individual sports where the team around an athlete is smaller, physical combat sports where Think Aloud may not be possible during assessment, and adolescent sport to assess whether appropriate considerations are already in place or if work is required (e.g., maladaptive attributions linking to parent/guardian support that may require further education). Consideration may also be given to sports where coach influence is higher during performance and therefore can have a greater impact on formation of attributions. For example, archery can see coach engagement after each end completed, whereas sailing will not see their coach until they return to shore. Therefore, the role of the coach in attributing performance may change with the amount of time spent in dialogue during performance.

Methodologically, the ARiS protocol pilot study revealed some limitations with performance outcomes outweighing intervention effectiveness. To caveat this, use of a control group vs. an ARiS intervention group could be considered. For example, future research could use two teams or individuals from the same club or sport to assess intervention effects against a baseline control group. Alternatively, a longitudinal study over the duration of a sporting

season could decrease the influence of performance outcomes by capturing multiple timepoints that are not associated with competitive results (e.g., pre-season, post-season).

Recognising that “attributions are never made in vacuum” (Coffee et al., 2019), the role of significant others and social identity were considered throughout the thesis. Assessment of significant others was a consistent discussion point across co-production, and the ARiS intervention was proven to successfully enhance athlete’s perception of received social support in Chapter 7. However, the prominence of social identity theory in assessment of attributions dwindled as the thesis progressed, with minimal mention of its prevalence during co-production. This may have been due to a shift towards social support as opposed to the social identity of those providing social support which appeared better understood to those working in sport (e.g., focus on the role of others as opposed to assessing in-group ties). Although the lead researcher made a conscious effort to buy into the social identity of the university futsal team (e.g., use club mottos, integrate as a member of the coaching team with club kit on), no research was conducted on the influence of these actions. Future research could deliver ARiS with a view to assessing the role of social identity in sport. For example, ARiS could be delivered by two different individuals, where one is integrated into the team, and another is an outsider who is visually depicted with inadequate attire and knowledge. Results could then assess whether the role of social identity influences ARiS outcomes to enhance adaptive attributions. Alternatively, future research may assess the mechanisms as to why ARiS observed effects of increased received social support amongst athlete’s perceptions (e.g., competence of significant others to provide support after psychoeducation).

Acknowledged consistently throughout the thesis, the role of the significant others can be key to enhancing sustainability of intervention outcomes. Although the coaching team were present during full delivery of ARiS, no data was captured to assess whether they themselves had enhanced generation of adaptive attributions. The head coach was assessed using Think Aloud, but further research into whether ARiS enhances generation of adaptive attributions amongst the support network is required. For example, future research may consider asking all personnel attending any aspect of delivery of ARiS to complete pre-post questionnaires.. Data captured could then support claims that educating the support network can positively influence generation of adaptive attributions in athletes, although further observations is recommended. For example, assessing whether the support behaviours of significant others changed because of ARiS delivery would be critical for future research to consider in line with Allen et al. (2012).

## **Thesis Reflections**

Over the course of this thesis, transparency in pragmatic approaches to develop a sport specific attribution retraining intervention have been present. The lead author noted the following reflections upon conclusion of the thesis.

Firstly, the author notes how co-production guidelines (Hawkins et al., 2017) provided a rigorous structure to aid intervention development with minimal disagreement. Although consensus was not an aim of the thesis, it was an element that naturally occurred as stakeholders of all backgrounds provided knowledge equitably in their respective stages. Upon reflection, this does detail some elements of cobiguity where consensus was not discussed but assumed as highlighted in Chapter 3.

Secondly, the lead author's role as a contributor of knowledge as a co-researcher in development of ARiS in Chapters 4-6, and deliverer of ARiS in Chapter 7 can be seen to impact practical validity of this intervention. Although the position of the lead author as a co-researcher had consistent benefit to development of ARiS, it would be beneficial to explore the delivery of ARiS outside of the realm of researchers that have supported development of ARiS within this thesis. Therefore, further research using ARiS beyond delivery by the lead author will further the rigour and validity of this co-produced intervention.

Finally, integration of the ARiS intervention into the sporting environment is essential for participant receptiveness. The increased baseline observation certainly contributed to relationship building between the lead author and participants which enhanced participant buy-in visibly during sessions that required interaction. Engaging in a level of personable interaction beyond that of research inquiry should be considered an element of bridging the gap between research and practice within sport and exercise settings.

## **Conclusion**

In conclusion, this thesis achieved its aim to create a novel attribution retraining intervention for use in applied sport settings. Leaning on co-production, intervention development and refinement was successful, with 27 stakeholders supporting the research team to co-produce an ARiS intervention protocol ready to be piloted. A successful pilot of the intervention demonstrated that ARiS can be effective in enhancing adaptive attributions in sport. Evaluation of the effectiveness of the ARiS intervention was also present. Conclusively, the thesis findings highlight how ARiS can be well-received by athletes and effective in improving received social support, mental well-being, and subjective performance. In the future, ARiS can become a leading control-enhancing intervention that can be adopted by

researchers and practitioners to improve generation of healthier explanations for sporting performance.

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## **Appendices**

**Appendix A** – PRISMA-P Search strategy for systematic scoping review

**Appendix B** – Inclusion Criteria for Stakeholders and Expert Stakeholders in Co-Production

**Appendix C** – ARiS Protocol

## Appendix A – PRISMA-P Search strategy for systematic scoping review.

| Category            | Inclusion                                                                                                                                                             | Exclusion                                                                                            | Justification                                                                                                                                                                                                                                                                                                                    |
|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Key Sources         | <b>Empirical Research and Grey Literature.</b><br><br>Therefore <b>Dissertations, Thesis, Research Reports, Conference Papers, and Articles</b> will all be included. | <b>Review of Books, Book Chapters, Systematic Reviews and Narrative Reviews</b> will all be excluded | There will be no bias towards peer-reviewed documents. Documents that are unable to present primary findings related to AR are not relevant to this study.                                                                                                                                                                       |
| Language            | <b>English</b>                                                                                                                                                        | Anything outside of English                                                                          | There are no resources available to the authors that allow for translation of articles published in alternative languages                                                                                                                                                                                                        |
| Years of Publishing | <b>2000-2022 (Present).</b> This will cover the production of research since the last review was published in 2000.                                                   | <b>Prior to 2000</b> is deemed to have been covered in previous systematic reviews.                  | Despite the secondary aim of online interventions not being published until the 2010s, the area of attributional retraining lacks a systematic consolidation of research since 2000.                                                                                                                                             |
| Search Terms        | Attribut*<br>Retrain*<br>Intervention*<br>Program*<br>Therap*                                                                                                         | Treatment*                                                                                           | Treatment* was used in a scoping review but no results were deemed to have been directly found off this search term. This term also produced excessive amounts of irrelevant articles due to “attribute treatment interactions” returning. This phrase is a methodology of assessing the characteristics of treatment protocols. |
| Search Databases    | SCOPUS<br>SPORTDiscus<br>Web of Science<br>Psych Info                                                                                                                 | Pub Med<br>Google Scholar                                                                            | PUB Med was deemed to not add anything to the previous four databases. It generated no new articles for the review after the previous four searches and added provided heavy focus on medical therapies and interventions. Google Scholar was deemed again to not be a useful addition to the chosen four                        |

|  |  |  |                                                                       |
|--|--|--|-----------------------------------------------------------------------|
|  |  |  | databases due to its lack of specificity and Boolean functionalities. |
|--|--|--|-----------------------------------------------------------------------|

**Information Sources:** Scopus, Sport Discus, Web of Science, PsychInfo. Contact major authors for reference mining purposes , Reference Mining of major publications in the area.

#### **Search Strategy:**

1. (Attribut\* AND Retrain\* OR Therap\*OR Intervention\* OR Program\* OR > 2000 – **661,810 Results**
2. (S1) ti,ab,kw – **116,640 Results**
3. SUBJAREA (psyc) AND S2 – **148 Results\***
4. S3 AND LANG “Eng” –**128 Results**

#### **Final Search Example – Scopus (Retrieved 15.06.2022)**

(Attribut\* PRE/1 retrain\* OR therap\* OR intervention\* OR program\*) ti,ab,kw AND PUBYEAR > 1999 AND SUBJAREA (psych) AND LANG (eng) - **115 Results**

## Appendix B – Inclusion Criteria for Stakeholders and Expert Stakeholders in Co-Production

### *A breakdown of Stakeholder Inclusion Criteria for Co-Production of an ARiS Intervention*

| Stakeholder Type               | Inclusion Criteria                                                                                                                                                                                                                      | Expert Inclusion Criteria                                                                                                                                                                                                               |
|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Athlete                        | Anyone who currently participates in their chosen sport.<br>Stakeholders in this area will not be required to demonstrate any qualification or preferred standard as a variety of experience is welcome.                                | A professional athlete in elite sport                                                                                                                                                                                                   |
| Coach                          | Anyone who currently coaches in a sports club or team.<br>Coaches will be required to be at least Level 2 qualified via the relevant national governing body or have >5 years' experience in the role.                                  | Anyone who currently coaches in a sports club or team.<br>Coaches will be required to be at least Level 2 qualified via the relevant national governing body, have >10 years' experience across multiple age groups and ability levels. |
| Sport Practitioner             | Anyone who is a professional representative of Sport Psychology, Strength and Conditioning, Physiology, Sport Nutrition or Physiotherapy. Participants must hold a BASES or BPS qualification or have >5 years' experience in the role. | Any professional representative of Sport Psychology, Strength and Conditioning, Sport Nutrition or Physiotherapy.<br>Participants must hold a BASES or BPS qualification AND have >10 years' experience in the role.                    |
| National Sporting Organisation | Anyone who is a member of a national sporting association whether this is locally or nationally.<br>Stakeholders in this area should have knowledge of coach education or player development.                                           | Anyone who is representative of a National Sporting Organisation at a National Level. Representatives in these areas should have knowledge of coach education or athlete                                                                |

|                                   |                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Attribution Theory Researcher     | Anyone who has published in the area of Attributions within the last 15 years. Experts in this area will also be qualified at postgraduate level or higher and any experience within sport is welcome.         | development and performance in Elite Sport (Swann et al., 2015).<br><br>Anyone who has published in the area of Attributions within the last 5 years. Experts in this area will also be qualified at postgraduate level or higher and any experience within sport is welcome. Experts will also have over 5 publications in Attribution Theory, with preference in particular to those with knowledge of Attribution Retraining. |
| Social Identity Theory Researcher | Anyone who has published in the area of Social Identity within the last 15 years. Stakeholders in this area will also be qualified at postgraduate level or higher and any experience within sport is welcome. | Anyone who has published in the area of Social Identity within the last 5 years. Experts in this area will also be qualified at postgraduate level or higher and any experience within sport is welcome. Experts will also have over 5 publications in Social Identity Research.                                                                                                                                                 |

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## **Appendix C: ARiS Protocol**

### **Stage 3: Stakeholder Approval of ARiS Pilot Protocol**

Thank you for agreeing to participate in Stage 3 of this Co-Production study to develop a new Attribution Retraining in Sport (ARiS) intervention protocol. Please see below key definitions before reading the full ARiS protocol with supporting materials to aid intervention delivery.

#### **Key Terms Defined**

**Attribution:** Thoughts that allow you to control or predict future motivation in similar events. They often occur when reflecting on performance to a stimulus.

**Maladaptive/Dysfunctional Attribution:** A negative thought that will not improve motivation to a similar stimulus in the future. Attribution Research would suggest this is a thought that is out of a person's control or external to them. An example of this would be the officials, the weather, the opponents.

**Adaptive/Functional Attribution:** A positive thought that will improve motivation towards a similar stimulus in the future. Attribution Research would suggest this is a thought that is in a person's control and internal to them. An example of this would be effort levels, technique used, or preparation to perform.

**Think Aloud:** A method of data collection that is currently popular within sport. Participants will wear microphones whilst performing in their chosen sport and be instructed to voice their cognitions as they perform. This has been used previously in Attribution Retraining research (Moffat et al., 2021).

## **ARiS Pilot Protocol**

The ARiS Pilot Protocol is made up of 5 phases and is recommended to be delivered during pre-season where possible. This is to ensure appropriate time can be dedicated to installing healthier attributions processes for athletes prior to the strain of the competitive season commencing.

**Please note:** The below protocol may require adaptations when working with youth athletes to conform to the safeguarding policy employed by the recipient. This will differ on a case-by-case basis and as a result the below intervention presents guidelines for implementation.

### **Phase 1: Baseline Assessment & Needs Analysis**

In Phase 1, prior to baseline assessment, a needs analysis will be completed to assess viability of population group subject to the ARiS Intervention. Initial conversations with key personnel or a contact point within the sports team will be organised to assess suitability to the intervention. Upon collation of responses, baseline assessment will commence. Athletes will be required to complete the Causal Dimensional Scale II (CDS-II), a questionnaire to assess current attribution levels, as well as capturing the athlete's live attributions via Think Aloud or Video Recordings. These video recordings will also be part of an observation where the sport psychologist should record or note maladaptive examples within the team – these can be later used as anonymous vignettes in attribution induction material. This could also be done by working with the performance analysts to review recent performances which could identify instances of maladaptive attributions or behaviours. Support will be available by contacting Tom Doncom (ARiS Researcher) for all participants if they require help in completing assessment. Both audio and visual recordings will be monitored to pick up on athlete behaviours and verbalisations associated with attributions.

### **Phase 2: Psychoeducation**

Psychoeducation will work across three main strands: In-Class Workshop, In-Practice education, and education of external influences (i.e., the coach, the peer, the parent). ‘Cheat Sheets’ can also be found in the appendices providing an infographic for ‘the athlete’, ‘the coach/support staff’, and ‘the parent/carer’ (See Appendix A, B, & C).

#### **Phase 2a: The In-Class Workshop**

In the psychoeducation phase, athletes and coaches will together participate in 1 x 30-minute workshop to educate them on how and why sport psychology impacts performance before concluding with an exploration into what attributions are, how they work, and why they are important for future performance. Athletes and coaches will also be required to complete group and individual tasks based on example attributions relevant to the specific

sport of the population. These tasks may include dividing vignettes into adaptive or maladaptive examples and viewing videos relating to famous athletes attributing their success or failure before being required to divide the examples into adaptive or maladaptive. Competition/exercises to increase enjoyment in this session will be at the forefront of delivery in the hope the session will be memorable as a result.

### **Phase 2b: In-Practice Education**

An in-practice education will also be created to transfer classroom-based learning into the athlete's sporting environment. Working with the coach(es), this is likely to be built into existing training sessions organically, where identification of maladaptive attributions is emphasised and initial probes to reframe attributions is introduced. The contents of each session are likely to be unique to each group and may involve increasing the likelihood of failure which will supplement the generation of maladaptive attribution. The job of the staff member in charge of implementing ARiS will be to highlight moments of failure where maladaptive attributions have or could occur based on the in-class education in Phase 2a. An example session could be a small-sided game where a member of each opposing team is paired up. If their partner scores, there may be a forfeit, which will in turn provoke failure related attributions for in-practice education to occur.

### **Phase 2c: Parent/Carer Discussion (If in Youth Sport)**

As a round table discussion, parents will be invited to participate in education around attributions in their young athlete. The role of the parent across example topics such as the pep talk in the car to matches, the car journey home, and the feedback from the side-lines will all be covered in round table discussions. Further details for potential topics will be identified in the needs analysis of Phase 1 or informed by the coach/athletes themselves. The intervention lead will facilitate discussion whilst interspersing education around the differences between adaptive and maladaptive attributions, the influence of the parent on their young athlete, and top tips to enhance their young athletes soon to be formed adaptive mindset.

### **Phase 3: Development of "ARiS Leadership Group"**

A leadership team consisting of coaches, athletes, and other external influences (i.e., Members of the club hierarchy, parents, sport practitioners) will be invited to form a "ARiS Leadership Group" to take ownership over the implementation of this process throughout the club beyond the initial psycho education sessions in Phase 2. The ARiS Leadership group can be supported by cheat sheets received in Phase 2 and further information will be available on their responsibilities on a scenario-by-scenario basis. Members of the ARiS Leadership

Group will be identified by collaborating with the coaching staff and athletes to identify key personnel. This may be done via a network analysis approach or by inviting relevant personnel to join. If no one steps forward, the coach may be asked to nominate an athlete representative to work alongside a nominated non-athlete member of staff.

Responsibilities include supporting athletes engineer an adaptive attribution process, reporting issues with the ARiS Intervention to the Sport/Performance Psychologist (if available) and ensuring sustainability of a new or already embedded adaptive thought process beyond the initial intervention. Ensuring sustainability will include reflection on reflective logs and identifying maladaptive attributions if and when possible. Time expected to be given for supporting the delivery of ARiS will likely vary on a scenario-by-scenario basis.

It may be that one member of staff takes more responsibility, and others act as information sharers, but this will be distinguished by each team/club. Number of members will also vary depending on availability, suitability, and internal availability of potential ARiS leadership group representatives.

#### **Phase 4: Attribution Retraining**

The Attribution Retraining phase will be split into two parts: ARiS Induction and ARiS Consolidation. The purpose of Attribution Retraining is to increase functional attributions creating a shift from maladaptive to adaptive attributions.

##### **Phase 4a: ARiS Induction**

Athletes will participate in a 1 x 60-minute ARiS Induction workshop to educate them on the difference between adaptive attributions and maladaptive attributions in their sporting context. They will be provided with video examples of fellow athletes displaying adaptive and maladaptive attributions and the outcomes associated with each. This will also look to utilise the vignettes collected in Phase 1: via Think Aloud and Video Observations. All materials will be made available on demand to suit scenarios where classroom sessions are not available. Acts as a refresher/extension to psychoeducation.

##### **Phase 4b: ARiS Consolidation – The flagging exercise**

Athletes will take part in a training session co-designed with the club's coaching team to increase the likelihood of failure. Failure is most likely to generate negative, uncontrollable, external attributions otherwise known as 'Maladaptive Attributions'. Acknowledgement to the difficulties of any uncontrollable attributions will also be focused upon. By increasing the likelihood of failure, athletes will have an opportunity to put into practice the taught content of ARiS Induction. The ARiS Leadership Group and Coaching staff, alongside the sport psychologist, will ensure the group are "psychologically safe" to

carry out this exercise: parents will also be consulted if in youth sport. This means that group dynamics may need to be assessed, and timing of the intervention considered depending on the atmosphere of the group. For example, identification of any potential conflicts should be noted prior to delivering a failure provoking task or task that require “calling out” peers mistakes. The session is recommended to be delivered in the presence of a sport psychologist for group safety.

*Example Session:*

Athletes will also be encouraged to identify peers who continue to make maladaptive attributions in a task labelled “No Mal Pal!”. The task “No Mal Pal!” is short for “No Maladaptive Attributions Pal” to enhance buy-in from external influences such as coaches and fellow athletes. This name is subject to change to suit the language and buy-in of the group and is only used for example purposes in this protocol. If an athlete is caught attributing their failure maladaptively or in a situation which may potentially provoke a maladaptive attribution, then the team must shout “No Mal Pal!”. Rules and regulations around competitions can be altered internally to suit the group. Not only will this exercise include athletes supporting their peers, but there is also an opportunity where those identifying maladaptive attributions will also develop their own understanding of when these are likely to occur. Failure task will be organised between the coach and sport psychologist to ensure both are happy with the practicality of the task. For example, in soccer, a sport psychologist may advocate that in a small-sided game, one team can only score with their weaker foot whilst their opponents do not have the same restrictions.

**NOTE:** This is a separate in-practice session to that of 2b: In-Practice Education. This session will be focused on athlete involvement and flagging demonstrating and consolidating attribution retraining knowledge acquired from 4a: ARiS Induction.

**Phase 5: Evaluation & Follow-Up**

Phase 5 will include an Evaluation process and Follow-up process which can coincide with relevant timelines that have been set. This will mirror the contents of Phase 1. Athletes will also be encouraged to keep reflective logs post-performance on their attributions and may engage in a “hot debrief” post-performance to capture their immediate attributions. An example of this can be seen in Appendix D: Reflective Log for Attributions. Time frames provided below are recommendations and can be altered to suit groups accordingly.

**Phase 5a: Evaluation**

This phase will mirror the contents of Phase 1: Assessment and Needs Analysis. The CDS-II will be redistributed to assess pre and post intervention progress as well as the use of

Think Aloud/Video Recordings/ 'hot debriefs' to capture live attributions. This data will be used to assess the level of adaptive vs. maladaptive attributions present compared to pre psychoeducation and ARiS intervention phases.

### **Phase 5b: Follow-Up**

In the follow-up phase, athletes will be required to complete the CDS-II for a third time. The ARiS Leadership Group will also be consulted on sustainability of ARiS intervention and next steps will be developed on a case-by-case basis. Next steps may include revisiting Phase 2: Psychoeducation or Phase 3: ARiS Intervention depending on the level of maladaptive attributions present. On Demand resources such as Adaptive vs. Maladaptive attribution refresher videos will be made available for athletes.

### **Appendices**

Please see **Appendix A, B, and C** for 'Cheat Sheets' to be handed out during Phase 2: Psychoeducation. You can also see **Appendix D** for a 'Attribution Reflection Log' example that athletes could use post-performance. **Appendix E** presents a proposed intervention schedule that could be integrated with the relevant population.

## 4 WAYS YOU CAN CREATE HEALTHIER ATTRIBUTIONS

01

### FOCUS ON ATTRIBUTIONS IN YOUR CONTROL



Remember, attributions that are in our control are easiest to change. When reflecting on your performance, think about your technique, effort, strategy - how could influence a change to enhance our future performances?

02

### FOCUS ON ATTRIBUTIONS SPECIFIC TO YOU



As well as attributions in our control, we know that focusing on attributions specific to you will also help future motivation. Avoid focusing attention on external factors, and focus on attributions that are controllable and specific to you!

03

### REDUCE ATTRIBUTIONS THAT ARE UNCONTROLLABLE



Uncontrollable attributions such as external influences (officials, spectators, opponents), weather conditions, and performance environment are all factors we cannot change for future performance improvements: so don't let your attributions focus on it!

04

### REDUCE ATTRIBUTIONS THAT ARE EXTERNAL



Often uncontrollable too, attributions that are external will effect all athletes performing in the given environment. For example, focusing on the weather conditions or task difficulty is something that effects all competitors, and cannot be changed by your attributions. Remember: internal and controllable attributions for the win!

## 4 WAYS YOU CAN SUPPORT CREATION OF HEALTHIER ATTRIBUTIONS

01

### FOCUS ON INTERNAL & CONTROLLABLE ATTRIBUTIONS



Remember, attributions that are in our control are easiest to influence. When supporting your athlete(s) to reflect on their performance, challenge them to think of attributions related to strategy, technique, or effort. These are factors in their control.

02

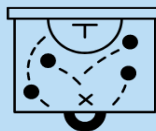
### REDUCE EXTERNAL & UNCONTROLLABLE ATTRIBUTIONS



Uncontrollable attributions such as external influences (officials, spectators, opponents), weather conditions, and performance environment are all factors your athlete(s) cannot change for future performance improvements: so encourage them reduce attributions that focus on it!

03

### THE POST PERFORMANCE REVIEW...



It can be frustrating observing a performance from the side-lines, but remember what you say post performance can effect your athlete's attributions. If you can form healthier attributions to reflect on your athlete's performance, then it is likely they will generate healthier attributions too!

04

### QUESTIONS ARE HEALTHY ... BUT NOT TOO MANY!



Supporting your athlete(s) generate healthy attributions after performance can be important. The timing, the type, and the approach to questions requires consideration. The answer to those consideration are often unique to the individual. However, you can remember to focus on factors in their control and specific to the athlete's performance.

## 4 WAYS YOU CAN SUPPORT CREATION OF HEALTHIER ATTRIBUTIONS

01

### FOCUS ON INTERNAL & CONTROLLABLE ATTRIBUTIONS



Remember, attributions that are in our control are easiest to change. When supporting your son/daughter reflect on their performance, challenge them to think of attributions related to strategy, technique, or effort. These are factors in their control.

02

### REDUCE EXTERNAL & UNCONTROLLABLE ATTRIBUTIONS



Uncontrollable attributions such as external influences (officials, spectators, opponents), weather conditions, and performance environment are all factors your son/daughter cannot change for future performance improvements: so encourage them reduce attributions that focus on it!

03

### THE CAR JOURNEY HOME...



It can be frustrating observing the ones we love perform, but remember what you say on the journey home can influence future performance. If you can form healthier attributions to reflect on your son/daughter's performance, then it is likely they will generate healthier attributions too!

04

### QUESTIONS ARE HEALTHY ... BUT NOT TOO MANY!



Supporting your son/daughter generate attributions after performance can be important. The timing, the type, and the approach to questions requires consideration. The answer to those consideration are often unique to the individual. However, you can remember to focus on factors in their control and specific to their performance.

## ARiS Appendix D: Attribution Reflective Log Example

Describe your performance today in a few words:

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---

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Are your performance explanations above maladaptive (negative), adaptive (positive), or both? (Circle answer below)

Maladaptive

Adaptive

Both

Explain why you have circled the answer above:

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If you circled *Maladaptive* or *Both*, how could you reframe these to become adaptive attributions? **HINT: Look back at your ARiS Cheat Sheets for support!**

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Have any of your social support provided feedback on your performance? If so, what?

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If the above feedback was maladaptive, how could you reframe this feedback to improve your future performances via adaptive attributions?

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---

Your attribution reflection log is complete! You can repeat this log again if you have further attributions you wish to reframe. Alternatively, you can complete this again when you next perform.

Remember, attributions that are in your control and specific to you are more likely to generate positive performance outcomes in the future!

| <b>Week</b> | <b>Activity</b>                               | <b>Stage of Intervention</b> |
|-------------|-----------------------------------------------|------------------------------|
| <b>1</b>    | Needs Analysis<br>Observation                 | <b>Stage 1</b>               |
| <b>1</b>    | Conversation with<br>Coach & Support Team     | <b>Stage 1</b>               |
| <b>2</b>    | Athlete<br>Questionnaires                     | <b>Stage 1</b>               |
| <b>2</b>    | In-Class Workshop                             | <b>Stage 2</b>               |
| <b>2</b>    | Parent Education                              | <b>Stage 2</b>               |
| <b>3</b>    | In-Practice<br>Education (Athlete &<br>Coach) | <b>Stage 2</b>               |
| <b>3</b>    | ARiS Leadership<br>Group Creation             | <b>Stage 3</b>               |
| <b>4</b>    | ARiS Induction                                | <b>Stage 4</b>               |
| <b>5</b>    | ARiS Consolidation                            | <b>Stage 4</b>               |
| <b>6</b>    | Evaluation impact<br>(Questionnaire)          | <b>Stage 5</b>               |