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The Effectiveness of a Psychological Skills Training Intervention for Midget Ice Hockey Goaltenders

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The Effectiveness of a Psychological Skills Training Intervention for Midget Ice Hockey Goaltenders

by

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Abstract

The purpose of this study was to examine the effectiveness of a six-skill psychological skills intervention on the performance of male midget ice hockey goaltenders. The psychological skills utilized included goal setting, arousal regulation, self-talk, attention, imagery, and pre-competition and in-competition routines. The participants were three male ice hockey goaltenders competing in midget hockey. A single-subject multiple baseline study design was used to evaluate the psychological skills package. The results demonstrated the intervention could be effective for enhancing both subjective and objective performance in midget goaltenders. The social validation results indicated that athletes enjoyed the intervention, felt that their performance improved, and were satisfied with the results attained. As well, it appeared that all athletes benefited from the intervention for different reasons, promoting the package approach to psychological skills training.

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Dedication

This document is dedicated to my loving family and friends, whom without their gracious support this thesis would not be possible. Thank you.

Chapter 1 – Introduction

Moran (2014) specified that "although sport is played with the body, it is mainly won in the mind" (p. 83). However, similar to a muscle, the mind must be trained and stretched in order to allow for optimal performance. Research has demonstrated that psychological skills can improve performance throughout a multitude of sports (Kendall, Hrycaiko, Martin, & Kendall, 1990; Mamassis & Doganis, 2004; Rogerson & Hrycaiko, 2002; Sheard & Golby, 2006; Thelwell, Greenlees, & Weston, 2006, 2010; Thelwell & Maynard, 2003; Wanlin, Hyrcaiko, Martin, & Mahon, 1997), as well as improve anxiety responses (Fletcher & Hanton, 2001; Hanton & Jones, 1999a; Mamassis & Doganis, 2004). Although research has been conducted in a number of sports and skill levels, there has been a relative paucity of literature in regards to ice hockey goaltenders. The effects of psychological skills training (PST) to enhance sports performance have been positive, however, any attempts to generalize between athletes of different skill levels, or between sports of differing task demands "are treading on equally thin empirical ice" (Greenspan & Feltz, 1989, p. 220).

The implications of this notion are two-fold. Firstly, caution must be undertaken when trying to apply research results from different sports, levels, and age groups. Taylor (1995) argued that, in order to design a successful psychological skills intervention, the physical, technical, tactical, and psychological demands of the specific activity (i.e., both sport and position) need to be taken into account. This lends support to Greenspan and Feltz's (1989) notion that generalizability between sporting tasks can be questioned. Secondly, these suggestions perpetuate the fact that research needs to be conducted on a wide variety of skills, sports, and populations in order to determine effectiveness for each specific cohort.

Another limitation with the predominant PST literature revolves around study design and validity (Hrycaiko & Martin, 1996). With traditional experimental designs, the goal is to have high internal validity to demonstrate that only the applied intervention is responsible for any changes to the dependent variable (Anderson, Mahoney, Miles, & Robinson, 2002). However, in order to demonstrate high internal validity, researchers must seek out to control as many extraneous variables as possible, which may limit the practicality of interventions in these real-world settings (Hrycaiko & Martin, 1996). By monitoring athletes in real sporting settings rather than contrived tasks, researchers can gain insight into what strategies or interventions will improve in-game performance.

The benefits of PST have been demonstrated in a wide variety of tasks, age groups, and skill levels, however, generalizability from task to task can be questioned. Therefore, an individual PST program was designed specifically with the task demands of the ice hockey goaltender in mind. Previously, Rogerson and Hrycaiko (2002) demonstrated the effectiveness of a one-session centering and self-talk intervention with junior A goaltenders. Although effectiveness was demonstrated through the use of save percentage (S%) as an outcome, one participant stated that they would have liked to learn psychological skills earlier in their careers, before they had already developed plans to focus. McFadden (1982) also suggested that around 15 years old is the appropriate age to teach mental preparation strategies, as these athletes are more amenable and open-minded.

The package approach to PST has been suggested over the use of a single skill for a number of reasons. Patrick and Hrycaiko (1998) mentioned that by providing education on a multitude of skills, "each athlete would be equipped with a toolbox of mental skills to be utilized in a systematic manner before training and competitions" (p. 293). In their study with endurance

athletes, participants reported that the usage of all the psychological skills in a relaxation, imagery, self-talk, and goal setting package each aided in learning the subsequent skills, suggesting that these mental skills are interrelated. As well, Weinberg, Seaborne, and Jackson (1981) uncovered that combining imagery with relaxation, in the form of visuo-motor behavioral rehearsal, was more effective in facilitating performance in karate sparring than either relaxation or imagery alone, thus providing support for the education of multiple psychological skills to improve performance in applied settings.

With specific regard to ice hockey goaltenders, Rogerson and Hrycaiko (2002) demonstrated that a successful psychological skills intervention may have as few as two components (i.e., centering and self-talk) delivered in a single session. The single session allowed for a short practice phase of the intervention so that the skills could be introduced directly into competition. Overall, effectiveness was demonstrated by increased S%'s from baseline to intervention phases in all experimental participants. In addition to increasing overall level of the S%, three of four participants recorded visual decrease in variability, suggesting an increase in performance consistency; a valuable attribute of a successful goaltender. Effects of the intervention were socially validated by the participants through the use of a brief 5-point Likert scale questionnaire examining the usefulness, enjoyment, and satisfaction of the psychological skills intervention. The coaches of the participants were also shown the single-subject data of S% for all goaltenders, and asked to confirm whether the data displayed a performance change. This study utilized a single-subject multiple baseline (SSMB) design using three teams and five participants; however, the goaltenders on the same team received the interventions together, thus mitigating certain benefits of the multiple baseline design.

In addition to Rogerson and Hrycaiko (2002), Gelinas and Munroe-Chandler (2006) outlined that successful ice hockey goaltenders can attain and maintain control of their game by implementing the psychological skills of concentration, arousal control, imagery, and self-talk into their strategies. To maintain concentration, they suggested using Nideffer's (1976) four attentional styles, recognizing that goaltenders use all four types of attention in competition, and that continual practice is needed in order to maintain appropriate concentration throughout the game. It was also advised that goaltenders must identify their optimal levels of arousal in order to reach peak performance levels, and learn strategies to both decrease and increase their levels of arousal, as each may be needed throughout the duration of a hockey game. Imagery can serve as a way to control arousal, learn and implement new skills, enhance confidence, and achieve goals, and therefore can be used in a multitude of situations that a goaltender may encounter. Lastly, self-talk was identified as a method to maintain attention on both the puck and the environment, and to preserve a positive inner dialogue. Although the acquisition and implementation of these skills for goaltenders is intuitive, a PST package with these skills has yet to be empirically tested in this specific sport niche.

Study Premise

The premise of the current study was to evaluate the effectiveness of a PST intervention for improving the performance of midget ice hockey goaltenders. A secondary purpose of this study was to evaluate the individual effects of this intervention on anxiety and self-confidence, and to provide a subjective evaluation through the use of semi-structured interviews. Based on previous research and suggestions with goaltenders, as well as inferences from similar sporting demands and situations, the PST intervention included goal setting, arousal regulation, self-talk, concentration, imagery, and routines.

Chapter 2 – Literature review

Introduction

Many athletes and sports performance personnel attest to the mental fortitude elite sport performance requires, and there are few sporting roles that have the psychological demands of the elite ice hockey goaltender. Jacques Plante summed up the psychological requirements of a goaltender by asking, "How would you like it if at your job, every time you make the slightest mistake a little red light went on over your head and 18,000 stood up and screamed at you?" (Hertz, 2012). Hall of Fame goaltender Ken Dryden also asserted the mental concerns of a goalie by stating that:

> Because the demands on a goalie are mostly mental, it means that for a goalie, the biggest enemy is himself. Not a puck, not an opponent, not a quirk of size or style. Him. The stress and anxiety he feels when he plays…[is] in constant ebb and flow, but never disappearing. The successful goalie understands these neuroses, accepts them, and puts them under control. The unsuccessful goalie is distracted by them, his mind knots, his body quickly following (as cited by Gelinas & Munroe-Chandler, 2006, p. 64)

A common misconception about psychological skills is the notion that they are innate to the athlete, and thus can't be learned or trained (Weinberg & Gould, 2011). Psychological skills, similar to physical and technical skills, need to be practiced continuously and systematically in order to be developed and used in the high-pressure situations that sport places on performers.

Psychological Skills Training

Psychological skills training (PST) is the systematic employment of cognitive, emotional, and behavioural strategies to achieve performance success and personal well-being (Gould, Flett, & Bean, 2009; Vealey, 2007). Vealey (2007) identified that in order to perform optimally,

athletes must possess skills that can allow them to selectively direct and sustain the proper focus of attention for the specific task, as well as manage their various emotional states (e.g., arousal, anxiety, excitement) in order to achieve optimal energy levels for performance. If athletes can acquire skills and techniques to regulate their thoughts and intensity, they can then change their behaviours, actions, and outer aspects of their life (Halliwell, Zaichowsky, & Botterill, 2006; Vealey, 1994). The goal behind the regular and systematic training of psychological skills for athletes is to learn and practice techniques to control their thoughts and feeling states in order to produce optimal performance (Weinberg & Gould, 2011). These techniques include, but are not limited to, imagery, self-talk, relaxation, goal setting, and attentional focus strategies.

PST and performance. When assessing the usefulness of PST for performance enhancement, it is important to investigate intervention effectiveness with high-level athletes in competitive settings rather than in contrived tasks (Greenspan & Feltz, 1989). Several reviews have examined the literature regarding psychological interventions in sport performance (Greenspan & Feltz, 1989; Vealey, 1994; Weinberg & Comar, 1994). Greenspan and Feltz (1989) reviewed 23 studies that included a psychological skills intervention with athletes that competed on a regular basis in organized settings, and assessed an in-competition performance measure as a dependent variable. The review encompassed a wide variety of intervention characteristics (e.g., imagery, progressive muscle relaxation, and biofeedback) and task demands. In total, 12 sports were included in the review, half of which were open skills (i.e., reactive) and half of which closed skills (i.e., self-paced). The authors concluded that remedial cognitive restructuring interventions and educational relaxation-based interventions were effective in improving performance of collegiate and adult athletes in competitive situations (Greenspan & Feltz, 1989). However, these inferences warrant caution, as only four of the 23 interventions

used what was discussed as an adequate manipulation check that would ensure participants were using the instructed protocols. Generalizability can also be questioned, as it may not be the case that results from a particular study may transfer to different positions, sports, or skill levels, as ice hockey was not examined in any of the studies included in this review.

Vealey (1994) identified an additional 11 articles that included 12 interventions applied throughout a variety of sports (e.g., swimming, volleyball, basketball, skiing). Interventions were again categorized into three areas: cognitive, cognitive-behavioural, and behavioural. Nine out of 11 studies using psychological interventions significantly improved performance, with causality being inferred in seven out of nine interventions. Causality was inferred when performance benefits were displayed using an appropriate single-subject design. Vealey (1994) concluded that cognitive restructuring and cognitive-behavioural routines proved efficacious for enhancing performance in sport specific skills in competitive environments However, similar trends emerged with regard to a lack of manipulation checks, as well as a need to specifically define treatment protocols so that they can be replicated and evaluated.

Building upon these findings, Weinberg and Comar (1994) identified 10 additional studies employing psychological interventions (i.e., 4 cognitive and 6 cognitive-behavioural) with athletes in competitive situations. Participants of the studies included elite athletes, college athletes, and youth athletes of differing abilities (i.e., pre-novice figure skaters to international caliber gymnasts). Overall, nine out of ten interventions displayed significant improvements in performance; however, all articles identified used either group or case study designs. Weinberg and Comar (1994) concluded that effective interventions should be delivered in a systematic, individualized manner over time employing a variety of psychological techniques.

Consistent throughout these reviews is the notion that studies must employ adequate manipulation checks in order to assess the participants' perspectives on the effectiveness of the interventions, as well as appropriate designs so that causality can be inferred. Additionally, all of the authors noted the potential publication bias, in which only studies demonstrating positive results receive publication (Greenspan & Feltz, 1989; Vealey, 1994; Weinberg & Comar, 1994). Greenspan and Feltz (1989) noted the lack of generalizability between tasks, skill levels, and age groups. Thus, when designing a PST program for athletes, practitioners must take into account the demands of the specific tasks the athlete is engaged in.

Task Demands

Taylor (1995) suggested that when examining which psychological skills to include in a program, practitioners must take into account the physical, technical, and tactical demands of the both the sport and position, as well as integrating the specific needs of an athlete. It is important that PST interventions are task specific, and tailored to the demands of the task under investigation. Although tailoring interventions to each individual for specific performance concerns would be ideal, it is unlikely that athletes have ready access to mental performance consultants at youth and sub-elite levels. Botterill (1990) suggested that, although part-time involvement from a mental performance consultant may have limitations, it can help to promote the "client independence goal regarding mastery, monitoring, and application" of psychological skills (p. 360). Thus, an educational approach to PST may be optimal to provide athletes with a variety of tools that can be applied in appropriate situations.

Open and closed skills. The first relevant distinction when examining task demands is that of open and closed sport skills. For example, the psychological requirements of a golfer may not be the same as those required for an ice hockey goaltender. A closed skill is performed

in a relatively stable environment that is moderately predictable, and often self-paced (e.g., golf), whereas an open skill is reactive, and involves an athlete performing in an interactive and ever-changing environment (e.g., hockey; Craft, Magyar, Becker, & Feltz, 2003). In addition to being an open skill, the physical demands in hockey involve; a relatively long duration (e.g., usually over two hours), bursts of activity with short (e.g., 30 second whistle) and long (e.g., 15-minute intermission) breaks in between, and the potential for long idle periods with little activity. These characteristics of hockey could lead to potential fluctuations in performance during competition. Goaltenders also require a balance of both gross and fine motor skills. Gross motor skills are needed in order to make powerful and efficient movements around the crease, whereas fine motor skills are needed to execute controlled saves. Because of these demands, Taylor (1995) suggested that self-confidence, arousal management, and a process focus are paramount to optimal performance within these task demands.

PST and performance in open tasks. PST has proven beneficial for facilitating performance throughout a variety of open sport tasks including basketball (Kendall et al., 1990), tennis (Mamassis & Doganis, 2004), soccer (Thelwell et al., 2006; 2010), and cricket (Thelwell & Maynard, 2003). These sports are all considered open tasks, and intuitively bare a moderate relationship to the demands that an ice hockey goaltender will face throughout a season. As well, to date, there has been one published study examining the effectiveness of PST for ice hockey goaltenders (Rogerson & Hrycaiko, 2002).

Kendall and colleagues (1990) examined the effectiveness of a multicomponent PST intervention including imagery, relaxation, and self-talk on performance of a specific defensive skill (i.e., cutting off the baseline) in four female collegiate basketball players. The study utilized a single-subject multiple baseline (SSMB) design to measure percentage of successful

attempts to cut off the baseline over 33 games during the competitive season. The researchers used a target of 70% success rate to determine effectiveness, as specified by the coach. The participants' skill of imagery and social validation data were assessed at the end of the study.

Visual inspection of graphical data revealed that all four participants increased in successful attempts to cut off the baseline, and that positive effects were demonstrated immediately after the intervention, which strengthens the case for its effectiveness (Hrycaiko & Martin, 1996). As well, all participants reached the criterion of 70% successful execution (Kendall et al., 1990). Based on improvements in these performance markers, it can be concluded that the intervention was successful for enhancing individual performance in the targeted behaviour.

Mamassis and Doganis (2004) used a single-subject AB design to test the effectiveness of a 25-week PST intervention including goal setting, positive thinking/self-talk, concentration/routines, arousal regulation techniques, and imagery. The intervention was given to five elite junior tennis players in Greece (one male and four females), and four were held as controls (two males and two females). The only performance marker used was an 8-question subjective performance inventory, using a 5-point Likert scale for each item.

Visual inspection of graphed means revealed a post-intervention increase in subjective performance for four out of five intervention subjects. All of the control participants either remained the same or decreased in subjective performance from the pretest condition (Mamassis & Doganis, 2004). However, there were no objective performance markers recorded, and although individual participant data were documented, it was analyzed by comparing pre- and post-intervention means rather than graphing each individual data point through the entire study, thus mitigating the benefits of a proper single-subject design (Mamassis & Doganis, 2004).

Although control participants were included, an adequate visual analysis of graphical data should have been employed in order to determine the effectiveness of the intervention on subjective performance.

Thelwell and colleagues (2006) tested the effectiveness of a PST package on three performance subcomponents with five varsity collegiate male soccer players. This study used a SSMB across individuals design to continually monitor changes in all three dependent variables over a 9-game span during the competitive season.

The intervention for this sample, based on Taylor's (1995) model, included relaxation techniques, imagery, and self-talk skills, as these can be used to increase motivation and effort, which can be important due to the length of a soccer game (Thelwell et al., 2006). For relaxation, the participants received instruction in progressive muscle relaxation, centering, and breath control. Participants were instructed mainly to use motivational general – mastery imagery (Hall, Mack, Paivio, & Hausenblas, 1998) to see and feel successful attempts of each of the targeted skills, as well as successful recoveries from poorly executed first touches, incomplete passes, and missed or mistimed tackles. Self-talk instructions included constructing appropriate positive self-talk, identifying negative self-talk, and restructuring it to positive, motivational, or challenging thoughts. Social validation data were obtained from each participant upon completion of the study.

Visual analysis of graphical data yielded mean improvements for all participants in all three targeted behaviours, however, the magnitude of the effect and the number of overlapping data points varied across individuals. As suggested by Hrycaiko and Martin (1996), the effectiveness of PST packages is strengthened with a larger effect size and few overlapping data points. Although the number of overlapping data points and effect sizes were variable across

participants, it can still be concluded that the intervention was effective for enhancing performance of the three targeted behaviours, as Bryan (1987) suggested that for high-level athletes, even small improvements may be important and meaningful changes in competitive settings.

Thelwell and colleagues (2010) expanded on their earlier findings by assessing performance changes in three adult soccer players participating in a similar intervention including relaxation, imagery, and self-talk. In addition to examining overall changes in performance of the same targeted subcomponents (i.e., percentage of successful first touches, passes, and tackles), performance changes were also tracked across the first- and second-half of each match, as the authors suggested performance may deteriorate throughout the duration of a match. It was examined whether PST can mitigate these performance declines during the later stages of a game.

For successful first touches, visual analysis of graphed data revealed that all three participants improved performance in both the first- and second-half of matches after the intervention was introduced (Thelwell et al., 2010). With regard to pass completion, participant one increased both first- and second-half performance after the intervention. Participant two increased only slightly after the intervention in first-half performance, although the trend was rising for the duration of games after the introduction of the PST package. However, participant two decreased in second-half performance for pass completion percentage. Participant three decreased in first-half passing percentage, and increased in second-half pass completion percentage after the intervention was introduced. As for percentage of successful tackles, all three participants increased in first-half performance. In the second-half, participant one decreased slightly, and participants two and three increased slightly.

For first touch percentage, the PST intervention was successful for improving both first and second-half performance in adult soccer players. The PST intervention also improved tackling percentage in the first-half, however the effectiveness for second-half performance was inconclusive. With regard to passing percentage, the variability in results could be an outcome of the definition of a completed pass. The authors operationalize a completed pass as one "that reaches its destination" (Thelwell et al., 2010, p. 113). It could be the case that potential passes were going to the proper destination, however the receiving player was not in the correct position, appearing as though the pass was off target. The variability could then be a result of factors other than that of the participant. Thus, for certain performance skills, PST may prevent declines in performance in the face of fatigue during the later stages of competition. This finding may also be applicable to goaltenders, since the duration of a hockey game is similar to that of a soccer game, and fatigue can result from the duration and intensity of the task of goaltending.

Rogerson and Hrycaiko (2002) examined the effects of a two-skill (i.e., centering and self-talk) PST intervention on S% in Junior A goaltenders, aged 16-18. The participants completed one 45-minute session in which they were educated on the use of three different types of self-talk. Participants also completed muscle tensing and relaxing exercises, as well as a breathing component to use with self-talk (i.e., centering). A SSMB design was used to analyze S% on an individual game basis.

All four experimental participants improved in overall S% from baseline to intervention phases, and improvements were seen immediately after the intervention was applied (Rogerson & Hrycaiko, 2002). The effectiveness of the intervention was also socially validated by the participants through a 5-point Likert scale questionnaire. At the end of the study, the head coaches of the participants were shown the single-subject graphs and asked to comment on any

observed changes. Two of the three coaches involved suggested that all four participants reported important changes to their performance. Although the intervention appeared to be effective for junior A goaltenders, an appropriate multiple baseline design was not used, as the intervention was delivered to multiple participants at once. No subjective measures of performance or anxiety were displayed.

The corroborated results from PST intervention studies in open tasks suggest that these interventions may be effective for improving both overall objective and subjective performance, as well as providing benefits to specifically targeted performance subcomponents. Due to the relative scarcity of research with hockey players, and specifically goaltenders, the tasks reviewed (i.e., basketball, tennis, and soccer) resemble the sporting demands of hockey, as they are relatively long competitions that have short breaks in between, and include a combination of fine and gross motor skills. However, goaltending in hockey is a unique position, and thus warrants more research to determine the effectiveness of a PST package.

Anxiety

Weinberg and Gould (2011) defined anxiety as "a negative emotional state characterized by nervousness, worry, and apprehension associated with activation or arousal with the body" (p. 78). According to Lazarus (2000), "anxiety is aroused when important values and goals are threatened under conditions of ambiguity about what will happen when we have only limited personal resources to put against the threat" (p. 243-244). Competitive anxiety is widely characterized as being multidimensional in nature, consisting of both psychological and physiological components (Martens, Burton, Vealey, Bump, & Smith, 1990).

Cognitive anxiety refers to the psychological component of anxiety, and is manifested as "negative expectations and cognitive concerns about oneself, the situation at hand, and potential

consequences" (Morris, Davis, & Hutchings, 1981, p. 541). Somatic anxiety consists of the physiological and affective components of the anxiety experience that cultivate from autonomic arousal (Jones, 1995). Somatic anxiety is manifested through symptoms such as increased heart rate, perspiration, muscle tension, and butterflies in the stomach (Baker, Côté, & Hawes, 2000).

Self-confidence is conceptualized as "one's belief in meeting the challenge of the task to be performed" (Woodman & Hardy, 2003, p. 443). It was regarded as being at the opposite end of the spectrum of cognitive anxiety (Martens et al. 1990), and is measured as part of the Competitive State Anxiety Inventory – 2 (CSAI-2; Martens et al., 1990). Cognitive anxiety is regarded as having a negative linear relationship with performance, somatic anxiety as having a curvilinear relationship with performance, and self-confidence as having a positive linear relationship with performance (Woodman & Hardy, 2003). It was also noted that cognitive anxiety may account for more performance variance than somatic anxiety (Martens et al., 1990), and that athletes performing open skills may feel more anxiety due to uncertainty about the competitive situations (Martens, Vealey, & Burton, 1990).

A meta-analysis conducted by Woodman and Hardy (2003) identified 48 studies that examined the effects of cognitive anxiety and self-confidence on performance. Overall it was discovered that cognitive anxiety had a significant effect size of -0.13, and self-confidence had a significant positive effect size of 0.27 on performance. When moderators were assessed, it was discovered that "high standard" athletes (i.e., competing at national or international competitions), had significantly larger negative effects for cognitive anxiety, and significantly larger effects for self-confidence on performance. No significant correlation was found between self-confidence and cognitive anxiety, suggesting that they are distinct dimensions rather than being opposite ends of a spectrum, as proposed by Martens and colleagues (1990). Somatic

anxiety was not examined in this analysis, and multiple different anxiety measures were used in the studies included.

Craft and colleagues (2003) also conducted a meta-analysis with 29 studies examining the effect between cognitive anxiety, somatic anxiety, and self-confidence on performance, exclusively using the CSAI-2. Contrary to the findings of Woodman and Hardy (2003), no significant correlations were found between cognitive anxiety and performance ($r = 0.01$). Somatic anxiety also yielded no significant relation to performance ($r = 0.03$), and self-confidence displayed a low, yet significant correlation with performance ($r = 0.25$). When moderators were assessed, it was found that between sport type (i.e., team or individual), skill type (i.e., open or closed), skill level, and time of CSAI-2 administration, cognitive anxiety either had null or positive correlations with performance, contrary to previous findings (Woodman & Hardy, 2003). Particularly pertinent to ice hockey goaltenders, positive correlations were found for cognitive anxiety ($r = 0.23$), somatic anxiety ($r = 0.15$), and self-confidence ($r = 0.55$) when open skills were examined. In open skills, cognitive interpretations may account for more performance variance than the somatic manifestations, however the direction was opposite of that predicted. These findings suggest that, contrary to previous notions or hypotheses, cognitive anxiety may not necessarily have a negative relationship with performance. In addition, self-confidence appears to account for the largest amount of performance variance compared to cognitive anxiety and somatic anxiety.

Anxiety direction. Lazarus (2000), noted that "the assumption that anxiety is always, or even usually, destructive is an exaggeration" (p. 245), and stated that anxiety can, in fact, facilitate performance. In respect to the equivocal findings of the relationship of the intensity of

anxiety components and performance, Jones (1995) proposed the hypothesis that the direction of anxiety may also play a role in the anxiety-performance relationship.

Anxiety direction refers to "how sports performers label the cognitive and physiological symptoms they experience on a debilitative-facilitative continuum" (Jones, 1995, p. 463). Essentially, competitive anxiety does not necessarily impair performance, and can actually have beneficial effects. Simply, it is not how anxious an athlete feels that influences how they perform, but rather how that athlete interprets and appraises their symptoms. An athlete may feel intensely concerned about the upcoming game, however this concern may be interpreted as relating to the importance of the competition and preparation, thus facilitating performance; or may be interpreted as worry or panic, therefore potentially hindering performance. In short, anxiety direction refers to assessing how performers label their cognitive and somatic symptoms on a debilitative – facilitative continuum (Jones, 1995).

PST and anxiety direction. In a two-study series examining competitive anxiety direction, Hanton and Jones (1999b) initially interviewed ten elite male swimmers who had competed internationally, and who were characterized as having consistent facilitative interpretations of anxiety. The goal was to identify the skills and strategies elite athletes use in order to interpret pre-competition cognitive and somatic states as being facilitative of performance.

Through qualitative analysis, Hanton and Jones (1999b) uncovered several themes about how, at an early age, performers suffered from negative thoughts and somatic states prior to competition; such as fear of mistakes and fear of letting their team down. These performers then specified that a significant other or coach told them that precompetitive feelings of anxiety and nervousness are normal and must be accepted, and that they had early experience with anxiety

symptoms helping performance and preparation. Participants also stated that they used the psychological techniques of imagery and goal setting, particularly process goals, in the days leading up to a race to manage anxiety. In their routines, just prior to racing, participants used a variety of techniques such as positive self-talk and maintaining an internal, process focus, as well as positive imagery. It was also mentioned that participants label any symptoms they feel in a positive light, and that the athletes used relaxation strategies in their prerace routine.

In a similar study, Wadey and Hanton (2008) interviewed 15 (9 female, 6 male) athletes from a variety of sports (e.g., badminton, hockey, judo, and rugby) regarding their use of basic psychological skills of goal setting, imagery, self-talk, and relaxation as a coping mechanism for anxiety. The athletes stated themes such as focusing on realistic performance and process goals, and executing certain skills when experiencing increases in both cognitive and somatic anxiety. Athletes also mentioned using imagery to associate anxiety symptoms to positive images. Self-talk was also used to cope with anxiety by increasing motivation on the task at hand, and concentrating on preparation. Lastly, relaxation was used to decrease worries and manage tension. Although these studies (Hanton & Jones, 1999b; Wadey & Hanton, 2008) provided insight into how psychological skills may be used to cope with anxiety, participants encompassed a wide range of sports with differing task demands. As well, even though the study was conducted with elite athletes, the exploratory nature of the study does not empirically test the effectiveness of the stated coping strategies.

Hanton and Jones (1999a) used the techniques described from their previous study (1999b) to design a multimodal PST program for swimmers who displayed consistent debilitative interpretations of pre-race anxiety. In total, four male adult swimmers competing at regional and national levels were chosen based on modified CSAI – 2 (i.e., CSAI-2d) scores that

displayed debilitative symptoms. The program included two phases; one educating participants about pre-competition (i.e., days leading up to race) goal setting and imagery, and one about pre-race (i.e., hours leading up to race) positive thinking, self-talk, imagery, thought rationalization, and process focus.

Visual analysis of graphical data revealed that both cognitive and somatic anxiety intensity remained relatively unchanged after the intervention for all three experimental participants. However, increases in direction of cognitive and somatic anxiety from debilitative to facilitative were found for all experimental participants, as well as an increase in self-confidence. The control participant remained relatively stable for cognitive anxiety, somatic anxiety, and self-confidence intensity and direction. Over the 10-race series in which performance was monitored, all swimmers who received the intervention improved their personal best, whereas the control participant's best performance throughout the study fell short of his personal best, potentially outlining the link between anxiety direction and performance.

With nine elite youth tennis players, Mamassis and Doganis (2004) examined the effects of a five-skill PST intervention including goal setting, positive thinking/self-talk, concentration/routines, arousal regulation, and imagery on anxiety intensity and direction. Of the nine participants (M_{age} = 14.1 years), five received the intervention and four acted as controls. All athletes were ranked in the top 25 players within their age group in Greece. Individual analysis of pre-test and post-test means revealed that all five intervention participants improved their interpretation of cognitive and somatic anxiety direction, although two improved only marginally, and one participant's interpretations remained debilitative. Control participants' changes from pre- to post-test were variable, with two decreasing and two increasing slightly.

One reason for this inconsistent finding may be the sensitivity of the direction scale used. Hanton and Jones (1999a) used a scale from -3 to 3 for each item on the CSAI – 2, whereas Mamassis and Doganis (2004) used a scale of -1 to 1 for each item. As well, the data would have been more comprehensive if displayed using an appropriate single-subject type analysis rather than simply comparing pre-intervention and post-intervention means. The intervention was not specifically dedicated to changing athletes' interpretations of anxiety, as done by Hanton and Jones (1999a; 1999b), so this may not be the specific performance issue that was important to the athletes.

Overall, it appears that using PST interventions may prove useful for changing how a performer interprets anxiety, and may have a positive influence on performance. However, these findings need to be replicated throughout different sport tasks, performance standards, and age groups in order to draw sound conclusions about the effectiveness of PST for changing anxiety interpretations as a mechanism for enhancing performance.

Single-Subject Research Designs

Single-subject research designs are described by Portney and Watkins (2009) as "an alternative approach that allows us to draw conclusions about the effects of treatment based on the responses of a single [participant] under controlled conditions" (p. 236). They entail several features that make them appropriate for investigating the effectiveness of PST interventions in applied sport settings.

The key attribute that distinguishes single-subject designs from commonly used group designs is the repeated and ongoing measurement of dependent variables (Barker, Mellalieu, McCarthy, Jones, & Moran, 2013; Hrycaiko & Martin, 1996). This allows for each participant to act as their own control by providing a comprehensive baseline measurement of performance

(Page & Thelwell, 2013), as well as identifying individual variability with regard to effects of treatment (Bryan, 1987). Traditional designs that average results of a group may ignore the impact of a treatment for the individual participant, and can potentially mask idiosyncrasies in response to a specific treatment. A benefit of the single-subject design is that the repeated measurement may illuminate an individual's changes in performance that may have been masked by a group design.

Single-subject designs in sport also allow researchers to "differentiate between characteristics of those [athletes] who responded favorably to treatment from those who did not improve" (Portney & Watkins, 2009, p. 235). In applied field settings, within-group variability is likely to be high as there is very little control over external factors. This high variability may not provide statistical significance, but can allow for detection of small changes in performance (Bryan, 1987). By allowing participants to act as their own control, the single-subject design makes it possible to distinguish these small, yet meaningful and important, changes within individuals. With high-level athletes, there may be only a small room for improvement (e.g., a few percentage points), which may seem small or negligible to experimenters. However, these small improvements may be extremely meaningful to an athlete (Hrycaiko & Martin, 1996) or team. For example, if a goaltender can improve S% from 0.890 to 0.910, this may not seem, or prove statistically, significant (i.e., two percentage points), however to an athlete or coach this may be the difference between winning and losing a game. For a goaltender, one save at the right moment can change the outcome of a game. The repeated measurement of single-subject designs allows for small, meaningful changes to be detected that may be covered by traditional statistical designs.

Internal validity. One of the common critiques of single-subject designs is that they are essentially case studies, and therefore lack both internal and external validity (Hrycaiko & Martin, 1996). With regard to internal validity, there is a general lack of control when working in applied competitive settings, and that changes in the dependent variables could be attributed to a number of causes (e.g., coaching strategies, personnel changes, training schedules). However, there are ways to address internal validity, specifically with the multiple baseline design. In the multiple baseline design, interventions are delivered in a staggered fashion across subjects. Experimental control can be exhibited by demonstrating that the baselines are independent, and that observed changes occur only after the intervention is applied (Portney & Watkins, 2009). Anderson and colleagues (2002) noted that, although the case study approach can be criticized for its weak internal validity, greater confidence in the treatment effects can be developed by assessing multiple dependent measures repeatedly, triangulating evidence, and replicating results across cases, as done by Thelwell and Maynard (2003), who assessed objective performance, subjective performance, and psychological skills usage in cricket players.

In addition to using multiple dependent measures, social validation can increase confidence that observed changes are due to the intervention presented. Social validation is the "consideration of social criteria for evaluating the focus of treatment, procedures that are used, and the effects that they have" (Kazdin, 1982, p. 479). In addition to performance measures, social validation evaluates the practical importance of an intervention to the participants and significant others (e.g., coaches, parents, or loved ones). Thus, social validation aims to measure the perceptions of a treatment, which indicate effectiveness (i.e., if the treatment is useful under real-world circumstances), rather than efficacy (i.e., if the treatment produces results under ideal, controlled settings, Page & Thelwell, 2013). In general, social validation assesses what

participants think of the intervention procedures. Social validity is an important component, not only for the assessment of the intervention procedures, but also to "ensure that practitioners do the best job that they can in helping consumers of their service" (Hrycaiko & Martin, 1996, p. 187). It also serves the function of practitioner evaluation, and can aid the consultant in improving their services. Social validity assessments typically ask three questions: a) what do participants, and others, think about intervention goals? b) what do they think about the procedures applied? and c) what do they think about the results produced by these procedures? (Page & Thelwell, 2013). Social validation is a key component of demonstrating the effectiveness of a PST intervention in a real-world field setting, and thus the internal validity of an intervention study.

External validity. Since single-subject designs are essentially considered case studies, it proves difficult to generalize the results of a single-subject design to the target population. However, across subject designs can demonstrate external validity between the subjects of the study (Hrycaiko & Martin, 1996). The number of athletes analyzed in most PST intervention literature is three to five (e.g., Kendall et al., 1990; Rogerson & Hrycaiko, 2002; Thelwell et al., 2006). If the effectiveness of the intervention can be replicated across athletes involved, then it may be generalizable to other athletes with similar performance issues. Single-subject research designs also have the ability to assess treatment effects in real-world, applied settings, and thus results from single-subject studies may be more readily generalized to competitive settings than controlled group designs (Portney & Watkins, 2009). For example, testing a PST intervention in a laboratory setting with a contrived task under strict constraints may demonstrate the efficacy of the intervention, but its generalizability to a real sport setting that includes open tasks where control over extraneous variables is impossible, is likely compromised as participants must react

to situations under the pressures of competition. By utilizing single-subject designs, and employing appropriate assessments, researchers can have confidence that changes in performance can be attributed to the intervention applied, and these changes can have a meaningful impact in real field settings. Thus, with proper design and analysis, single-subject studies can display both internal and external validity, and demonstrate the effectiveness of interventions.

Inclusion of Psychological Skills

Thelwell and colleagues (2010) noted that many PST intervention studies do not provide adequate rationale for selection of psychological skills into an intervention. For example, Rogerson and Hrycaiko (2002) chose to include only centering and self-talk in their intervention with junior A goaltenders. Their techniques were chosen based on Greenspan and Feltz's (1989) systematic review, as well as descriptive reports from mental performance consultants in professional ice hockey (Botterill, 1990; Halliwell, 1990). Although the review by Greenspan and Feltz (1989) found support for the use of relaxation and cognitive restructuring interventions, the review encompassed a wide variety of skills and techniques such as progressive muscle relaxation, visualization, biofeedback, and systematic desensitization. As well, none of the reviewed studies used ice hockey performance as an outcome measure. Botterill (1990) and Halliwell (1990) both discussed using self-talk and centering strategies in their respective NHL consultations; however, they also cited using visualization and goal setting procedures to enhance performance.

When designing an appropriate PST regiment, Taylor (1995) suggested that the physical, technical, tactical, and psychological demands of the sporting activity must be taken into account. As mentioned, the demands of an ice hockey goaltender involve a long duration of play

(e.g., usually around two hours for a game), both fine and gross motor tasks, and potential variability in performance throughout a competition. In regard to these sport demands, Taylor (1995) recommended that positive self-talk, short-term goal setting, process focus, and motivational imagery are potential strategies for these athletes to use in competition. Taylor's model of integrating sport demands into PST interventions has demonstrated effectiveness through the work of Thelwell and colleagues (2006, 2010) within the context of soccer performance. Based on the needs of an ice hockey goaltender, Gelinas and Munroe-Chandler (2006) professed that goal setting, self-talk, concentration, and imagery are psychological skills that ice hockey goaltenders can use in order to achieve successful performance; however, these skills have not been tested empirically in midget ice hockey goaltenders.

Current Limitations

Several limitations currently exist in the extant PST literature. Anderson and colleagues (2002) outlined four effectiveness indicators that should be addressed when measuring the success of an intervention: 1) quality of support, 2) psychological skill, 3) response to support, and 4) performance. Quality of support refers to the effectiveness of the consultant, usually measured through a social validity questionnaire. Psychological skill refers to a change in the usage of the mental strategies that are taught in the intervention. Response to support refers to a change in athlete's knowledge of, and attitude towards, sport psychology, and is usually measured through a questionnaire at the end of the intervention. And since an increase in performance is the ultimate goal of a PST intervention (Anderson et al., 2002), it should be assessed both objectively and subjectively.

The evaluation of performance in the PST literature is limited in scope regarding these four effectiveness indicators. Thelwell and colleagues (2010) suggested that in some sports, it

may be more enlightening to use performance subcomponents as opposed to global measures of performance. Thelwell and Maynard (2003) also advocated against using purely objective performance indicators, as these outcomes are subject to extraneous influence, and thus may not entirely reflect how an athlete performs. Most published works (e.g., Mamassis & Doganis, 2004; Rogerson & Hrycaiko, 2002) have failed to incorporate and integrate both objective and subjective measures of performance.

Previous PST intervention research (e.g., Thelwell et al., 2006; 2010) has failed to account for changes in psychological skills usage to corroborate with changes in performance and anxiety. Assessing changes in the usage of psychological skills is important in PST interventions to help strengthen the case for a causal relationship between the intervention and changes in performance. If an increase in performance after the intervention correlates with higher post-intervention psychological skills usage, although this does not prove causality, it helps form the basis of a causal relationship (Anderson et al., 2002; Thomas & Fogarty, 1997).

Rationale and Hypotheses

The rationale behind the proposed research study is to extend the extant PST literature to a population of male midget ice hockey goaltenders. Secondly, this proposed research will address the aforementioned limitations by: 1) incorporating multiple performance markers; 2) including a formal pre- and post-intervention psychological skills assessment; and 3) demonstrating a comprehensive rationale of the psychological skills included for the intervention.

Based on the previous literature on the effectiveness of PST for performance enhancement in sports with similar demands to ice hockey, it was hypothesized that performance will improve after the six-skill PST intervention. In addition, since PST has been demonstrated

to improve anxiety responses, it was hypothesized that interpretations of both cognitive and somatic anxiety will be more facilitative after the PST intervention.

Chapter 3 -Methodology

Participants

Six male midget (i.e., aged 15-17) ice hockey goaltenders were sought out from minor hockey associations throughout Calgary. This sample size was chosen based on the extant PST literature utilizing SSMB designs, in which the number of participants typically ranges from three to five. Midget goaltenders were chosen based on Rogerson and Hrycaiko's (2002) work with junior A goaltenders (age 16 to 20), which suggested that PST may be more beneficial at earlier stages and levels, before a goaltender has already developed a routine and focusing pattern. Participants were required to be of midget age, participating in AAA, AA, Minor Midget AAA, or community tier 1 and 2.

Midget AAA is the highest level of midget hockey. Teams are built by selecting the best players within a given region, and these teams compete throughout the entire province. Midget AA is one level below, and usually consists of players who do not make the AAA team. Midget AA teams generally play in a specified region within the province (e.g., Southern Alberta). Minor Midget AAA consists of only first year midgets (i.e., 15 years old), and teams are built similar to that of Midget AAA, in which the best first years are chosen to compete province-wide. Community tier 1 and 2 teams compete within the city, and usually consist of players who do not make Midget AAA or AA. Although this level is slightly lower than the AAA and AA system, it is still a competitive environment in which performance is usually prioritized.

Several recruitment procedures were used in order to obtain the desired sample. Participants were initially sought through a goaltending coaching company in the city of Calgary, as well as through minor hockey associations. Initial contact letters were sent via email to reach out to goaltenders who may be interested in the study (see appendix A). If interested, they

responded to the email address listed on the contact letter, and received a copy of the consent form (see appendix B) for further review.

The researcher wrote to either the goaltenders or association administrators (see appendix C) that a research study was being undertaken to assess the effects of a goal setting, arousal regulation, self-talk, concentration, and imagery package. They were informed goaltenders would receive specific one-on-one training for the skills, and that they would be asked to fill out both pre-game and post-game questionnaires.

In addition, once goaltenders had agreed to participate in the study, all of their head coaches were contacted via email (see appendix D) to provide a subjective analysis of their goaltender's performance for every game during the season.

Study Design

As noted, SSMB design was chosen for this study. The SSMB design involves introducing an intervention to different baselines at different points in time (Barker, McCarthy, Jones, & Moran, 2011). This method consists of monitoring performance on a game by game basis through two phases, a) the baseline phase, and b) the intervention phase. The two phases were separated by the introduction of the intervention, which occurred at a different time point for each participant. By staggering the introduction of the intervention to different participants at different time points, researchers can identify if changes occur to performance after the intervention is introduced for each participant. If treatment effects happen after the intervention is introduced, and this effect is replicated across participants, it can help strengthen the case for a causal relationship between the introduction of the intervention and any changes in performance (Hrycaiko & Martin, 1996).

For this study, the introduction of the intervention was staggered by approximately one week for each participant. As well, all participants played on different teams, and varied in number of games played before the intervention was introduced. By intervening participants on different teams in different leagues, there was a small chance of communication between participants, thus maintaining the multiple baseline nature of the introduction of the intervention.

Dependent Measures

Objective performance. To assess objective performance, save percentage (S%), goals against average (GAA), and win percentage (win%) were utilized. S% is the percentage of shots on target that the goaltender stops. It is calculated by dividing the number of saves a goaltender makes by total shots on goal. S% has been used previously (Rogerson & Hrycaiko, 2002) in research, and is the objective statistic that is most under the goaltender`s control; however, this metric may be dependent on external factors such as team performance and level of competition.

GAA is a measure of central tendency that reflects the number of goals scored on a goaltender per game. GAA is calculated by dividing the number of goals allowed by a goaltender by the number of minutes played, then multiplying by 60. Empty net goals and shootout goals were excluded from this calculation. GAA, like S%, is used as a metric for comparing goaltender performance in hockey, however this statistic is even more so impacted by external factors such as team performance, coaching strategy, and level of competition. In the 2016-2017 NHL season, the mean GAA for the league was 2.59 (Hockey Reference). Goaltenders generally aim for this number to be under 3.

The goaltender is the only player in ice hockey who usually plays the entire game. Because of the nature of this position, goaltenders are given their own win/loss record, as they have the most control over the outcome of a game. However, win % is the objective statistic

least under the goaltender's control, as many factors can influence the outcome of a competition. In order to calculate goaltender win %, the following formula was used. In the 2016-2017 NHL season, the league leading goaltender in wins won 42 games out 63 starts, for a win percentage of 71.4 (National Hockey League).

$$\text{WIN \%} = \frac{\text{(Ties) + (Overtime and Shootout Losses) + (2 X Wins)}}{\text{(2 X Games Played)}}$$

Subjective performance. To supplement objective performance outcomes, subjective performance was primarily measured by having goaltenders rate their own performance (see appendix E). In addition, coaches were approached to provide a rating of their goaltender's performance when applicable These measures were adapted from and modified by those used in Chisamore (2006). To update these scales, the researcher consulted with a professional goaltending coach who worked with two Western Hockey League teams over the past 9 years, and consulted with several professional clients. The goaltender observation of own performance scale consists of 12 performance subcomponent items rated on a 10-point Likert scale (i.e., *1 = poor*, *10 = perfect*), one overall performance scale, and three open ended questions. The coach observation of goaltender performance consists of the same format, but only two open ended questions were asked (see appendix F). Explanations for each of the scales were provided on the back of the questionnaires for both goaltenders and coaches, and both parties were encouraged to ask questions if any of the scales were unclear.

Psychological skills. Psychological skills assessments are important in order track changes in the use of psychological skills and techniques after an intervention. To measure psychological skill usage in participants, the Test of Performance Strategies (TOPS; Thomas,

Murphy, & Hardy, 1999) was chosen based on its content for assessing the psychological techniques under investigation. Although there are other inventories for assessing psychological skills (e.g., ACSI-28), the TOPS addresses the specific skills that are being taught and utilized in this intervention, thus the frequency of skill usage could be directly investigated. The TOPS consists of 64 items that investigate psychological processes that underlie successful athletic performance (Lane, Harwood, Terry, & Karageorghis, 2004). It includes 32 items regarding negative thinking, goal setting, imagery, self-talk, emotional control, relaxation, activation, and automaticity in competition settings (i.e., 4 items per skill). All responses are recorded on a five-point Likert scale (i.e., *1 = never, 5 = always*) addressing how often athletes utilize each skill in either training or competition. In practice settings, 32 items address seven of these eight areas, with attentional control replacing negative thinking. Alpha coefficients for competition subscales range from 0.74 to 0.80, and practice subscales range from 0.66 to 0.81 (Thomas et al., 1999).

Anxiety. Competitive state anxiety was measured using the frequency and direction (Jones & Swain, 1992) scales of the Competitive State Anxiety Inventory – 2 (CSAI-2d; Martens et al., 1990). The CSAI – 2d includes 27 items rated on four-point Likert scale (*1 = not true at all, 4 = very much so*) addressing three dimensions; cognitive anxiety, somatic anxiety, and self-confidence. Scores for each subscale are totaled giving a score between 9 and 36. The frequency scale has been reported to have Cronbach's Alpha coefficients ranging from 0.79 to 0.90 (Martens et al., 1990), demonstrating acceptable internal consistency. In addition, each question in the cognitive and somatic anxiety subscale was accompanied by a direction scale ranging from -3 to +3 to indicate whether the athlete interprets this symptom as debilitative or facilitative (Hanton & Jones, 1999b; Jones & Swain, 1992). Direction scores for each subscale

were totaled, resulting in a range from -27 to +27. Mellalieu, Hanton, and Jones (2003) reported internal consistency coefficients ranging from 0.80 to 0.89 for the cognitive anxiety direction scale, and coefficients ranging from 0.72 to 0.84 for the somatic anxiety direction scale (Jones & Hanton, 1996).

Social Validation. As advised by Page and Thelwell (2013), and outlined by Mellalieu, Hanton, and Thomas (2009), all participants were asked four questions using a Likert scale response (*1 = not at all, 7 = extremely*). Participants were asked:

1. How important is it for you to improve performance?
2. Do you consider the performance changes to be significant?
3. How satisfied are you with the intervention procedures?
4. Have the intervention procedures proved useful to you?

As well, there were three open-ended questions asked as part of the questionnaire (see appendices G and H). These questions included:

1. Additional comments about the intervention procedures?
2. Reasons for success or failure of the intervention?
3. Has this intervention changed your knowledge of, and/or attitude towards sport psychology and psychological skills training?

Post-season Interview

In addition to the social validation questionnaire, athletes and coaches were asked to participate in a post-season interview to elaborate on their experiences throughout the course of the season and the intervention. These interviews were important to the overall analysis, as they provided individual perceptions into the appropriateness of format, content, and

delivery of the intervention, and gave "an alternative form of evaluation of the effectiveness of the treatment, or its component parts" (Thelwell & Maynard, 2003, p. 382). Having a qualitative form of evaluation can provide "alternative conceptions of social knowledge, of meaning, reality, and truth" to the quantitative data (Kvale, 1996, p. 11). Thus, it seems pertinent to provide a qualitative evaluation of the intervention procedures, as well as provide insight on the individuals' perceptions of the intervention delivery and its parts. Gucciardi, Gordon, and Dimmock (2009a) stated that providing qualitative examination may "enhance the interpretability and meaningfulness of quantitative data by gaining an understanding of key stakeholders' (i.e., athletes', parents', coaches') perspectives on the goals, procedures, and results" of interventions (p. 326). These researchers conducted a quantitative comparison between two different skills interventions (i.e., mental toughness training vs. psychological skills training), and interviewed athletes, their coaches, and parents in response the mental toughness training protocol. These interviews provided context to the participant's changes after the intervention. For example, cited mechanisms for the success of the intervention included; athletes being more receptive to criticism, athletes having more quality preparation, and athletes being more self-aware and self-regulatory. As well, several methods for the improvement of the intervention were provided through this analysis.

Semi-structured interviews have a sequence of themes to be covered by using scripted questions, yet allow for changes in sequence and questions in order to follow-up from answers given to the questions (Kvale, 1996). This method was chosen in order to gain insights into direct themes related to the intervention (e.g., what part was used most), as well as provide ample opportunity for the athletes to expand on their perceptions of the intervention (e.g., barriers, obstacles, and challenges to participation).

The interviews with the athletes took place in a boardroom at the arena where the intervention meetings were held. The athlete interviews were conducted in person, and the coach was interviewed over the phone. All interviews were conducted, recorded, transcribed verbatim, and examined by the first author.

Athletes were first asked about their perceptions to the intervention techniques in order to highlight any perceived underlying mechanisms for the success or failure of the intervention (Mellalieu et al., 2009). Next, participants were asked to illuminate which parts of they intervention they found most and least useful, and to explain the situations in which they used the techniques, and why they found these skills to be used this way. Lastly, the participants were asked to provide information about the overall perception of the intervention, if there were any difficulties to participating in the study or the intervention, and how they would change it to make it better in the future. On average, the interviews were 16.09 minutes in length.

Participants were asked five questions, and probed to elaborate on their responses. The structured questions included:

1. Did you find the intervention procedures useful to your performance? Why?
2. Which part of the intervention did you use the most? Why?
3. Which part of the intervention did you use the least? Why?
4. If you could change anything about the intervention procedures what would you change? Why?
5. Were there any barriers, obstacles, or challenges to taking part in the study?

The Intervention

The independent variable for this study was a six-skill PST intervention. The intervention consisted of the psychological techniques of goal setting, self-talk, arousal regulation, concentration, imagery, and routines. These skills were chosen based on a combination of recommendations by Taylor (1995), Gelinas and Munroe-Chandler (2006), and Thelwell and Maynard (2003).

The intervention was delivered through six one-on-one private sessions, each spanning approximately 45-minutes to one hour. Participants were educated on the effectiveness and usage of each of the psychological skills, and completed workbook exercises to practice and integrate the skills into their training sessions and competitions.

Goal setting was introduced first in order to identify each goaltender's outcome goals, as well as strengths and areas for improvement. In accordance with Thelwell and Maynard (2003), participants were educated about the distinction and usage of process, performance, and outcome goals, the importance of each style, and when it is beneficial to focus on each. Kingston and Hardy (1997) suggested that process goals may be more beneficial in a competition, and Wanlin and colleagues (1997) also recommended the use of goal setting to increase productivity in practice sessions where constant monitoring by the coach is absent, as is the case with many goaltenders. Therefore, participants were instructed to choose their own meaningful process goals for practice in order to improve skills, and performance and outcome goals to increase motivation in non-game settings (see appendix I).

Arousal regulation techniques were taught next in the intervention. According to Weinberg and Gould (2011), increased state anxiety can cause increased muscle tension, interfere with coordination, and narrow attentional field. With specific regard to an ice hockey

goaltender, this narrowing may be detrimental by inhibiting focus on broad cues, such as opposition players without the puck (Gelinas & Munroe-Chandler, 2006). As well, certain situations may require a goalie to increase arousal levels (e.g., when playing a very low caliber team). If arousal levels are too low, attentional focus may become too broad, causing an athlete to focus on both relevant and irrelevant cues (Weinberg & Gould, 2011), as there are many potential distractions throughout the course of an ice hockey game.

Participants were educated about the relationship that arousal levels and anxiety can have on sport performance, and the importance of being able to monitor and regulate one's own arousal levels. Breathing strategies to manage anxiety and arousal were used (see appendix J). Both relaxation strategies and activation strategies were taught, based on recommendations by Taylor (1995) and Gelinas and Munroe-Chandler (2006). Relaxation strategies included breath control, using a centering breath (i.e., 6-1-8 tempo), and progressive muscle relaxation. The activation strategy taught in this session was the use of controlled breathing (Thelwell & Maynard, 2003). Following this recommendation, to attain higher activation, a series of longer inhalations and short exhalations was suggested (i.e., 2-1 tempo).

Self-talk was the third technique that was introduced. Self-talk has been used for a variety of functions, such as the development of skills/techniques, reinforcement of game plans/strategy, maintenance of focus, improvement of self-confidence, arousal control, and attainment of goals in both practice and competition (Hardy, Gammage, & Hall, 2001). Self-talk can also be used as a thought stopping technique (Dugdale & Eklund, 2002). This intervention meeting focused on three steps of thought control, 1) identification, 2) thought stopping, 3) thought replacement. In competition, emphasis was placed on process self-talk. Participants were instructed to identify scenarios in which their self-talk became negative, focused on

mistakes, or focused on past, future, or outcomes. They were then taught to come up with three to five short, positive and process focused phrases to pair with breathing techniques to respond to adverse situations (see appendix K).

Focus and concentration skills were taught fourth, as "the ability to pay attention to what is most important in any situation while ignoring distractions is a vital ingredient of successful performance in sport" (Moran, 2009, p. 195). Goaltenders must be able to maintain attentional focus on task relevant cues, and be able to change attentional style when appropriate (Gelinas & Munroe-Chandler, 2006). Toner and Moran (2015) also note the importance of being able to change attentional focus, especially for expert skill execution.

In this session, education was provided regarding Nideffer's (1976) four attentional styles, and situations in which one should utilize each attentional style, as all are relevant for goaltenders. The importance of being able to switch attentional focus and blocking distractions was also stressed. This involved the identification of specific times and triggers when concentration may be lost, and how to bring attentional focus back to the task at hand by building on the previous self-talk session (Thelwell & Maynard, 2003). This session also included the development of individual and situational specific strategies to change attentional focus, improve concentration, and block distractions when they occur (see appendix L).

Imagery was the fifth psychological skill introduced in the PST package. Imagery can be used for a variety of functions that include enhancing skill performance, improving self-confidence, and regulating arousal (see Martin, Moritz, & Hall, 1999 for review). As well, imagery has been used in an effective PST package designed to change swimmers' debilitative interpretations of anxiety (Hanton & Jones, 1999b), and has been used previously with ice hockey goaltenders (McFadden, 1982).

This session involved education of the different types of imagery, and the potential usage of each type of image. Firstly, the researcher read different imagery scenarios to the athletes, and they rated themselves on both the controllability and vividness of the images. The researcher and athlete then discussed the five different functions of imagery, and it was stressed that different images may serve different, or multiple, functions for each individual (Short, Monsma, & Short, 2004). This session also involved practice of different types of imagery, and suggestions of how to incorporate imagery into multiple situations (see appendix M).

The sixth session involved incorporating the previously taught psychological skills into a comprehensive pre-competition and in-competition routine. Orlick and Partington (1988) revealed that the "best athletes had developed systematic procedures for drawing upon their strengths in important competitions" (p. 115). These procedures included the development of a) pre-competition plans, usually involving imagery, positive thoughts, physical warm up, and focusing on previous success, b) in-competition focus plans which involve strategies to keep competitors focused on what they need to do (i.e., process focus), and c) distraction control plans, in which athletes develop individual strategies to deal with disruptions before or during competition. Participants developed a pre-game routine that started the day of competition, leading up to puck drop. They then went through the specific routine and decided what was necessary for preparation in the event that the routine need to be shortened (e.g., late arrival to road game). Lastly, participants completed education for an in-game refocusing plan in order to manage disruptions, distractions, and adverse events (see appendix N).

Procedure

Permission to conduct this study was obtained from the University of Calgary Conjoint Health Research Ethics Board.

The initial meeting. Once contact was made and goaltenders had agreed to participate in the study, an in-person meeting was arranged at the athlete's convenience. During this brief meeting, consent forms were reviewed and signed by the researchers and goaltenders. Participants received an initial copy of the TOPS (Thomas et al., 1999), and were instructed to complete it on their own and return it to the researcher, either in person or via email. Goaltenders were also instructed to complete the CSAI – 2d before every game that they start, and to complete the performance rating questionnaire after every game. Each goaltender's head coach was contacted via email, informed about the study, and asked to complete a performance questionnaire after each game that the participants start.

Data Collection. Performance data were collected from every game the goaltenders started. S%, GAA, and win % were all calculated using online league statistics when possible, and corroborating subjective performance questionnaires from participants and their coaches if online statistics were unavailable. Participants were instructed to either email or text message copies of completed data after games, or in person at the intervention meetings if it was more accessible.

Intervention introduction. After approximately five games played for the first participant, and at the convenience of the goaltender, the intervention was introduced. Interventions were staggered by approximately one week in order to obtain the benefits of a multiple baseline study design. At the beginning of the first intervention session, the TOPS was administered to examine each individual's psychological skill usage for the second time.

The intervention was scheduled to be carried out over the course of six weeks (i.e., one meeting/skill per week). However, due to other commitments, sickness, and injury, two of three interventions lasted slightly longer than the desired timeline (i.e., approximately two months).

These intervention meetings took place at the convenience of the participants. Each psychological skill came with exercises for the goaltenders to complete with the researcher. Participants continued data collection until the completion of the season.

Post-season meeting. At the completion of the hockey season, all participants completed; the TOPS for a final time, social validation questionnaires regarding their response to the intervention procedures, and a semi-structured interview to provide depth of responses of the intervention, and potentially make improvements to future PST interventions for goaltenders of this age group. Coaches were also approached to provide social validation questionnaires, as well as participate in post-season interviews.

Data Analysis

Hrycaiko and Martin's (1996) traditional visual inspection of graphical data was used in order to assess the effectiveness of the PST intervention on S% and the modified CSAI – 2d. This method uses five criteria for contrasting baseline and intervention phases to determine the effects of treatment. These guidelines state that a case for the effectiveness of an intervention can be strengthened if:

1) Baseline performance is stable or in a direction opposite of that predicted

2) The treatment effect is replicated across subjects

3) There are few overlapping data points

4) The effect happens immediately after the intervention occurs

5) The effect size is large compared to baseline

In addition, the mean line was plotted through the baseline phase and another through the intervention phase to assess changes in level.

Win %, GAA, and TOPS scores were compared individually to assess differences between baseline and intervention phases. Likert responses to the social validation questionnaires were visually compared to address individual responses and adherence to the intervention. Content from the open-ended responses and post-season interviews were examined to assess participants' perceptions of, and subjective responses to, the intervention.

Chapter 4 – Results

The results of this study are displayed in two parts. First, the general results of all three participants will be compared in the analysis. This section includes a brief description of participants, and overall comparisons of S%, GAA, Win %, objective social validation results, and psychological skills usage, similar to Rogerson and Hrycaiko (2002). The second portion is a more focused analysis that will include an individual participant examination, including subjective performance, individual anxiety responses, and the interviews from the end of the season.

General Results

Participants. Recruitment procedures initially yielded six participants (i.e., 1 minor midget AAA, 2 midget AA, and 3 community goaltenders). The two midget AA goaltenders dropped out before data collection began, and one community goaltender dropped out mid-

Table 1

The Participants

	P1	P2	P3
Age	17	15	16
Level	Community 1	Minor Midget AAA	Community 2
Average practice hours/week	3	5	3
Games Played	23	17	16

intervention. The final complete sample yielded three goaltenders aged, 17, 16, and 15. A brief description of each of the participants can be found in Table 1.

The reliability of the intervention procedures was ensured by having the participants complete the intervention worksheets and exercises for each psychological skill in the presence of the researcher, during the scheduled intervention sessions. Participants worked on the skills with the researcher, and then were given the worksheets to take home, so that they could review the information whenever they needed.

Objective Performance. For two of three participants, shots against, goals against, and minutes played were collected from online game sheets. For participant 1 (P1), these data were collected from the post-game questionnaires, and corroborated with game sheets from this participant's head coach.

The effect of the intervention on the participants' S% is displayed graphically in Figure 1, and a numerical comparison of each participant's S%, GAA, and W% before and after the intervention is shown in Tables 2, 3, and 4, respectively. P1 received the intervention first. Performance during the five-game baseline phase was rather stable, and in the direction opposite of that hypothesized. However, this goaltender's baseline was highly elevated, starting the year with three shutouts. The initial intervention data point was slightly below the last baseline data point. Performance stabilized for the next five games, then proceeded through a period of variability for seven games. Performance increased and stabilized again for the final four games of the season. P1 recorded a GAA of 0.60 and a win % of 75.0 in the baseline phase, compared to a GAA 2.10 and a win % of 61.0 in the intervention phases.

Participant 2 (P2) played nine games in the baseline phase and eight in the intervention phase. He received the intervention second, and baseline S% was relatively variable before the

intervention was delivered. Although the first data point in the intervention phase is slightly below the last point in the baseline phase, all of the data points in the intervention phase are above the baseline mean, and a large increase in overall S% was observed (i.e., 6.1 percentage points). This participant's elevated performance endured through the duration of the intervention phase. P2 also recorded a GAA of 2.57 and win % of 55.6 in the baseline phase compared to a GAA of 1.13 and win % of 87.5 in the intervention phase.

The last to receive the intervention was participant 3 (P3). Performance in the baseline phase was relatively stable with the exception of the last data point. This participant displayed a slight increase in overall S% from baseline to intervention phases. There was no immediate effect of the intervention for this participant, and performance remained variable throughout the intervention phase. In total, five of ten data points in the intervention phase are above the baseline mean performance. It should be noted that game two in the intervention phase was a relief performance in which the team had already allowed 6 goals when P3 started to play. P3 recorded a GAA of 4.47 and a win % of 41.7 in the baseline phase compared to a GAA 4.73 and win % of 11.1 in the intervention phase.

Overall, two of three participants improved in S%. P2 displayed the greatest treatment effect, recording a rather drastic change (i.e., 6.1 percentage points). Although improvements may not have been immediate, all participants improved just slightly after the intervention was delivered. As well, two of the participants displayed "leveling off" effects, suggesting that performance consistency was improved.

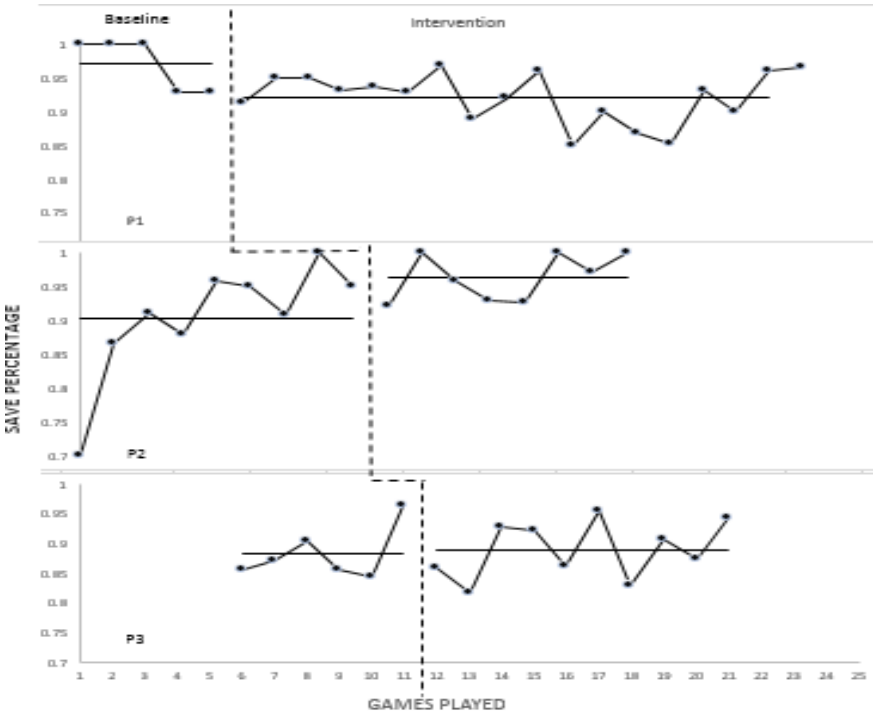

Figure 1. Participants' S% for each game played during the baseline and intervention phase

Table 2

Save Percentage

	P1	P2	P3
Before Intervention	97.2	90.3	88.3
After Intervention	92.1	96.4	89.1
Difference	-5.1	+6.1	+0.8

Table 3

Goals Against Average

	P1	P2	P3
Before Intervention	0.6	2.6	4.5
After Intervention	2.1	1.1	4.7
Difference	+1.5	-1.4	+0.3

Table 4

Win Percentage

	P1	P2	P3
Before Intervention	75.0	55.6	41.7
After Intervention	61.0	87.5	11.1
Difference	-14.0	+31.9	-30.6

All three participants were asked to complete a social validation questionnaire at the conclusion of the study. These results are summarized in Table 5. All participants stated that it was extremely important for them to improve their performance, and that they were extremely satisfied with the intervention procedures provided (i.e., 7 out of 7). In addition, all goaltenders recorded a score of 6 or higher when asked to rate the significance of performance changes and the usefulness of the intervention procedures. In the open-ended response portion, it was mentioned that the procedures were well done, and that they changed the participants' understanding and knowledge of sport psychology, psychological skills, and their relationship to performance.

Table 5

Social Validation

	P1	P2	P3	Mean
How important is it for you to improve performance?	7	7	7	7
Do you consider the performance changes to be significant?	7	6	6	6.3
How satisfied are you with the intervention procedures?	7	7	7	7
Have the intervention procedures proved useful to you?	7	6	7	6.7

*Note***:** All responses were scored on a 7-point Likert scale (i.e., 1 = not at all, 7 = extremely).

Using the TOPS, participants completed both baseline and intervention phase measures of psychological skill frequency to corroborate with any changes in performance. Of the psychological skills included in the intervention, all participants used more competition goal setting, self-talk, and imagery, and two of three used competition relaxation and activation more frequently. Although P2 displayed increases or similar scores in all TOPS competition scales from baseline to intervention phases, he displayed decreases in almost all of the TOPS practice scales. P1 and P3 reported increases in nearly all of the practice TOPS scales (see appendix O).

Individual Analysis

Participant 1. This participant was 17 years old, playing in midget community 1. In total, five games were played during the baseline phase and 18 games in the intervention phase.

Subjective Performance. In addition to objective performance, P1 rated his own performance after every game during the season. The intervention effects on P1's rating of his own performance is displayed in Figure 2.

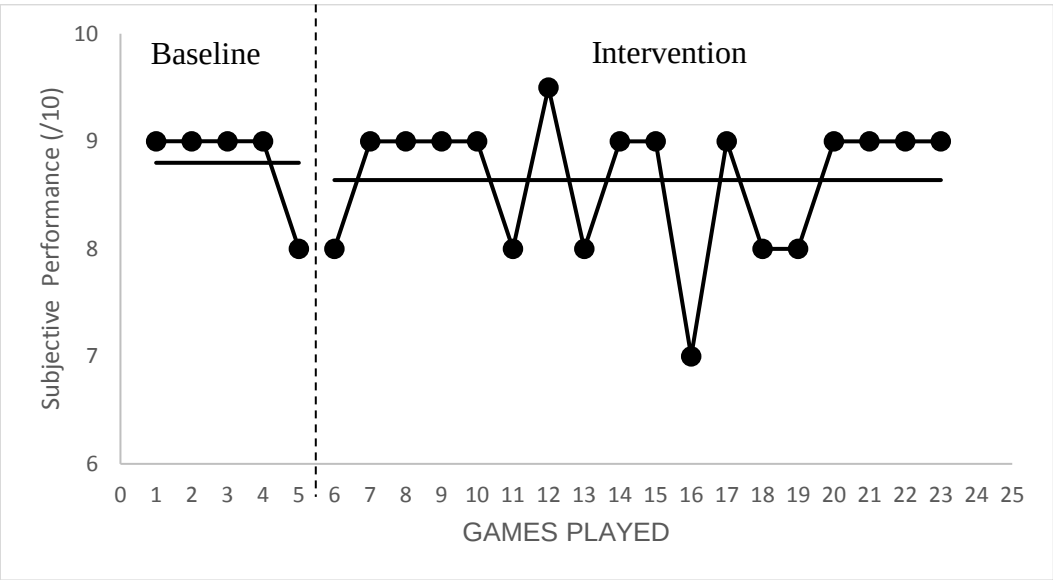

Figure 2. P1's subjective performance rating.

Overall, this participant's subjective ratings of performance follow similar trends to that of his S%. Performance is initially stable, trending opposite that of the hypothesized intervention effect. The overall performance rating decreased from 8.8 in the baseline phase to 8.64 in the intervention phase. Performance is initially stable during the intervention phase, followed by a period of variability. Near the end of the intervention phase, performance again stabilizes, as P1 reported scores of 9/10 for the final four games of the season. There are also no data points which are reported as being below 7/10.

Subscales for the subjective performance ratings were also examined throughout the duration of the study to identify changes to any performance subcomponents. Several changes were reported from baseline to intervention phases, including slight increases in physical energy, save execution, and reads and anticipations. However, slight decreases were displayed in shot preparation, puck-handling and decision making, and communication (see appendix P).

P1's head coach also rated his goaltender's performance for most games during the season. From the baseline to intervention phase, P1's mean rating of performance by the coach decreased from 9/10 to 8.4/10. This performance marker follows similar patterns to that of P1's S% and his own rating of performance. Baseline performance is very stable, reporting 9/10 for every game in this phase. After the intervention was introduced, performance appears variable until the last four games of the season, displaying a slight difference from P1's own performance ranking. Similar to P1's own ratings of performance, there are no reported subjective scores under 7/10. When the subscales of the coach performance inventory were analyzed, all scales decreased from baseline to intervention phases (see appendix S).

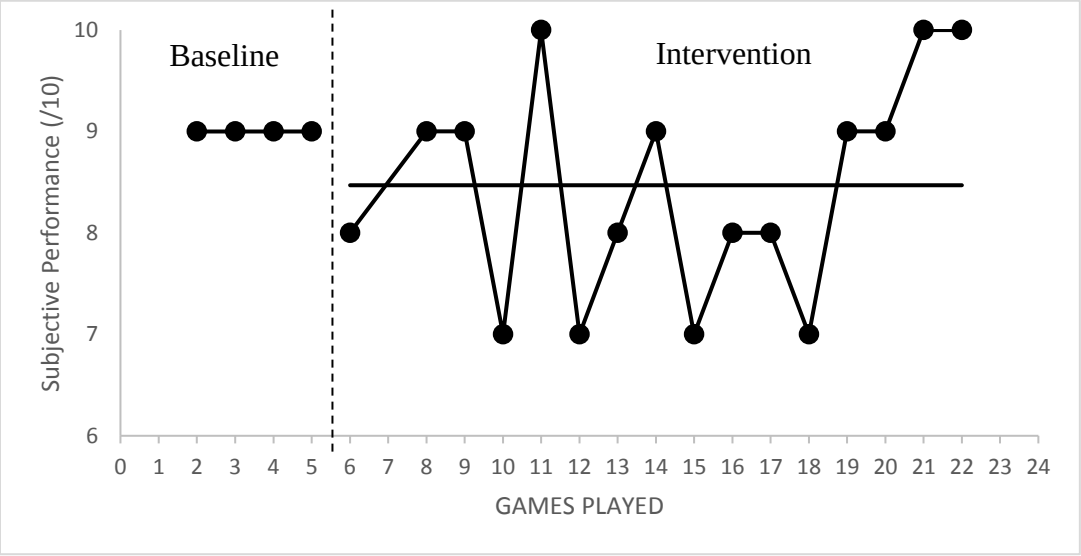

Figure 3. P1's head coach rating of performance.

Competitive anxiety. P1's CSAI – 2d scores for baseline and intervention phases are reported in Table 6. Overall, P1 decreased in both cognitive anxiety intensity (CA) and somatic anxiety intensity (SA), and increased in cognitive anxiety direction (CA-D) and somatic anxiety direction (SA-D). Self-confidence (SC) also improved from baseline to intervention phases.

Table 6

P1's self-report anxiety response

	Baseline	Intervention	Difference
Cognitive Anxiety	14.6	10.6	-4.0
Cognitive Anxiety Direction	12.6	17.9	+5.3
Somatic Anxiety	13.4	10.9	-3.5
Somatic Anxiety Direction	11.8	14.1	+2.3
Self-confidence	33.0	34.3	+1.3

Note. Cognitive anxiety, somatic anxiety and self-confidence range from 9-36. Cognitive anxiety direction and somatic anxiety direction range from -27 to 27.

Anxiety responses were also analyzed in a single-subject manner, to provide depth to performance (see Figure 4). All dimensions of the CSAI-2d show improvements from baseline to intervention phases. Figures 4a and 4b display CA and SA respectively. Although improvements were not immediate, P1 reported decreases in both intensity scales during the second game of the intervention phase. This decrease was relatively stable, with the exception of one "spike" in each scale. Figures 4c and 4d display reported scores for CA-D and SA-D for both baseline and intervention phases. All reported direction scores are facilitative (i.e., above 0). In the second game after the intervention, P1's CA-D appears to elevate slightly, and remain stable until a dramatic decrease during game 19. Scores then recover and elevate slightly during the final four games of the season. SA-D scores are somewhat more variable throughout the duration of the intervention phase. Figure 4e displays P1's self-confidence levels, which appear slightly elevated compared to baseline, with the exception of the first intervention data point, and one sharp decrease before the final four games of the season.

Social validation. In addition to providing a social validation questionnaire, P1 took part in a semi-structured interview to assess his interpretations and responses to the PST intervention. During the open-ended portion of the data collection, P1 stated the skills he learned allowed him to calm down his emotions and be more mentally controlled, and that they helped him relax and find where he played his best. He specifically noted the importance of self-awareness, as the intervention helped figure out what level of intensity he should be playing at, and to calm down when he needed to, and keep his nerves under control in close games. P1 stated that the self-talk and arousal regulation components were the most helpful because when adverse events happened, he was able to relax and focus on his process.

P1's head coach also participated in a semi-structured interview about his goaltender`s performance from the beginning to end of the season. He noted that his goaltender's performance increased steadily until the beginning of February, then declined slightly for a brief period, and increased and stabilized again through the end of the season. After being asked about performance, the coach was shown the S% single-subject data, which corroborated his own perceptions of the goaltender's performance. This coach mentioned that he could see how P1 just calmed down, and that it was easy to see when his performance declined, that he slightly lost his way and began to question everything. At the end of the year, he became very calm again, and had a kind of peacefulness to his performance.

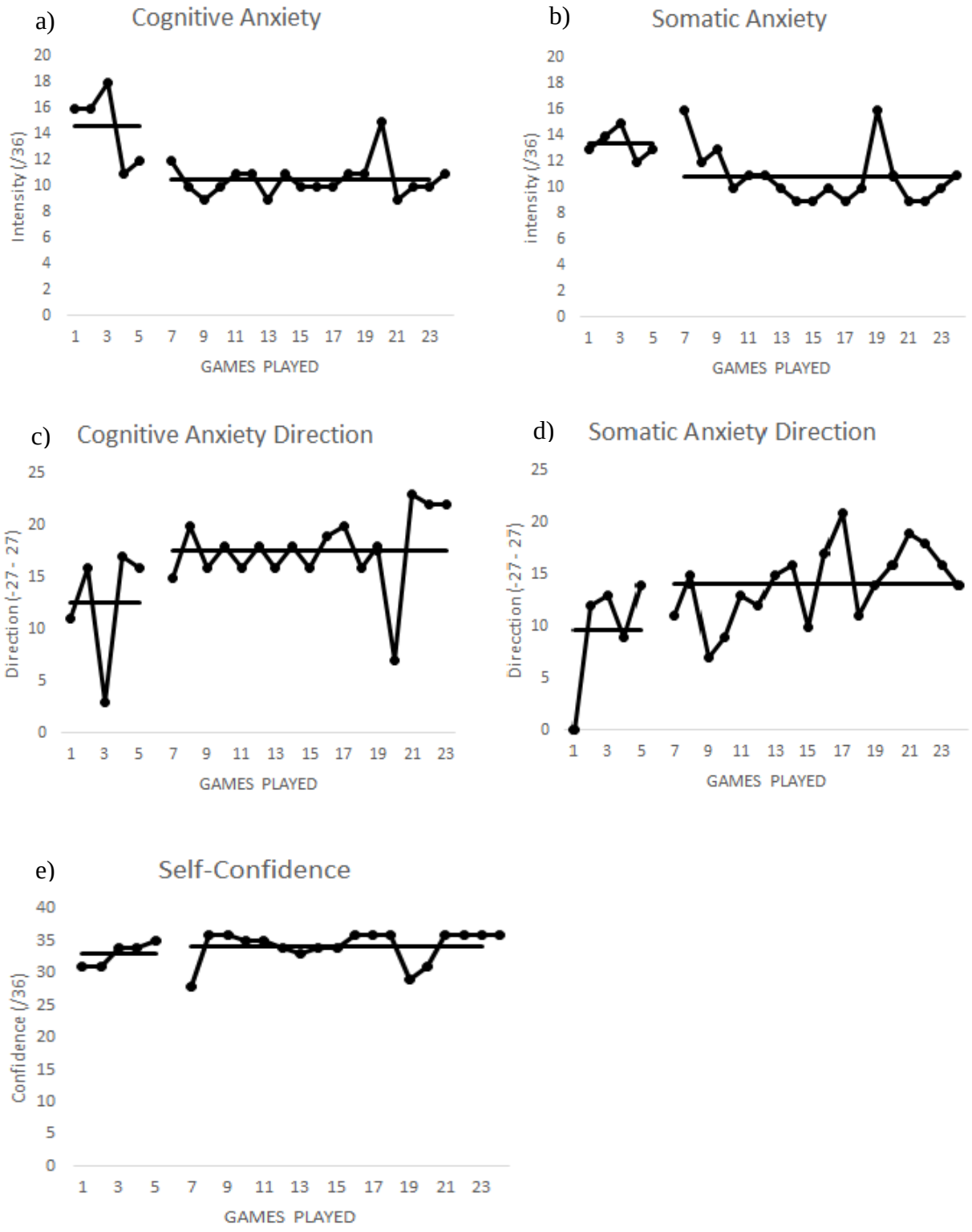

Figure 4. P1's single-subject CSAI-2d scores.

Participant 2. P2 was 15 years old, playing in the Alberta Minor Midget AAA Hockey League. Overall, he played nine games in the baseline phase and eight games in the intervention phase.

Subjective Performance. The effects of the intervention on P2's self-ratings of performance are included in Figure 5. The overall performance rating changed from 8.67 in the baseline phase to 9.50 in the intervention phase. Baseline performance was relatively stable, but increasing (i.e., in the direction hypothesized). The first data point in the intervention phase was similar to the last point in the baseline phase, followed by an increase in performance. All the data points in the intervention phase are above the baseline mean. P2's head coach participated in the study during the baseline phase, however he opted out of providing data for P2's performance in the new year, which resulted in no data points for the intervention phase, thus a comparative analysis could not be made.

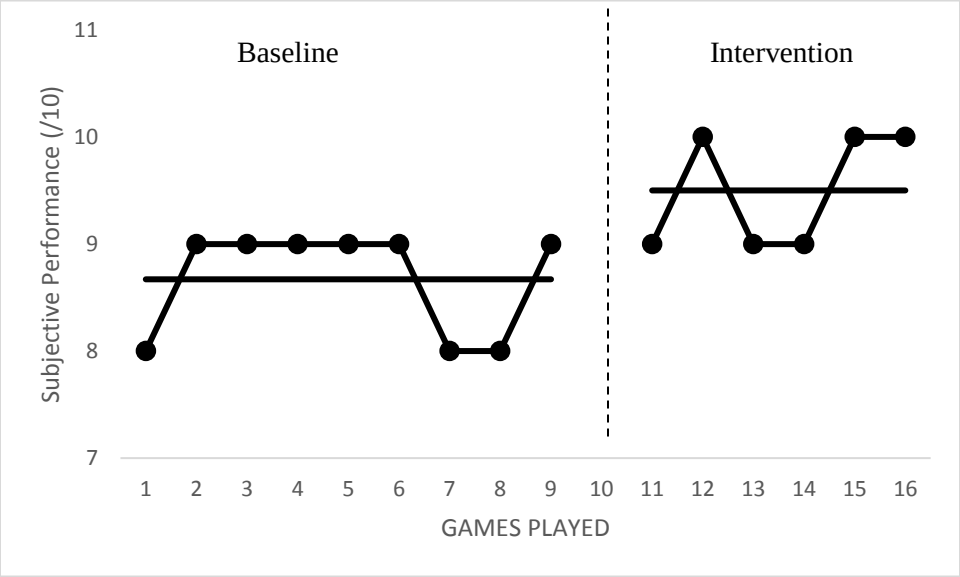

Figure 5. P2's subjective performance rating.

Competitive anxiety. P2's CSAI-2d responses for baseline and intervention phases are reported in Table 7. Overall, P2 decreased slightly in both CA and SA. For anxiety direction scales, P2's SA-D improved slightly, yet his CA-D decreased substantially (i.e., 6.9 points). Both scales remained debilitative. However, P2's SC improved from 28.8 to 33.0 from baseline to intervention phases.

Table 7

P2's self-report anxiety response

	Baseline	Intervention	Difference
Cognitive Anxiety	17.7	16.0	-1.7
Cognitive Anxiety Direction	-11.4	-18.3	-6.9
Somatic Anxiety	12.7	11.3	-1.3
Somatic Anxiety Direction	-16.9	-16.3	+0.6
Self-confidence	28.8	33.0	+4.2

Note. Cognitive anxiety, somatic anxiety and self-confidence range from 9-36. Cognitive anxiety direction and somatic anxiety direction range from -27 to 27.

Due to a brief coaching strategy in which neither goaltender knew who was starting, P2 only had three CSAI-2d data points in the intervention phase. All dimensions of the CSAI-2d are depicted in a single-subject fashion in Figure 6. CA and SA are depicted in Figures 6a and 6b respectively. Both baseline phases are stable, and displayed only slight, yet stable, decreases in the intervention phase. CA-D was consistently debilitative in the baseline phase, with the exception of one data point. From the end of the baseline to the intervention phase, P1's CA-D displayed little change, and remained debilitative throughout (see Figure 6c).

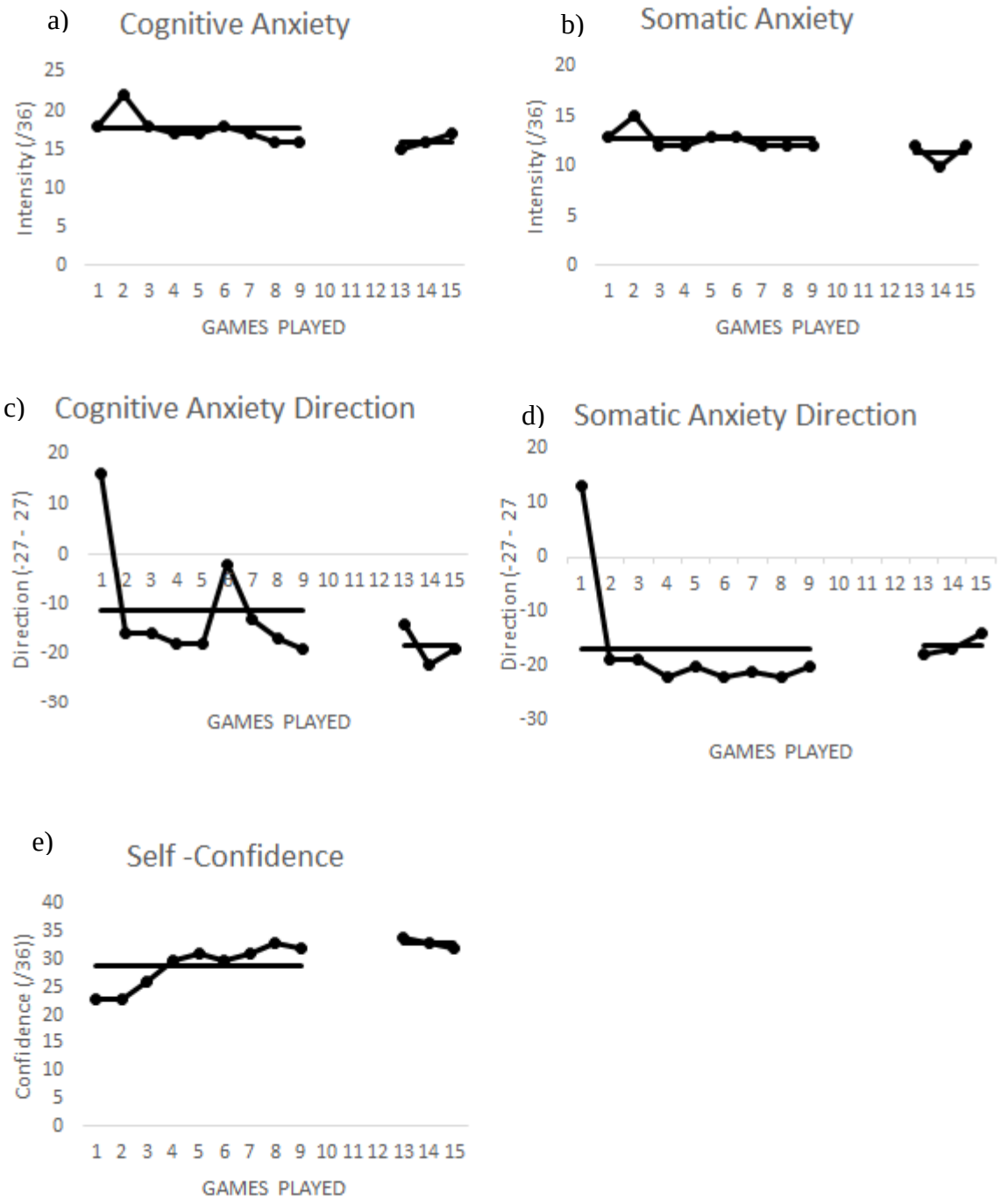

Figure 6. P2`s single-subject CSAI-2d scores.

A similar trend was observed for SA-D (see Figure 6d). With the exception of the first data point, all points in the baseline phase are consistently debilitative. The intervention phase

displayed a slight increase in direction, but no data points were facilitative. SC showed a slight increase from baseline to intervention phases (see Figure 6e), and all data points in the intervention phase are above the baseline mean.

Social validation. P2 also took part in a semi-structured interview after the completion of the season to assess his interpretations of the intervention procedures. P2 stated that the intervention was useful to performance, and that he used the worksheets to learn about the skills even after the intervention had terminated. He specifically stated that using the goal setting techniques in practice enhanced his motivation to continually improve his skills and maintain a process focus on the specific technical aspects he needed to work on. Building a routine before games, and using cue words in games were also mentioned as being particularly useful. P2 found these skills (i.e., goal setting and process focus) the most beneficial component of the intervention. He also stated that the intervention was enjoyable, easy, accessible, and that the skills were delivered in a suitable order. Due to the dropout of P2's head coach, he was not available for a post-season interview regarding his goaltender's performance.

Participant 3. P3 was 16 years old, playing in community level midget tier 2. In total, this participant played six games in the baseline phase, and nine games in the intervention phase.

Subjective performance. The intervention effects of P3's own ratings of performance are depicted in Figure 7. Overall, this participant rated his own performance for four games in the baseline phase and five games in the intervention phase. There was an overall mean performance change from 8.88 in the baseline phase to 9.5 in the intervention phase. Performance increased through the end of the baseline phase, and this increase was maintained through the intervention phase. However, since subjective performance analyses were not

submitted for every game, there appears to be a bias in which most of P3's submitted game sheets depicted positive performances.

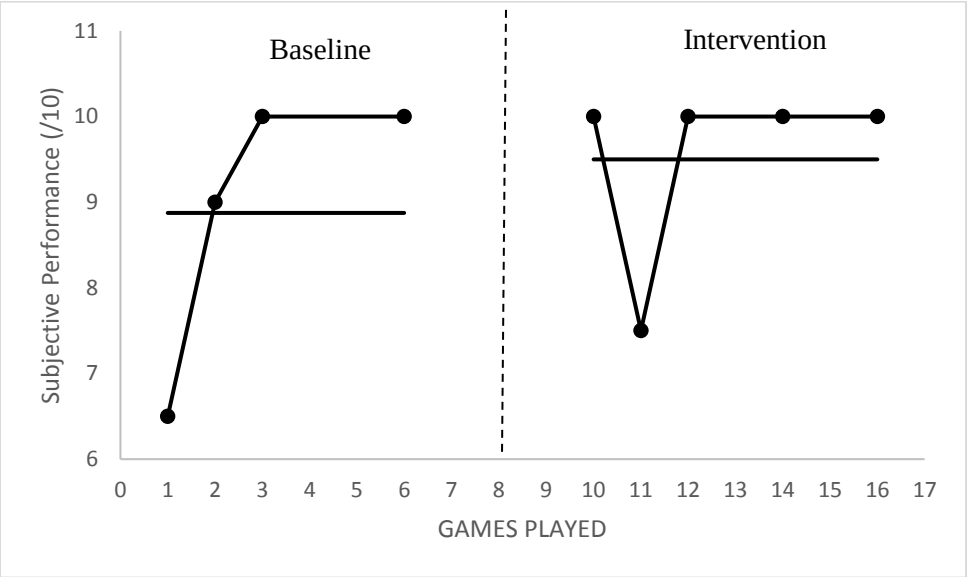

Figure 7. P3's subjective performance rating.

Competitive anxiety. P3's responses to the CSAI-2d are reported in Table 8. Overall, this participant increased slightly in all components of both anxiety intensity and direction, with the exception of SC, which marginally decreased from baseline to intervention phases. The intervention effects of the CSAI-2d are displayed graphically in Figure 8. CA and SA are displayed in Figure 8a and 8b respectively. In the baseline phase, CA appeared stable, and was generally variable throughout the intervention phase. SA showed a slight decrease after the intervention, and this was stable throughout the intervention phase with the exception of one elevated data point. Figures 8c and 8d display P3's CA-D and SA-D respectively. CA-D displayed a marginal increase between baseline and intervention phases, and this remained for most of the data points. P3 reported slight increases initially in SA-D from baseline to intervention phases, however, this was followed by a marginal decrease. Both CA-D and SA-D

remained debilitative in both baseline and intervention phases. SC was very elevated in the baseline phase, and decreased slightly, particularly near the end of the intervention phase. Interestingly, in game 16, one of P3's best statistical performances, he reported the second lowest level of SC throughout the entire study. Any conclusions from P3's CSAI-2d warrant caution, as there are some missing data points in each phase.

Table 8

P3's self-report anxiety response

	Baseline	Intervention	Difference
Cognitive Anxiety	12.5	14.4	+1.9
Cognitive Anxiety Direction	-20.8	-16.4	+4.4
Somatic Anxiety	10.3	11.0	+0.7
Somatic Anxiety Direction	-19.3	-17.8	+1.5
Self-confidence	34.3	32.0	-2.3

Social validation. P3 also took part in a semi-structured interview at the end of the season to address his responses to the intervention procedures. P3 identified that the intervention procedures were very useful to his performance. He found that the arousal regulation procedures were particularly valuable. The intervention gave P3 the self-awareness to identify his own optimal state of arousal, and identify situations in which he may need to change his arousal level. He stated that there were times in games where he was abruptly fatigued and lacking adrenaline. During these situations, he'd be able to immediately use a breathing technique and become energized right away. He noted that he was able to identify times when he was too jittery or

agitated, and then calm himself down right away. P3's head coach did not agree to participate in the study.

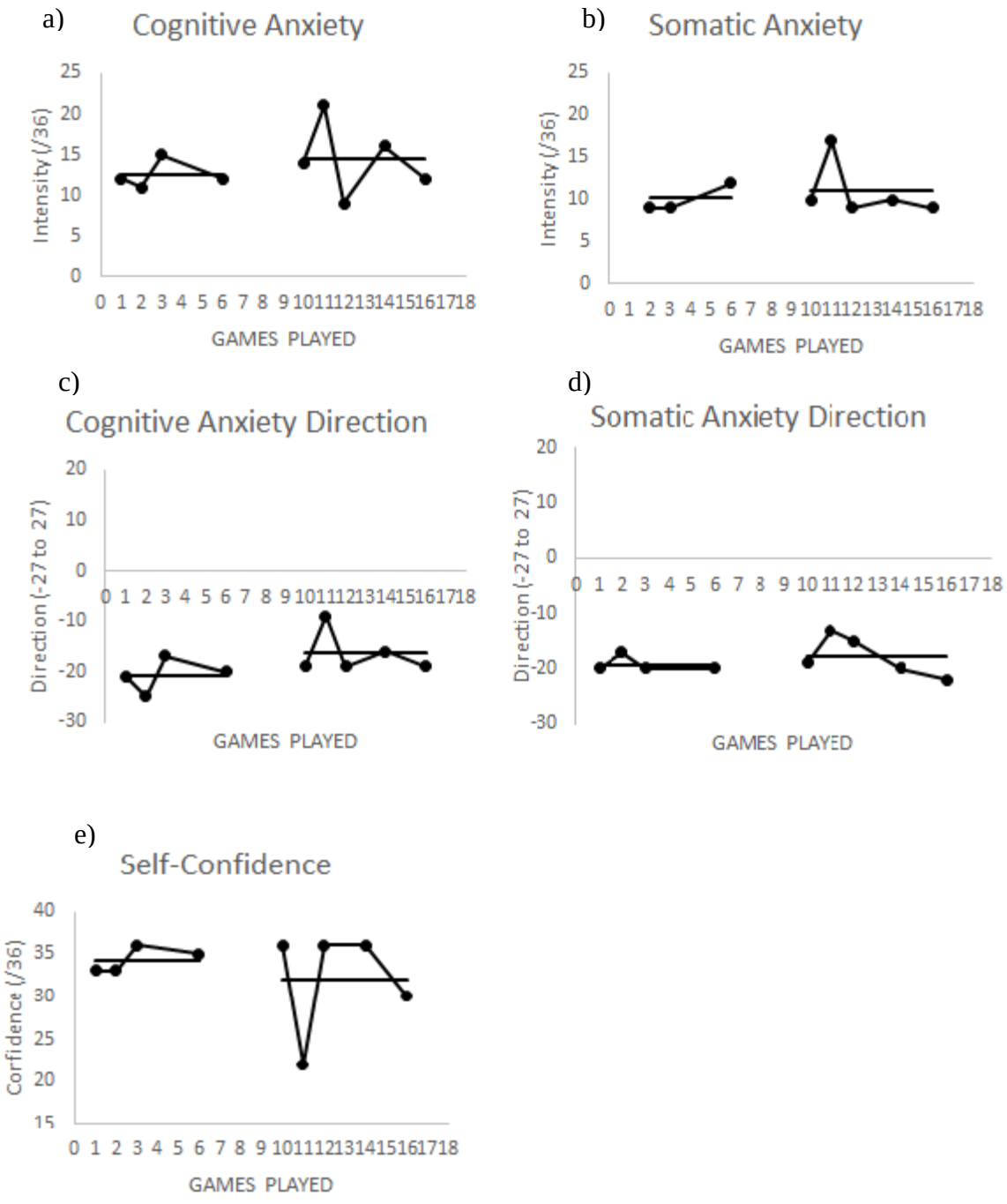

Figure 8. P3's single-subject CSAI-2d scores.

Chapter 5 – Discussions and Conclusions

For the purposes of this discussion, the findings will be presented in a similar fashion to that of the results. The general findings for the participants as a group will be presented first, followed by an analysis on a participant-by-participant basis. In this more focused analysis, comments from the follow-up interviews, post-game questionnaires, and PST sessions will be included to provide depth to the investigation. Participants were encouraged to be honest in their comments regarding their perceptions of the intervention. Three participants and one head coach took part in the final assessment.

General Discussion

Addressing the main hypothesis of this study, it was demonstrated that a PST intervention including goal setting, arousal regulation, self-talk, concentration, imagery, and routines may be effective in improving midget goaltenders' game performance. The overall evaluation of the participants' performance found that two out of three participants improved in S% from baseline to intervention phase, and other subjective assessments corroborated performance enhancements.

This study responds to the stated lack of research that empirically examines a comprehensive PST intervention in ice hockey goaltenders (Rogerson & Hrycaiko, 2002), specifically in midget. The positive effects of the PST intervention in ice hockey goaltenders support previous assertions and observations reported in articles using goaltenders (Gelinas & Munroe-Chandler, 2006; Rogerson & Hrycaiko, 2002) and other athletes in similar tasks (e.g., Kendall et al., 1990; Thelwell et al., 2006; 2010) that used multicomponent interventions in order to obtain a treatment effect. The benefits of using the package approach may have been demonstrated in the social validation interview, in which P1 and P3 stated that self-talk and arousal regulation were the skills that they found most useful, whereas P2 utilized the goal

setting portion most to motivate himself in practice. P2 also stated that all of the skills were useful. The practicality of multiple skills also supports Patrick and Hrycaiko's (1998) notion of providing athletes with "a toolbox of mental skills" (p. 293) that can be utilized for specific situations. For example, P3 noted that he was able to use both activation and relaxation strategies in order to manipulate his level of arousal to the optimal point. Thus, providing multiple psychological skills in a package approach appeared to be useful for the goaltenders involved in this study.

As noted by Rogerson and Hrycaiko (2002), there is a paucity of research specific to the sport of ice hockey, especially with goaltenders, who occupy a very unique niche in sport. This study extends the literature with this population, and adds to the dearth of experimental assessments of psychological skills for improving in-game performance of midget goaltenders. Although Rogerson and Hrycaiko (2002) cited utilizing the SSMB study design, they used three baselines for five participants, giving two pairs of goaltenders the intervention together. Compared to this methodology, all three participants in this study received the interventions at staggered time points in the season rather than performing interventions in groups, thus providing an independent baseline for each participant.

When assessing S%, two of three participants improved from baseline to intervention phase, and one participant decreased. Although S% is a common metric used to analyze goaltender performance, this metric has an objective ceiling (i.e., a shutout) which can add difficulty to assessing the effects of an intervention. In P1's case, his baseline performance included three shutouts, a GAA of 0.60, and a win % of 0.75. This performance is extremely elevated, and not sustainable for the duration of the season. For example, the National Hockey League leading goaltender for the 2016-2017 season recorded a S% of 93.1 and a GAA of 2.06

(National Hockey League). Although the intervention may not have appeared effective when examining the objective statistics of P1, further subjective analysis may provide a deeper examination of the intervention effects (see individual discussions). This finding may also authenticate the importance of the single-subject design in which dependent variables are measured consistently over time, and potentially illuminate the significance of including multiple performance markers rather than just objective performance.

This study also adds to the relative scarcity of research in which the effectiveness of PST interventions is assessed using real-world sporting variables. For example, Barker and colleagues (2013) reviewed literature between 1997 and 2012, and identified only 20 studies that specifically examined sports performance in applied settings throughout this 15-year span. By using performance markers from league games and in-field settings, researchers may be able to identify if interventions can be effective for improving performance under the pressures and demands of actual competition, compared to that of performance in practice or simulated tasks.

The findings of this research also demonstrate the difficulty in conducting a single-subject study design that includes multiple subjective performance inventories, possibly contributing to the previously cited lack of single-subject designs in sport settings. Although S% data was relatively uncomplicated to gather via online resources, adherence to returning subjective data reports was inconsistent across participants. P1 and P2 were relatively engaged, submitting data for almost every competition. However, P3 was missing multiple data points throughout the season. Several reasons for the missing data were highlighted throughout the post-season interview. Regarding the missing CSAI-2d's, P3 stated that leading up to games it was difficult to do the anxiety surveys, as he is more of a verbal person, and would prefer to articulate his feelings rather than rate them on a questionnaire. He also stated that time before

games was a factor, as the sheets took too long to complete, and could not be effectively incorporated into his game-day routine. To ease data collection, participants were asked to fill out only CSAI-2d's for the games that they were starting, however, P2 stated that for a brief time his coach would inform the goaltenders who was starting right before the game start, not allowing him to complete the forms prior to game start. P3 also noted that he had difficulty trying to electronically send the game sheets to the researcher, and had misplaced multiple completed questionnaires.

The primary purpose of this investigation was to assess the effects of a PST intervention on performance of male midget ice hockey goaltenders. The principal objective performance measure in this study was S%. Overall, all three participants displayed slightly different responses in S% after the intervention was introduced. P1 decreased, P2 increased substantially, and P3 increased slightly. As mentioned, P1's baseline S% was elevated beyond the point of sustainability, and thus the decrease in S% was expected as a regression to the mean. A potential cause for the variability in objective responses to the intervention may be that objective performance variables for goaltenders are highly effected by factors outside of their personal control, such as level of competition and team performance. Although S% is the objective statistic most under the goaltender's control, it is still amenable to outside influence. Even though P1's S% declined, his performance was very stable and consistent immediately after the introduction of, and during the intervention (i.e., until game 11). This was followed by a brief period of variability. When probed, P1 noted that the psychological skills he learned slightly deteriorated without discussion and monitoring from the researcher, and that a mid-season "tune-up" may have been beneficial.

P2 improved substantially in S% (i.e., six percentage points) from the baseline to the intervention phases. He stated that by becoming aware of his process goals (i.e., the skills he wanted to improve), he was able to fully utilize his practice and training sessions, similar to the findings of Wanlin and colleagues' (1998) investigation of a goal setting intervention with speed skaters. He said the worksheets were useful in building routines and focusing in games, which he also felt aided his performance. Every data point in P2's intervention phase was above the baseline mean, and his performance remained consistently good throughout the duration of the intervention phase, as this participant lost only one game, and allowed more than two goals only twice in eight games.

P3 improved slightly in S%, increased in GAA, and declined in win %. In the intervention phase, P3 posted five data points which were above the baseline mean. Performance was relatively poor throughout the baseline phase, with the exception of the last elevated data point. In the intervention phase, performance is rather variable, yet elevated when compared to the overall baseline phase, thus it appears that the intervention was effective for improving P3's performance. Although this participant did not obtain a win in the intervention phase, he maintained that the intervention was useful and that it helped his performance substantially, specifically through the usage of the arousal regulation techniques.

Based on performance changes, an argument may be made that the effectiveness of the intervention may depend on skill level, as the participant playing at the highest level (i.e., Minor Midget AAA) displayed the most substantial objective performance increases. Another possible explanation for the differences in response to the intervention could be the amount of time to practice the psychological skills, as quadrant/rep hockey teams are generally more engaged, and

get priority ice and practice time compared to community teams. However, these potential reasons for the difference in intervention responses are speculative.

Overall, when examining multiple sources of assessment (i.e., objective performance, subjective performance, and social validation), it appears that this intervention may have been useful for benefiting performance of midget-aged ice hockey goaltenders. All goaltenders perceived the intervention procedures as useful, and used different techniques in different situations, thus potentially validating the package approach to training psychological skills.

The CSAI-2d. A secondary objective of the study was to examine the effects of this PST intervention on goaltenders' intensity and direction of competitive anxiety. Overall, there was no identifiable pattern in anxiety responses that persisted across participants, and, although the intervention appears beneficial in some instances, it cannot be concluded whether this intervention had a consistent effect on anxiety intensity, direction, or self-confidence in midget ice hockey goaltenders. P1 showed the most substantial improvements in anxiety. CA and SA both decreased from baseline to intervention phases, whereas CA-D and SA-D increased from baseline to intervention phases. P1's SC improved slightly as well. Single-subject analysis revealed that, although all of these scales improved, they were relatively variable throughout the intervention phase. These patterns generally corresponded with that of P1's objective and subjective performance. For example, when P1's performance was elevated and stable just after the introduction of the intervention, both CA and SA decrease. However, when performance becomes more variable, there are surges displayed in this participant's anxiety responses, suggesting that fluctuations in an athlete`s psychological skills can account for performance variability (Woodman & Hardy, 2003). SA-D stayed relatively variable throughout the duration of the season. This could potentially support previous notions (i.e., Craft et al., 2003, Martens et

al., 1990) that somatic anxiety accounts for less performance variance than cognitive anxiety. SC also followed a similar pattern to that of performance, displaying slight decreases as performance became more variable, potentially demonstrating a link between P1's SC and performance.

P2 displayed no visible pattern in CSAI-2d results from baseline to intervention phase. In the baseline phase, P2's reported CA and SA scores were very stable. Although immediacy of an effect cannot be determined, the intensity scores continued to be stable throughout the intervention phase, decreasing slightly overall. CA-D and SA-D stayed debilitative throughout the course of intervention, with the exception of the first data point. This finding is in the opposite direction of the hypothesized results, as the facilitative data point corresponds with the lowest performance score reported. Although SC was on an upward trend before the intervention was applied, P2's reported scores were slightly higher in the intervention phase than in the baseline phase. This slight increase in SC potentially contributed to his increases in performance throughout the duration of the season.

P3 also displayed no clear visible pattern or change in anxiety responses from baseline to intervention phases. CA increased slightly, and remained rather variable throughout the intervention phase. SA increased slightly in the intervention phase, and then proceeded to level off and stabilize for the duration of the season. This could potentially be due to P3's assertions that he found the arousal regulation techniques the most beneficial for his performance, thus he may have been better able to manage SA symptoms. CA-D and SA-D improved slightly from baseline to intervention phase, although the interpretations remained debilitative throughout the season. P3's SC was rather variable in the intervention phase, which may have been a contributing factor to performance inconsistency in the intervention phase.

This study highlighted the difficulty in obtaining a comprehensive, ongoing measure of anxiety throughout the course of a season. The participants were instructed to complete the CSAI-2d's approximately two to three hours before puck-drop for games they were starting. Although Hanton, Thomas, and Maynard (2004) identified that anxiety intensity peaks approximately 30 minutes before game start, this time period was chosen as not to interfere with athletes' pre-competition routines. However, P3 stated that he did not like to complete the anxiety inventory before the game, as he found it distracting to his performance routine, and too laborious to complete the inventory before the game. He suggested that a shorter form of the questionnaire would have been more accessible, or that doing it after the game would be easier as to not disrupt his pre-competition routine. P2 stated that, for some games throughout the season, the coach would not tell the goaltenders who was starting, so he did not complete his CSAI-2d's for these games. This was not mentioned to the researcher, as it would have then been advised to complete them for every game. It would have been beneficial to understand this participant's responses in the presence of this uncertainty, and if the intervention had helped to overcome this challenge. This difficulty in obtaining comprehensive subjective data is part of the nature of conducting research in applied settings, as constant monitoring of participants is challenging. Although it is difficult to draw concrete conclusions about the effects of the intervention on anxiety responses, certain insights can be taken from the difficulty in obtaining CSAI-2d inventories for every game of the season, and these procedures can be updated for future research (see future directions).

The intervention presented in this study had a less consistent effect on anxiety direction when compared to Hanton and Jones (1999a), who found that a PST intervention improved elite swimmers' anxiety direction responses. One potential reason for this distinction may be the

nature of the intervention. Hanton and Jones (1999b) interviewed athletes about their facilitative interpretations of anxiety, and structured their intervention (1999a) specifically to address debilitative anxiety interpretations, whereas the present intervention was designed to address the task demands of an ice hockey goaltender to improve performance rather than target one specific performance problem. For example, P1's anxiety responses showed an overall improving trend throughout the course of the season, and he cited this as a potential mechanism for the success of the intervention. This can be compared to P2, who cited improving more from the goal setting piece, and displayed no interpretable pattern in anxiety responses. This appears similar to the case of Mamassis and Doganis (2004), who found slightly varied responses to anxiety direction after a 25-week PST intervention.

Social validation. Based on the need to accompany objective performance markers (Anderson et al., 2002; Thelwell & Maynard, 2003), and the difficulty of obtaining constant and consistent subjective performance variables, social validation procedures are paramount to SSMB designs in order to evaluate the practical importance of an intervention to the recipients. This is done to assess the participants' responses to the intervention procedures, as well as allow researchers to gain insight on how athletes perceive the PST training protocols. This can clarify any underlying mechanisms for the success or failure of an intervention, and help illuminate any personal factors or differences in response to the intervention procedures. Lastly, it can provide an evaluation of the intervention so that practitioners can modify and update procedures to better serve athletes.

Social validity was obtained via a brief four-question, 7-point Likert response inventory, and a semi-structured interview with each participant at the conclusion of the study. Overall, the response to the intervention procedures was very favorable. All participants gave a rating of 6/7

or 7/7 for each question asked, demonstrating that; it was important for all the athletes involved to improve their performance, the performance changes were significant, they were satisfied with the intervention, and the intervention was useful to them. The athletes were asked to elaborate on the intervention procedures at the end of the questionnaire. P1 stated that the intervention procedures were really well done, and allowed him to elevate his game by regulating his emotions and being more controlled mentally. He stated that it helped him relax while playing, and that the techniques could be used for hockey as well as other sports, highlighting that the intervention was useful outside of the position of goaltending. P2 stated that he understood the intervention, and that the researcher helped him acquire knowledge as to how psychological skills could help his performance. P3 mentioned that he found himself using the techniques in games, was able to calm himself down, and that his views on psychological skills had changed from an innate perspective to a more educational outlook in which he was able to learn skills that worked for him.

Semi-structured interviews. Similar to the questionnaire responses, all participants found that the intervention procedures were useful for their performance, however, each participant stated slightly different reasons and mechanisms. P1 stated that it helped him learn what level of intensity he needs to play at, to calm down and play a more controlled game, and to feel more in control of his emotions. It was easier to keep his nerves under control, and to focus on the game rather than the score. P2 revealed that the PST was "very useful," and that the worksheets, the relaxation exercises, and the practice goals helped him to improve throughout the year. P3 maintained that the intervention was useful, and that it improved his performance substantially. In particular, he felt he was able to control his activation level, and to "get [himself] re-energized using the breathing techniques."

The arousal regulation techniques appeared to be the most utilized throughout the course of the intervention phase, however P2 found the goal setting portion the most useful to his performance. P1 stated that he used the arousal regulation and self-talk components the most, and that if he "got too much in [his] head, [he] could use the breathing and the cue words to calm [himself] down and just play the game instead of thinking too much about it." If something went wrong he would just breathe, say a few words, and figure out how to correct the mistake, thus bringing a level of self-awareness to his performance. P3 mentioned that he used the breathing techniques most as well, and was able to calm himself down, especially when he got agitated or frustrated. When he was tired he'd be able to get reenergized immediately, or if he was jittery he could use the breathing techniques to bring himself back down. P2 noted that he enjoyed the process goal report card the most, as it allowed him to carefully monitor his own progress throughout the course of the season, and provide motivation to get better during practice sessions. He also mentioned that he used the routines and the cue words extensively.

The component of the intervention that the participants' used the least generally corresponded with a skill that they already used in either practice or competition. For example, P1 stated that he used the imagery component the least because he had already built this skill into his preparation prior to the intervention procedures. Imagery was a very useful component for his performance, but it was a skill he had become proficient at on his own. Although P2 stated that he used the breathing techniques the least, he still mentioned that all the skills were useful. Similarly, P3 found that he used the self-talk component the least, firstly because he had already been using cue words to benefit his performance. Secondly, P3 stated that he tries to play with a "quiet mind," and preferred to focus on his breathing rather than the process during competitions.

Based on the questionnaires and interviews, all participants found that the intervention was very useful, and that it helped to improve their performance through different mechanisms. This finding highlights the idiosyncratic nature of responses to multicomponent PST interventions. These discoveries further validate using an individualized and systematic (Weinberg & Comar, 1994) package approach to PST in order to meet the needs of the athlete (Taylor, 1995), and providing multiple skills for athletes to incorporate in different situations in order to benefit performance (Patrick & Hrycaiko, 1998). The participants' perceived barriers, obstacles and challenges, and suggestions to update the intervention procedures will be reviewed in the future directions section.

Coach semi-structured interview. In addition to being approached to provide data for their goaltender's performance throughout the season, all coaches were asked to participate in a semi-structured interview regarding the performance of their goaltender. However, only P1's head coach agreed to participate. The coach was asked slightly different questions, and the discussion was more open in order to provide more depth to the intervention responses. The coach was asked how he felt his goaltender performed over the course of the year. After a discussion of the different segments of the year, the coach was then shown the single-subject S%, subjective performance, and coach rating of his goaltender's performance throughout the course of the year. Although the coach was generally aware of the procedures, he was blind to the timing of the intervention and the exact skills being learned. After viewing these figures, the coach was then asked if he thought that the intervention appeared useful to the participant, and if he would recommend the education of these skills to other athletes.

When discussing P1's performance, the coach's comments generally followed the data trends described previously. He stated that P1's performance was increasing up until around

Christmas time, when he hit his first "peak" in performance. Then, slightly after Christmas break, when the regular season started, he noted that P1, as well as the whole team, began to struggle, and this started a slight downswing in both his confidence and performance. Then heading into the beginning of February (i.e., games 13, 14, and 15) his performance peaked again. He noted that performance waned slightly through the end of February (i.e., games 16, 17, 18, and 19), and that going into playoffs his performance was again very sound.

After being shown the data from the season, P1's head coach described that the intervention was "incredibly useful." Once he was enlightened about the timing of the intervention, he noted that he could see how P1 calmed down after the introduction of the intervention, and again at the end of the season. He noted that it appeared his goaltender began to "question everything" and become more frantic in his play and emotions at around the same time that P1 stated a "tune-up" would be useful. Once again through the end of the season, he stated that P1 became very calm and solid, and had something "like a peacefulness" to his performance and demeanor.

The coach also stated that the mid-season tune-up would be beneficial. He used the metaphor that "the fire doesn't go out, it just needs a little fanning," also corroborating the need for maintenance of psychological skills. As the team's performance diminished, P1 appeared to revert and question himself, and thus, he mentioned that is important to have consistent monitoring of the "mental conditioning" with young athletes.

Lastly, he noted that he would recommend the skills from this intervention be taught to other goaltenders, as well as other athletes. He also mentioned that he would advocate the skills be taught to athletes at an earlier age, in order to benefit their performance and provide more time to become proficient in these techniques.

Psychological skills usage. In field studies where environmental control is limited, Anderson and colleagues (2002) noted that self-reported psychological skills usage is an important indicator of intervention effectiveness, as any changes in performance paired with an increase in psychological skills usage may strengthen the case for the effectiveness of the intervention (Thomas & Fogarty, 1997). The TOPS was used because it specifically assesses the frequency of the psychological skills under investigation in this intervention. All participants were instructed to complete the TOPS four times throughout the study, however there are a few missing data points due to the timing of the intervention. All participants completed a baseline assessment and post-intervention assessment. P1 completed the TOPS three times; at the beginning of the intervention, at the end of the intervention, and during the post-season interview. P1 improved in most skills from baseline to intervention phases, and throughout the duration of the study. Corroborating with his post-season interview, in which he found the arousal regulation most beneficial, P1 more frequently was able to use relaxation and emotional control strategies in competition. P1 also displayed several improvements in practice environments, including goal setting, imagery, relaxation, and activation. Overall, this increase in skills usage corresponds with P1's changes in performance, as well as his social validation testimony (see appendix O).

P2 completed the TOPS four times throughout the duration of the study; at admittance, at the commencement of the intervention, at the end of the intervention, and at the conclusion of the season. P2's psychological skill responses fluctuated throughout the course of the season. For example, practice goal setting peaked at 4.0 at the beginning of the intervention, and then decreased to 2.8 and 2.5 for the two intervention phase assessments. However, during the follow-up interview, P2 stated that the practice goal setting was the most utilized psychological

skill that he learned. As well, self-talk usage increased from the beginning of the intervention to the end of the intervention, and then declined at the end of the season. These decreases from the conclusion of the intervention to the end of the season may demonstrate that psychological skills, like physical skills, can deteriorate without consistent repetition and monitoring, and that, self-reliance may not be achieved within a brief 6-session PST intervention.

P3 completed the TOPS twice; once at the commencement of the intervention and once at the conclusion of the season. Due to certain barriers to meet with this participant, the last intervention session took place with only one game left in the regular season, and therefore it was decided to only complete a post-season psychological skills assessment. Overall, this athlete used most psychological skills more frequently in the intervention phase than in the baseline phase, and this change occurred in both practice and competition. In particular, his imagery usage improved from baseline to intervention phases in practice and competition. Self-talk and goal setting usage improved as well, and these improvements in psychological skills may contribute to this athlete's increase in performance (see appendix O).

General Conclusions. When assessing the primary premise of this study, to evaluate the effectiveness of a PST intervention for enhancing performance in male midget ice hockey goaltenders, it appeared that the intervention may have provided benefits to the performance of all participants, albeit through different mechanisms. Two out of three participants improved in S%, and the subjective analysis supplemented P1's objective performance to demonstrate that the intervention may also have proved useful even when objective performance decreased from baseline to intervention phases. Although it is difficult to make the case for a causal relationship in applied field studies, the changes in psychological skills usage may help to strengthen the case of this relationship between psychological skills and performance improvements.

Despite the difficulty in obtaining subjective data, and varied responses to the intervention procedures, all the participants in this study reported the intervention to be valuable to their competition performance. Each participant mentioned utilizing various strategies and different aspects of the intervention, and when examining the evidence as a whole (i.e., objective performance, subjective performance, anxiety, social validity, and psychological skills usage), it appears that the intervention may have been effective for improving the performance of male midget aged ice hockey goaltenders.

The effects of the intervention on anxiety intensity, direction, and self-confidence appeared idiosyncratic, as all participants had slightly different responses in both dependent measures and perceptions of the intervention. The dissimilarities between this finding and other studies may be a result of the intervention applied, as previous studies (i.e., Hanton & Jones, 1999a) designed interventions specifically for the case of changing anxiety interpretations. While one participant appeared to consistently improve his measures of anxiety, the other two displayed no consistent patterns.

Individual Participant Discussions

For this section, each individual discussion will be broken into sections corresponding with the results (i.e., objective performance, subjective performance, psychological skills, and social validation) in order to expand on each type of performance marker for each participant. This will provide a comprehensive, in-depth, analysis for all three athletes.

Participant 1.

Objective Performance. P1 was somewhat of an anomaly, as he started the season with three shutouts, a 1-goal against, and a 2-goal against game. Because of this, his baseline S% and GAA appear inflated. This may have occurred for a number of reasons. Firstly, as his coach

stated in a follow-up interview, P1 leans to the elite side of community tier hockey, in which individual skill levels may be diverse. Secondly, in community hockey, the first part of the season serves as a seeding round, in which teams play each other to form competitive divisions. Based on the scores from P1's first three full games (8-0W, 8-0W, 10-1W), it may be the case that his team was stronger than most of the other teams in the initial division. When analyzing P1's data according to Hyrcaiko and Martin's (1996) guidelines, it appears that the intervention may have been unsuccessful, as there are many overlapping data points, and an overall performance decrease. Changes in performance appear gradual rather than immediate due to the three shutouts in the baseline phase, and the change in outcome is in the opposite direction as predicted. This led to a closer examination of each individual game, and certain trends that emerge within the intervention phase of the data.

For game 1, P1 played the first half of the game, which ended in a 4-3 loss. However, P1's team was winning 2-0 when he left the net. Games two through four, respectively, resulted in a 25 save 8-0 win, a 17 save 8-0 win, and a 15 save 10-1 win. Game 5 proved more competitive, resulting in a 2-1 loss with 28 saves. Although P1 won three out of four (i.e., game 1 = no result) games in the baseline phase, with two complete game shutouts, it can be speculated that these games were hardly competitive.

These could be contrasted with the next six games, which took place during the intervention meetings, when the psychological skills were being learned by the participant. Games six through eleven, respectively, resulted in a 22 save 4-2 win, a 21 save 5-1 win, a 19 save 3-1 win, a 28 save 4-2 win, a 30 save 2-1 loss, and a 26 save 2-0 loss. When analyzing the single-subject time graphs, the recorded S%'s from these games are slightly lower. Although the S%'s slightly decreased during this section of the season, it may be speculated that, based on

score differentials, these games were more competitive, and P1 appeared to display consistently good performance.

The next data trend that emerged endured for four games, starting immediately at the completion of the intervention (i.e., game 12) through game 15. These games resulted in a 28 save 2-1 win, a 24 save 4-1 loss (3 goals against), a 23 save 2-0 loss, and a 23 save 5-1 win, respectively. During this section of the intervention phase, the mental performance consultant was absent, only collecting data. S% is slightly variable, fluctuating from 0.97 to 0.89.

Following this section, P1 appeared to enter somewhat of a slump, which lasted four games, from game 16 to game 19. These games, respectively, resulted in a 17 save 3-2 loss, a 27 save 5-3 win, a 39 save 6-1 loss, and a 23 save 4-1 loss. Throughout the losses in this section, P1 stated on the post-game questionnaires that sometimes he "couldn't focus" or had "no energy," and that he was "worried" and played "too energetic and out of control." This is the section in which, when interviewed following the season, P1 stated that a psychological skills "touch-up" would have been beneficial, since it was approximately a month and a half after the last intervention session. He felt it would be beneficial to do a "review of everything later in the season."

However, after this short slump, P1's performance recovered to the previous levels, posting elevated save percentages for the final four games. He finished the season with four strong wins, including a 27 save 4-2 win, an 18 save 6-2 win, a 25 save 6-1 win, and a 29 save 2-1 win. Throughout these games, P1 mentioned that he felt "relaxed," "calm," and "focused."

Subjective Performance. P1's self-rated overall performance decreased slightly from 8.80 in the baseline phase to 8.64 in the intervention phase. This decrease is minor compared to the reduction in S%, and, although the single-case data follows similar trends to S%, the player's

own rating of performance appears less variable. Following Hrycaiko and Martin's (1996) criteria for analyzing single-subject data, there is a baseline trend opposite of the hypothesized change in performance, in which the athlete's perceptions of his performance decrease from 9/10 to 8/10, and performance returns within two games of the intervention, a near immediate change. However, because of the elevated performance of the potentially unchallenging games in the baseline phase, there are many overlapping data points, and the overall change in outcome variable is small, yet negative.

In addition, P1's head coach recorded a subjective analysis of his performance during the season. The average level of performance decreased from 9/10 in the baseline phase to 8.4/10 in the intervention phase. When analyzed in a single-case manner, performance in the intervention phase is rather stable through game 9. After this point, the rating of performance is inconsistent until game 20, ranging from 10/10 to 7/10. Performance then stabilizes for the final four games. These trends are nearly identical to those of S% and of P1's own rating of performance. As well, there were no subjective performance data points which dropped below 7/10, suggesting that P1's performance was relatively good throughout the duration of the season.

An interesting finding is the distinction between objective and subjective performance. For example, games four and five in the baseline phase have an almost identical S% of approximately 93%, however this participant rated his own performance differently for each game (i.e., game 4 = 9/10, game 5 = 8/10). In game four, one goal was allowed on 15 shots in a 10-1 win, whereas game five resulted in two goals on 28 shots in a 2-1 losing effort. As well, P1 stated after game five that, although satisfied, he "could have done better." In game 18, P1's S% was 87%, six percentage points below that of game five. However, the subjective rating of overall performance resulted in the same score (i.e., 8/10). Although game 18 resulted in a 6-1

loss, P1 stopped 42 out of 48 shots, and noted that all goals against were shorthanded, three of which were on 5-on-3's. Thus, objectively, his performance outcome appeared to suffer, but under the circumstances of the game P1 thought that he played relatively well. In addition, although there are certain dissimilarities between objective and subjective performance, the coach's rating of performance is generally in congruence with that of the goalie's. For the overall performance rating, there are differences in 7 out of 21 games recorded, and the difference is never more than one rating point out of 10, suggesting that both parties have similar perceptions about performance. This discussion also validates the need for practitioners and researchers to supplement objective performance statistics with subjective ratings of performance in order to provide a comprehensive analysis of the effects of interventions, as objective performance measures may be influenced by outside factors.

In addition to a subjective rating of overall performance, participants rated themselves on 11 performance subscales for each game. These subscales included: 1) physical energy, 2) shot preparation, 3) save execution, 4) post-save response, 5) reads and anticipations, 6) puckhandling/decision-making, 7) communication, 8) key saves at key times, 9) body language, 10) confidence, and 11) focus. The change in level of subcomponents was inconsistent, with some of the scales increasing, and others decreasing (see appendix P). Physical energy, save execution, post save response, and reads and anticipations all increased slightly; whereas the skills of shot preparation, puckhandling/decision making, communication, and confidence decreased slightly.

Psychological Skills. A closer examination of psychological skills displayed that almost all skills increased in usage from before the intervention to after the intervention. In addition, some skills, specifically goal setting, self-talk, imagery, and automaticity in practice, and self-

talk, automaticity, and emotional control in competition displayed further usage after the completion of the intervention, as the athlete potentially used the psychological skills on his own. It could also be the case that, as the season progressed and performance decreased slightly, this athlete potentially could have employed psychological skills more in order to recover performance to previous levels, suggesting that the skills were being used in the appearance of adverse events.

Anxiety. Using Jones' (1995) conception of directional anxiety, both intensity and direction were measured for cognitive and somatic anxiety. Both CA and CA-D appeared to demonstrate an overall improvement in level, as well as more consistency and stability than in the baseline phase, with the exception of game 19. This particular game, P1 stated that he was "too out of control," and "played too energetic." It is plausible that after this game, the awareness of his arousal level lead to an increase in psychological skills usage, which may have allowed P1 to regulate anxiety intensity and reinterpret these cognitive symptoms for the remaining games. This may corroborate with P1's sentiments that the intervention "helped him calm down, and figure out where [he] should be playing. . .what level of intensity [he] should be playing at." He stated that the most useful parts of the intervention were the arousal regulation and self-talk components, to "calm [him]self down and just play the game."

SA seemed to follow similar trends to that of CA. Although SA initially increased after the intervention commenced, it stabilized slightly lower than in the baseline phase within 3 games, with exception of game 18. Although P1 stated no thoughts or feelings prior to the game, he did state that he felt "worried" and "angry" during the game, potentially because of these symptoms.

Although the overall level of SA-D improved from the baseline to intervention phase, the scores displayed high variability throughout the course of the season. However, it is important to note that no points dropped below zero, meaning that P1's interpretations of anxiety stayed facilitative throughout the entire season. This may suggest that, for this participant, the SA-D may be less related to performance than that of the other components.

In the baseline phase, SC was trending upward, then slightly decreased directly following the intervention. This could potentially be due to the last game in the baseline phase, in which P1 recorded his first loss, which may have impacted his SC. There are several overlapping data points, however; this is likely the case of a ceiling effect, as the final point in the baseline phase was 35 out of 36. Although there was an overall increase in mean SC from baseline to intervention phase, games 18 and 19 showed a slight decline in SC. This corresponds directly with the games in which both CA and SA deviated from the intervention trends, and objective and subjective performance began a downturn, as well as the time period in which P1 suggested that doing a psychological skills "tune-up" at the end of the season would be beneficial.

Participant 2.

Objective Performance. P2 started the season relatively poor for the first two games of the baseline phase, which resulted in a 6-0 loss, in which P2 played half of a game allowing three goals, and a 4-0 full game loss. After this two-game period, performance elevated, yet remained slightly variable. The following games in the baseline phase (i.e., games three through nine), respectively, resulted in a 31 save 5-3 win, a 22 save 3-2 loss in which P2 played only the first period, allowing all three goals, a 24 save 7-1 win, a 40 save 3-2 win, an 18 save 9-0 win, and a 35 save 7-2 win.

Although there are several close games in the baseline phase, it appears similar to that of P1, in which three games out of nine resulted in wins with more than a 5-goal differential, suggesting that these games were not as competitive, and may have inflated baseline performance slightly. However, with the exception of games one and two, P2's baseline performance was rather good.

After the intervention was applied, this participant sustained excellent and consistent performance throughout the entire intervention phase, with the lowest data point being 92.3%. P2 only allowed more than two goals once in the intervention phase. The games respectively resulted in a 36 save 5-3 win, a 26 save 4-0 win, a 24 save 2-1 win, a 27 save 6-2 win, a 26 save 3-1 loss in which P2 allowed 2 goals, a 42 save 6-0 shutout win, a 34 save 5-1 win, and a 30 save 1-0 win in playoffs. Although performance was trending upward in the baseline phase, P2 stated that the intervention had helped him in improving his game, and the single-subject analysis displayed elevated and consistent performance throughout the intervention phase.

One potential reason for the improved consistency of P2's play could be the timing of the intervention. The intervention started after game 9, and took place weekly for the first two sessions. However, this participant was injured for most of December and the beginning of January. P2 took part in two intervention meetings between the last game of the baseline phase and the first game of the intervention phase. Once P2 returned to practice, the intervention resumed, and proceeded through game 13. This decision was made so that P2 would have ample time to practice the psychological skills while learning each of them. From games 14 to 17 the researcher was absent, only collecting data from the athlete. For P2, because of the duration of injury during the season, the researcher/consultant was present for a longer duration, thus potentially allowing this participant to benefit more as the psychological skills were consistently

being learned and adjusted through most of the season, in contrast to P1 who suggested that a tune-up after the intervention was complete would be beneficial.

Subjective performance. P2 rated his performance for every game, with the exception of the last two in the intervention phase. Overall, this participant improved his mean self-rated overall performance from 8.7/10 in the baseline phase to 9.5/10 in the intervention phase. As well, he did not report a single score below 8/10 when rating his overall performance throughout the season. P2's subjective performance also followed similar trends to S%, although displayed slightly less variability. The highest point recorded in the baseline phase is 9/10, which occurred in six out of nine games, whereas 9/10 was the lowest point in the intervention phase, as all performances were rated either 9/10 or 10/10, displaying the effects of the intervention on his perception of performance.

When the subscales of the questionnaires were examined, all performance subcomponents that were measured increased, with the exception of focus, which decreased slightly. This finding may be explained by the fact that P2 stated he utilized the practice goal setting component of the intervention the most, and thus had more beneficial practice sessions that allowed for improved skills, which may have been the mechanism of the intervention effectiveness for this athlete (see appendix P).

The comments from the subjective performance questionnaires were inspected for any changes in feelings or thoughts either before or after the competitions. During the first four games, P2 stated that he was "nervous" and "angry" while competing. During game 5, he stated that although being tired before the game, he felt happy both during and after this 7-1 win. In games 6 and 7, he was worried and upset during the game, and tired before the start of game 7,

however during the final two games in the baseline phase he stated that he was "ready" and "pumped" before these games, and was happy both during and after the game.

Before the first three games in the intervention phase, P2 stated that he was "ready," "nervous," and "excited" respectively. During the games, he noted being "happy," "nervous," and "happy" after the games. In the final games reported, he stated being "prepared" before the games and "nervous." This finding may suggest that P2 had nervous feelings during games that were close in score, yet performance did not suffer in these games.

In sum, P2's subjective performance ratings followed his objective performance markers, displaying increases in both performance criteria, as well as an increase in almost all of the performance subcomponents. This finding again details the link between objective and subjective performance criteria, and although they are related, objective performance variables may not fully encompass the details of an athlete's performance.

Psychological skills. As mentioned, P2 completed the TOPS four times throughout the course of the intervention; 1) at admission, 2) at the first intervention meeting, 3) at the last intervention meeting, and 4) during the post-season interview. P2's practice subscales of the TOPS follow an interesting pattern throughout the course of the season. Frequency of all psychological skills peaks at the start of the intervention, and then decreases throughout the rest of the season, even though these skills were specifically taught throughout the intervention, and the participants were instructed to incorporate them into both practice and game situations. A potential reason for this decrease could be the duration of P2's injury, which extended the intervention, and kept him out of practice for over a month. It may be the case that P2's psychological skills slightly declined in frequency without on ice practice to continually incorporate them.

Conversely, when P2's psychological skills for competition were evaluated, the skills either maintained or increased from T2 to T3 (see appendix O). For example, self-talk, imagery, and activation improved through the course of the intervention. However, from the end of the intervention to the follow up interview, several of the psychological skills for games began to decline. Goal setting, self-talk, and activation decreased in frequency of usage. There are multiple potential explanations for this finding. Firstly, it could be that in the absence of the researcher/practitioner, these skills could start to decrease, as mentioned by P1. Secondly, it may be a case of measurement error, as the follow up interview took place just under a month after the completion of the season for this goaltender. Thus, P2's self-reported psychological skills may be slightly influenced by recall bias. Although P2's psychological skills assessments are variable, in the post-season interview he stated that he utilized the learned psychological skills, and attested to their usefulness through the social validation component of this study.

Anxiety. The anxiety responses reported by P2 displayed no identifiable patterns for the baseline or intervention phase. As previously mentioned, this participant was unable to submit data for the first three games of the intervention phase due to a coaching strategy which did not allow him to know which games he was starting. However, data for games 13, 14, and 15 are provided. CA and SA are relatively stable in the baseline phase, showing only one fluctuation in game 2. In the post-game questionnaire P2 stated that he was nervous during the game. In the intervention phase, P2's CA and SA stayed relatively stable and consistent with that of the baseline phase, displaying little observable change after the intervention. Although this finding is opposite of that hypothesized, P2 stated in his post-season interview that arousal regulation was the component of the intervention that he used the least, thus potentially contributing to the near negligible change in SA symptoms.

The CA-D and SA-D reports follow interesting trends. The first data point, in which P2 stated being "confident" before the game, is the only one in which his interpretation of anxiety is facilitative. It is also the lowest objective data point recorded for the duration of the season. CA-D remained debilitative through the course of the baseline phase, even though performance started to trend upward. Similarly, in the intervention phase, P2 continued to report low and debilitative interpretations of anxiety even while performance continued to improve. An analogous trend was also displayed for SA-D. Although CA-D and SA-D began to increase in the intervention phase, they remained debilitative throughout. P2's ratings of anxiety intensity remained stable, and direction interpretations remained debilitative while performance continually improved and stabilized, displaying little relation between the two. However, P2's SC was generally high throughout the duration of the season, and increased slightly from baseline to intervention phase. This heightened SC may have been a mitigating factor between P2's debilitative interpretations of anxiety and his elevated performance.

This finding again illuminates the idiosyncratic nature of responses to a PST intervention. When analyzing multiple performance measures, it appears that both P1 and P2 improved their performance after the intervention. However, P1 may have improved through changes to his anxiety responses, which may have benefited his performance, whereas P2's anxiety responses changed only slightly and was likely not the mechanism to performance enhancements.

Participant 3

Objective Performance. As stated, P3's S% increased from 88.4 in the baseline phase to 89.1 in the intervention phase, a slight increase of 0.7 percentage points. With the exception of the last data point in the baseline phase, performance was relatively stable and low throughout. The first five games in the baseline phase resulted in a 30 save 7-5 loss, a 34 save 5-5 tie, a 19

save 6-2 win, a 36 save 6-0 loss, and a 38 save 8-6 loss, in which P3 was relieved after seven goals in 48 minutes. In this portion of the baseline phase, P3 gave up more than five goals in all games except game 3. In game 6, P3 elevated his performance beyond that of the overall trend, making 28 saves in a 3-1 win. This data point appears to be an anomaly based on the overall performance of this participant through the first five games.

After the introduction of the intervention, P3's performance decreased from the last point in the baseline phase, making 37 saves in a 6-0 loss. Game 8 is included in the analysis as it factors into this participant's overall S%, however it was a relief effort in which P3 replaced the other goaltender after six goals had been scored. P3 made 18 saves on 22 shots, however the goal differential may have already been unsalvageable. Through games 9 and 10 in the intervention phase, P3's performance began to climb, as these games resulted in a 40 save 3-3 tie and a 39 save 3-3 tie. Objective performance remained relatively variable throughout the remainder of the intervention phase, as P3 produced a 38 save 6-5 loss, a 42 save 2-1 loss, a 39 save 8-5 loss, a 40 save 4-0 loss, a 42 save 7-2 loss in which P3 allowed six goals, and a 69 save 4-3 loss to finish the season. P3 did not win a game in the intervention phase.

When viewing the objective data on a single-subject basis, the intervention effects appear small, however, they are not negligible. The baseline phase performance is stable, yet low. Out of six games, only two of them were above the baseline mean, which may have been inflated by the last elevated data point. In the intervention phase, although performance was variable, it is elevated above the baseline mean for half of the data points (i.e., games 9, 10, 12, 14, and 16). Even though performance is more variable through this phase, it appears that P3 was able to elevate his performance slightly. For example, although S% increased slightly from baseline to intervention, GAA worsened. So, although P3 allowed more goals per game on average than in

the baseline phase, he was facing more shots, which could potentially result in him fronting more scoring opportunities.

A possible reason for the variability in performance throughout the intervention phase may be the timing of the intervention. P3 was the last subject admitted into the intervention, providing the least amount of time to incorporate the psychological skills. In addition, P3 would consistently reschedule meetings due to other commitments, which pushed the time between intervention meetings to approximately two weeks rather than one week. Thus, P3's intervention was ongoing throughout the intervention phase, concluding after game 15. Because the education of skills took place continually, P3's performance may have been variable while he was learning and implementing the new skills into his game habits.

Based on this more in-depth analysis of objective performance from baseline to intervention phases, it can be concluded that the small rise in S%, and the number of elevated data points were meaningful changes for this participant, and that the intervention had a positive effect on objective performance.

Subjective performance. For subjective ratings of performance, P3 submitted data for four out of six games in the baseline phase, and 5 out of 10 games in the intervention phase. Although no concrete conclusions can be drawn from P3's subjective performance ratings due to the missing data points, certain insights can be taken from this analysis. Firstly, the overall level of the subjective performance ratings increased slightly, similar to that of S%. However, the baseline (M = 8.9) and intervention means (M = 9.5) may be slightly inflated, as the majority of post-game questionnaires submitted correspond with games where objective performance was relatively higher, and the missing data points parallel games in which objective performance was slightly lower (i.e., games 4, 5, 7, 13, and 15). These missing data points could provide a

measurement bias in which P3's self-rated levels of performance in each phase appear greater than in actuality.

Secondly, these missing data points may illuminate this participant's engagement in the study. The other two participants were missing few, if any data points for subjective ratings of performance. All participants were instructed to complete the inventories either after the game, or sometime within the next day to avoid problems with recall, and return them to the researcher via the most convenient method (i.e., either electronically via text/email, or in person at the intervention meetings). However, P3 continually mentioned having technical problems with text or email communication, and would consistently forget to return the completed questionnaires at the intervention meetings when requested by the researcher. At the follow-up meeting to conclude the intervention, P3 stated that he had lost the completed questionnaires for the missing games, suggesting that he may not have been as engaged or reflective of his performance compared to the other two participants.

Psychological skills. P3 completed the TOPS twice throughout the course of the study, providing a baseline and intervention measure of psychological skills. In addition to missing post-game and CSAI-2d's, P3 misplaced the first TOPS, which he was supposed to return to the researcher. Because the intervention was completed with just one game remaining in the regular season, it was decided that post-intervention and post-season measures would be redundant. The TOPS questionnaires were completed at the beginning of the intervention, and at the post-season follow-up session.

P3 improved in most psychological skills from baseline to intervention phases. In the practice TOPS subscales, increases were displayed in goal setting, self-talk, imagery, relaxation, activation, and attentional control. However, automaticity and emotional control decreased in

usage. For the competition subscales of the TOPS, increases were demonstrated in goal setting, self-talk, imagery, and emotional control. The other subscales stayed relatively stable from baseline to intervention phases (see appendix O).

These increases in psychological skills may corroborate with the slight increases in objective performance from baseline to intervention phases. As well, the increases displayed in TOPS subscales correspond with the skills that were being learned throughout the intervention sessions (i.e., goal setting, self-talk, imagery, and activation management). This can help provide insight into the relationship between an increase in psychological skills usage in both practice and competition, and performance increases in competition.

Anxiety. Similar to the subjective performance analysis, it is difficult to form tangible conclusions about this participant's changes in anxiety after the intervention was introduced due to a number of missing data points. Overall, this participant provided anxiety inventories for four games in the baseline phase and five games in the intervention phase.

The baseline phase was rather stable for CA, and the intervention phase was relatively variable. The variability in the intervention phase appears to fluctuate with performance. For example, games 10, 12, 16 represent CA scores that are below the intervention mean (M = 14.4), and these games correspond with S%'s of 92.3, 95.5, and 94.5 respectively. The two points that lie above the intervention mean (i.e., games 11 and 14) coincide with games in which objective performance was not as strong, resulting in S%'s of 86.3 and 90.9 respectively. However, it appears that there is little relation between the introduction of the intervention and CA responses for P3. SA intensity appears very stable throughout both the baseline and intervention phases, with the exception of game 11, where reported SA intensity peaked, and performance decreased.

However, it is difficult to form solid conclusions about this link for P3 due to several missing CSAI-2d inventories.

Both CA-D and SA-D followed similar trends to that of CA and SA, and remained debilitative throughout the course of the intervention. This could mean that for this participant, any CA or SA symptoms are perceived as being detrimental to performance. As well, there appears to be no observable effects of the intervention on P3's interpretations of anxiety.

Similarly, P3's SC was very high and stable throughout the course of the intervention, again with the exception of game 11, in which SC decreased well below the rest of the data points. Based on the data provided it appears that the PST intervention had little to no effect on anxiety intensity, direction, or self-confidence for this athlete.

Limitations of the Study

The first major assumption of this study was that the method of counting shots to calculate S% was accurate and consistent. When performing inter-observer reliability (IOR) in junior A hockey games, Rogerson and Hrycaiko (2002) found IOR scores ranging from 92.3 to 99.8% between two observers and the official league scorekeeper's report, demonstrating acceptable reliability (Kazdin, 1982). It was assumed that, for P2 and P3, the shot records kept by their respective leagues were accurate. P1's coaching staff tracked shots on goal throughout the season, as it was not consistently monitored throughout his league. Since P1's head coach had no vested interest in the outcomes the study, it is unlikely that these data are fabricated or mendacious.

In order to minimize recall bias when completing both pre-game and post-game questionnaires, participants were given instructions on when and how to fill out the data sheets. The researcher also contacted each participant at the start of the week to obtain data for games

played the previous weekend. Even with these specific instructions and contact, it could not be guaranteed or verified that the participants completed the CSAI-2d within the specified time frame of 3 hours before game start, or that they completed the post-game questionnaires within one day of the competition.

Because of the nature of conducting applied research in competitive settings with goaltenders, it was difficult to provide consistent monitoring to each participant in the study. Measures were taken to try to maximize contact and rapport between the participants and the researcher, but the burden fell onto the participants in the absence of the researcher to utilize the resources being provided. With this in mind, it was assumed that the athletes who chose to take part in the study would be motivated and have a sincere interest in learning and practicing the psychological skills, as the education and instruction that was provided had the potential to improve their performance. Thus, the governing assumption is that the participants would actively engage in the intervention in order to benefit their performance, the same way they train both on and off the ice. It was supposed that, since all participants rated the importance of improving performance as 7/7 on the social validation questionnaires, that they used training and competition in order to practice and incorporate the new skills into their game. However, it appeared that P3 was less engaged and motivated to participate in the intervention than P1 and P2. This assumption is based on the number of pre-game and post-game inventories that were absent, the intervention meetings which were rescheduled, and the time between intervention sessions due to conflicting events.

Although the SSMB design has many benefits, there are also several limitations presented with this study design. As mentioned by Rogerson and Hrycaiko (2002), the length of time required to conduct this type of study often leaves one or more participants with few games

left in the season, providing few data points to analyze in the intervention phase. In this study, this limitation was influenced by the length of the intervention. Because the intervention persisted over six to eight weeks, there were limited data points provided after the completion of the entire intervention for P2 and P3. However, the intervention was introduced before, or near, the midway point of the season for all participants, providing them with a basis of psychological skills to incorporate into their practice and competition habits for at least half of the season.

There are also limitations when assessing the relationship between an applied PST intervention and in-competition performance. The conclusions from the data are based on a triangulation of evidence from objective performance, subjective performance, social validation, and psychological skills assessments (Anderson et al., 2002, Thelwell & Maynard, 2003). Although it appears through this analysis that the PST intervention was, at least in part, responsible for changes in performance, a definitive causal link cannot be made due to the lack of control of outside variables, (e.g., team performance, changes in training regimens, amount of practice), that can be regulated in true experimental conditions.

Future Directions

Updates to the intervention. Based on the results of the study, and recommendations from the participants, the intervention procedures may be updated for future practice with midget goaltenders.

Firstly, based on the responses from the participants, it appears that the best time to intervene is near the start of the season, with a mid-season review session. Thelwell and Maynard (2003) intervened in the offseason, however in a population with semi-professional athletes it is likely they would be able to devote more time to offseason training than youth athletes at community and regional levels, thus intervening in the offseason may not provide

practice sessions in which participants could train and incorporate their psychological skills. Due the duration of this specific intervention, starting psychological skills within the beginning of the season would provide ample time to incorporate skills into their game, and having a mid-season review would be beneficial to address any specific issues that athletes are having either in competition or with the mental skills. However, in order to provide a comprehensive analysis, the SSMB design was the best option, thus providing all participants with the intervention early in the season would provide unclear results for the sake of investigation.

Secondly, it was suggested by P3 that the intervention worksheets would be more accessible if they were provided using online resources, rather than via personal meeting using paper resources, as he misplaced one of the intervention worksheets. Although this may make the worksheets more accessible, it may take away from the individualized nature of the intervention. Without a practitioner present during the completion of the worksheets, there would be a lack of accountability for the completion of the sheets. The athletes would also not be able to ask questions, nor have feedback and guidance while completing the PST sessions.

Although there may be limitations, incorporating new technological tools may be beneficial to both the intervention and data collection process. For example, developing a short-form, smartphone/tablet capable pre- and post-competition questionnaire may simplify data collection, and thus provide better adherence and engagement in the data collection process. These short and simple evaluations may also be useful to practitioners in order to provide a different assessment to their athletes' thoughts and feelings.

Technology may also prove useful when providing information included in the intervention procedures. Although athletes should be required to meet with the practitioners for education and development of psychological techniques and strategies, providing the information

in an online database may make it more accessible for athletes to review and use outside of the individual sessions, and provide backup information in-case individual workbooks and intervention exercises are misplaced. Thus, future research and interventions should look to incorporate different modern technologies (e.g., smartphones or tablets) in order to deliver and moderate intervention procedures for the benefit of the athletes.

Future directions in research. As noted by Greenspan and Feltz (1989), PST interventions need to be conducted in a wide variety of sport skills and populations in order to determine the effectiveness of interventions, as it is difficult to generalize results between groups. Because the athletes involved in this study competed in different leagues and slightly different levels of competition, future studies could look to examine the effectiveness of PST interventions within midget level goaltenders competing in the same levels of competition, to provide a more homogenous population. As well, P1's head coach mentioned that he believed the PST could be beneficial for younger goaltenders as well, so future studies could look to evaluate the effects PST interventions designed for peewee (i.e., ages 11-12) and bantam (i.e., ages 13-14) goaltenders, similar to other studies examining the outcomes of PST in youth athletes (e.g., Gucciardi, Gordon, & Dimmock, 2009b; Mamassis & Doganis, 2004; Sharp, Woodcock, Holland, Cumming, & Duda, 2013). Within the context of ice hockey goaltending, the current PST literature is rather sparse (Rogerson & Hrycaiko, 2002), and thus conducting studies evaluating interventions in a diverse range of ages and skill levels would expand the knowledge base of how each population responds to certain interventions.

As for updates to research methodology, it may be beneficial to simplify data collection in order to provide a more comprehensive analysis for subjective data. For example, it appeared that anxiety direction may not necessarily change unless the intervention is specifically designed

for this performance issue. Thus, it may be simpler for athletes to incorporate only the intensity scales of the CSAI-2. Although there are other sport anxiety measures that may be shorter (e.g., STAI-6; Marteau & Bekker, 1992), the CSAI-2 is optimal to use for comparative purposes, as there has been a meta-analysis strictly with this inventory (Craft et al., 2003), and it appears to be the most widely used anxiety inventory in sport literature (Woodman & Hardy, 2003). In order to simplify data collection, it may be possible to develop online versions of the questionnaires for participants to complete on their smartphones before games, however this technology may not be accessible to everyone. As noted, developing short form questionnaires may provide simpler data collection. Although it may be difficult to compare the results to other studies, it may be less intrusive for athletes, therefore increasing adherence, and potentially providing more comprehensive and robust single-subject data for the investigation at hand.

As mentioned by Barker and colleagues (2013), future single-subject researchers should seek to include maintenance and follow up procedures to identify if psychological skills, and any performance enhancements endure once the study is completed. Due to the difficulty and length of single-subject research designs, it appears that conducting interventions and analyses within one season is most efficient. However, it would be an interesting investigation to understand if, and how, midget goaltenders maintained their psychological skills in following seasons, and potentially into their junior careers.

In conclusion, the overall results of this study indicated that an intervention including goal setting, arousal regulation, self-talk, concentration, imagery, and routines can improve midget goaltenders' performance in league games. As well, the intervention received positive validation and reviews from all goaltenders involved.

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Appendix A – Letter of Invitation

Title of Study: The Effectiveness of Psychological Skills Training on the Performance of Youth Ice Hockey Goalies
Principal Investigator: Dr. David Paskevich, PhD, Faculty of Kinesiology, University of Calgary
Student Investigator: Benjamin Vandervies, MSc Candidate, Faculty of Kinesiology, University of Calgary

I, Benjamin Vandervies, from the Faculty of Kinesiology, University of Calgary, invite you to participate in a research project entitled "The Effectiveness of Psychological Skills Training on the Performance of Youth Ice Hockey Goalies."

The purpose of this research project is to examine the effectiveness of a psychological skills training package on performance, anxiety, and psychological skills usage in high-level midget ice hockey goaltenders. The psychological skills training sessions will include education and instruction in the areas of goal setting, arousal regulation, self-talk, concentration, and imagery. Should you choose to participate, you will be asked to complete questionnaires examining precompetitive anxiety and personal perceptions of performance before and after every regular season game, and a psychological skills assessment twice over the course of the season. As well, you will be asked to attend one-on-one psychological skills training sessions with the researchers in which you will be taught about the skills of goal setting, arousal regulation, self-talk, concentration, and imagery, and to complete workbook exercises pertaining to psychological skills development.

The expected duration of the research project is seven months, and will be undertaken over the course of the 2016-2017 ice hockey season. This research should benefit the subjects by educating them about psychological skills use, and the benefits psychological skills training can have on performance.

If you have any questions, feel free to contact any of the investigators listed below,

Thank you,

Dr. David Paskevich, PhD
Associate Professor, Faculty of Kinesiology,
University of Calgary,
403-220-3434,
dpaskevi@ucalgary.ca

Benjamin Vandervies
MSc Candidate, Faculty of Kinesiology,
University of Calgary.
403-854-6215
benjamin.vandervies@ucalgary.ca

This study has been reviewed and received ethics clearance through the University of Calgary Conjoint Faculties Research Ethics Board.

Appendix B – Consent Form
PSYCHOLOGICAL SKILLS TRAINING AND PERFORMANCE STUDY
PARTICIPATION CONSENT FORM

TITLE: The Effectiveness of a Psychological Skills Training Package on Performance and Anxiety of High Level Adolescent Hockey Goaltenders

SPONSOR: This study is not sponsored.

INVESTIGATORS: Dr. Dave Paskevich, and Benjamin Vandervies, Faculty of Kinesiology, University of Calgary

This consent form is only part of the process of informed consent. It should give you the basic idea of what the research is about and what your participation will involve. If you would like more detail about something mentioned here, or information not included here, please ask. Take the time to read this carefully and to understand any accompanying information. You will receive a copy of this form.

BACKGROUND

Psychological skills training (PST) is the practice of mental strategies for athletes to better their performance. PST packages have been linked to improved play and changes in anxiety. This study will look at the relationship between a PST package, anxiety, and performance in midget ice hockey goaltenders.

WHAT IS THE PURPOSE OF THIS STUDY?

You are being asked to take part in this research study because we are trying to learn more about psychological skills training, and its links with performance and anxiety. We are asking you to be in the study because of your age, position, and skill in ice hockey.

WHAT WOULD I HAVE TO DO?

These are some things that will happen if you are in the study:

- You will be in the study for the duration of the season
- You will need to fill out a form about 2-3 hours before games that you start
- You will need to fill out a form about 1 hour after games that you start
- You will do a written performance strategies form 4 times throughout the course of the study
- You will complete 6 meetings with the researcher to train the skills of goal setting, self-talk, relaxation, focus, imagery, and routines.
- You will do 10-15 minutes of homework each day (3-5 days a week)
- At the end of the study you will be asked questions regarding your involvement in the study

WHAT ARE THE RISKS?

A possible risk associated with participation in this study is mental fatigue that may be brought on by performing the mental skill activities. This risk will be limited because of the short duration of the sessions and homework. As well, participation may cause you to become aware of your anxiety for the game at hand. To reduce these risks, participants will be instructed to take breaks as necessary when doing the activities. There will be no researcher contact with participants prior to games other than a text message sent 2 hours before the game, as a reminder to fill out the anxiety form.

WILL I BENEFIT IF I TAKE PART?

If you agree to participate, there may or may not be a direct benefit to you. Your performance may be improved, but there is no guarantee of the PST package enhancing performance. The information we gain from this study may help us to provide better PST in the future for high level goaltenders.

DO I HAVE TO PARTICIPATE?

You do not have to be in the study. No one will be upset if you don't want to do this study. If you don't want to be in this study, you just have to tell us. It's up to you. You can also take more time to think about being in the study.

WILL I BE PAID TO PARTICIPATE OR DO I HAVE TO PAY FOR ANYTHING?

You will not be paid to participate in this study. However, there will be no additional costs to you for being in this study.

WILL MY RECORDS BE KEPT PRIVATE?

The information collected about you during this study will be safely locked up. Nobody will see it except the people doing the research. The study information about you will not be given to your parents. The researchers will not tell anyone else.

SIGNATURES

Your signature on this form indicates that you have understood to your satisfaction the information regarding your involvement in the research project and agree to participate as a subject. In no way does this waive your legal rights nor release the investigators or involved institutions from their legal and professional responsibilities. You are free to withdraw from the study at any time without jeopardizing your training protocol. If you have further questions concerning matters related to this research, please contact:

Dr. David Paskevich, (403) -220-3434

dpaskevi@ucalgary.ca

Or

Benjamin Vandervies, (403) 854-6215
benjamin.vandervies@ucalgary.ca

If you have any questions concerning your rights as a possible participant in this research, please contact the Chair, Conjoint Health Research Ethics Board, University of Calgary at 403-220-7990.

Participant's Name	Signature and Date
Investigator/Delegate's Name	Signature and Date
Witness' Name	Signature and Date

The University of Calgary Conjoint Health Research Ethics Board has approved this research study.

A signed copy of this consent form has been given to you to keep for your records and reference.

Appendix C – Association contact letter

Title of Study: The Effectiveness of Psychological Skills Training on the Performance of Youth Ice Hockey Goalies
Principal Investigator: Dr. David Paskevich, PhD, Faculty of Kinesiology, University of Calgary
Student Investigator: Benjamin Vandervies, MSc Candidate, Faculty of Kinesiology, University of Calgary

Dear _____

I wish to inform you about a research study that may be of interest to goaltenders in your association, and ask you to consider mentioning the study to your goaltenders, so that they can contact the researchers if they are interested.

The purpose of this research project is to examine the effectiveness of a psychological skills training package on performance, anxiety, and psychological skills in high-level midget ice hockey goaltenders. The psychological skills training sessions will include education and instruction in the areas of goal setting, arousal regulation, self-talk, concentration, and imagery. Goaltenders who agree to participate will be required to attend one-on-one psychological skills training sessions with the researchers in which they will be taught about the skills of goal setting, arousal regulation, self-talk, concentration, and imagery, and to complete workbook exercises pertaining to psychological skills development. As well, goaltenders will be asked to fill out pre- and post-game questionnaires. As part of the study, each goaltender's coach will also be asked to fill out a post-game questionnaire regarding their goaltender's performance for each game.

Goaltenders that are midget age playing in AAA, AA, minor midget AAA and division 1 or 2 are eligible for this study.

This research should benefit the subjects by educating them about psychological skills usage, and the benefits psychological skills training can have on performance. Please pass this information to the eligible goaltender's in your association, and advise them to contact the researchers if they are interested in participating. If you have any questions, feel free to contact any of the investigators listed below.

Thank you,

Dr. David Paskevich, PhD
Associate Professor, Faculty of Kinesiology,
University of Calgary,
403-220-3434,
dpaskevi@ucalgary.ca

Benjamin Vandervies
MSc Candidate, Faculty of Kinesiology,
University of Calgary.
403-854-6215
benjamin.vandervies@ucalgary.ca

This study has been reviewed and received ethics clearance through the University of Calgary Conjoint Faculties Research Ethics Board.

Appendix D – Coach consent letter

Dear _____,

Your goaltender, _____ has chosen to take part in a study looking at the effects of a psychological skills training (PST) program on performance and anxiety. These skills are the strategies that athletes use to perform their best, such as imagery, goal setting, and self-talk.

Your goaltender has agreed to fill out pre- and post-game questionnaires regarding anxiety and performance. As well, he has agreed to take part in 6 one-on-one sessions in which he will be trained in a number of mental skills.

You will be asked to fill out a post-game survey rating your goalie's performance for every game throughout the season. The researchers will meet with you once a week to collect the completed forms. This research project will take seven months, and will run over the course of the 2016-2017 hockey season.

This study should benefit the subjects by teaching them about the benefits of PST and potentially improving their play. It will also add to the knowledge of PST benefits, and which populations PST can be effective for.

Participation in this study is completely voluntary, and you may refuse to participate altogether, may refuse to participate in parts of the study, may decline to answer any and all questions, and may withdraw from the study at any time without penalty.

If you have any questions, feel free to contact any of the investigators listed below.

Thank You

Dr. David Paskevich, PhD
Associate Professor, Faculty of Kinesiology,
University of Calgary,
403-220-3434,
dpaskevi@ucalgary.ca

Benjamin Vandervies
MSc Candidate, Faculty of Kinesiology,
University of Calgary.
403-854-6215
benjamin.vandervies@ucalgary.ca

This study has been reviewed and received ethics clearance through the University of Calgary Conjoint Faculties Research Ethics Board.

Name: _____ Researchers Name:_____

Signature: _____ Researcher Signature: _____

Appendix E - Goaltender Observations of Own Performance

Date: ____ Goalie: _____ Game:_____ Arena: _____
Score: _____ Shots on Goal: _____ Goals Allowed: _____ S%:_____

1. Thoughts and/or feelings before the game (e.g., lethargic, energized, tired)?

2. Observations of your own performance during the game?

Physical Energy									
1	2	3	4	5	6	7	8	9	10
Shot Preparation									
1	2	3	4	5	6	7	8	9	10
Save Execution									
1	2	3	4	5	6	7	8	9	10
Post Save Response									
1	2	3	4	5	6	7	8	9	10
Reads and Anticipation									
1	2	3	4	5	6	7	8	9	10
Puckhandling/Decision Making									
1	2	3	4	5	6	7	8	9	10
Communication									
1	2	3	4	5	6	7	8	9	10
Key Saves at Key Times									
1	2	3	4	5	6	7	8	9	10
Body Language									
1	2	3	4	5	6	7	8	9	10
Confidence									
1	2	3	4	5	6	7	8	9	10
Focus									
1	2	3	4	5	6	7	8	9	10

3. Any thoughts and/or feelings during the game (e.g., relaxed, worried, nervous)?

4. Any thoughts and/or feelings after the game (e.g., satisfied, unhappy)?

5. How would you rate your overall performance?

1	2	3	4	5	6	7	8	9	10

6. How would you rate your team's performance?

1	2	3	4	5	6	7	8	9	10

Physical Energy
- Ability to maintain level of performance through an extended course of pressure
- Ability to maintain level of performance through an entire game.

Shot Preparation
- Correct selection of movement (t-push, butterfly slide, backside push)
- Arriving to positional targets early
- On angle
- Proper Body Position (i.e., square to puck)
- Appropriate situational depth
- Feet set before shot
- Vision on Puck

Save Execution
- Proper block/react decision making
- Patience on/reacting from feet (i.e., not dropping too early)
- Activating body towards puck
- Making saves in front of your body
- Visual attachment throughout save response
- Controlling rebounds

Post Save Response
- Maintaining vision on puck after save
- No delay in response after save/shot attempt
- Proper post save mechanics

Reads and Anticipation
- Aware of offensive threats without the puck
- Adjusting depth according to players without the puck (also part of your shot preparation)

Puckhandling/Decision Making
- Cleanly stopping rims and dump-ins
- Making proper decisions with the puck
- Making safe plays

Communication
- Being aware of forecheck pressure,
- Alerting defenseman as to pressure options

Key Saves at Key Times
- Ability to make saves when game is on the line (i.e., when game is within 2 goals)
- Ability to gain momentum from saves

Body Language
- Appearing calm and composed
- No slouching of shoulders
- No indications of distraction, frustrations, anger, giving up.

Confidence
- Appearing/feeling strong, assertive, and establishing a presence on the ice
- In command and in control
- No tentativeness in decision making
- Feeling unbeatable

Focus

- Paying attention to the task at hand for the duration of the game
- Bouncing back from goals, refocusing when necessary
- Blocking out distractors.

Appendix F - Coach Observations of Goaltender Performance

Date: ____ Goalie: _____ Game:_____ Arena: _____
Score: _____ Shots on Goal: _____ Goals Allowed: _____ S%:_____

1. Observations of your goaltender before the game (e.g., lethargic, energized, tired)?

2. Observations of your goaltender's performance during the game?

Physical Energy
1 2 3 4 5 6 7 8 9 10

Shot Preparation
1 2 3 4 5 6 7 8 9 10

Save Execution
1 2 3 4 5 6 7 8 9 10

Post Save Response
1 2 3 4 5 6 7 8 9 10

Reads and Anticipation
1 2 3 4 5 6 7 8 9 10

Puckhandling/Decision Making
1 2 3 4 5 6 7 8 9 10

Communication
1 2 3 4 5 6 7 8 9 10

Key Saves at Key Times
1 2 3 4 5 6 7 8 9 10

Body Language
1 2 3 4 5 6 7 8 9 10

Confidence
1 2 3 4 5 6 7 8 9 10

Focus
1 2 3 4 5 6 7 8 9 10

3. Any observations of goaltender after the game (e.g., satisfied, unhappy, content)?

4. How would you rate your goaltender's overall performance?
1 2 3 4 5 6 7 8 9 10

5. How would you rate your team's performance?
1 2 3 4 5 6 7 8 9 10

Physical Energy
- Your goaltender's ability to maintain level of performance through an extended course of pressure
- Your goaltender's ability to maintain level of performance through an entire game.

Shot Preparation
- Correct selection of movement (t-push, butterfly slide, backside push)
- Arriving to positional targets early
- On angle
- Proper Body Position (i.e., square to puck)
- Appropriate situational depth
- Feet set before shot
- Vision on Puck

Save Execution
- Proper block/react decision making
- Patience on/reacting from feet (i.e., not dropping too early)
- Activating body towards puck
- Making saves in front of your body
- Visual attachment throughout save response
- Controlling rebounds

Post Save Response
- Maintaining vision on puck after save
- No delay in response after save/shot attempt
- Proper post save mechanics

Reads and Anticipation
- Aware of offensive threats without the puck
- Adjusting depth according to players without the puck (also part of shot preparation)

Puckhandling/Decision Making
- Cleanly stopping rims and dump ins
- Making proper decisions with the puck
- Making safe plays

Communication
- Being aware of forecheck pressure,
- Alerting defenseman as to pressure options

Key Saves at Key Times
- Your goaltender's ability to make saves when game is on the line (i.e., when game is within 2 goals)
- Your goaltender's ability to gain momentum from saves

Body Language
- Appearing calm and composed
- No slouching of shoulders
- No indications of distraction, frustrations, anger, giving up.

Confidence
- Appearing/feeling strong, assertive, and establishing a presence on the ice
- Appearing in command and in control
- No tentativeness in decision making

- Feeling unbeatable

Focus

- Paying attention to the task at hand for the duration of the game
- Bouncing back from goals, refocusing when necessary
- Appears to block out distractors.

Appendix G - Goaltender Social Validity Questionnaire

1. How important is it for you to improve performance?

Not at all						Extremely
1	2	3	4	5	6	7

2. Do you consider any of the performance changes to be significant?

Not at all						Extremely
1	2	3	4	5	6	7

3. How satisfied are you with the intervention?

Not at all						Extremely
1	2	3	4	5	6	7

4. Has the procedure proved useful to you?

Not at all						Extremely
1	2	3	4	5	6	7

5. Additional comments about the intervention procedures?

6. Reasons for success or failure of intervention?

7. Has this intervention changed your knowledge of, and/or attitude towards sport psychology and/or psychological skills training?

Appendix H - Coach Social Validity Questionnaire

1. How important is it for your goaltender to improve performance?

Not at all						Extremely
1	2	3	4	5	6	7

2. Do you consider any of the performance changes of your goaltender to be significant?

Not at all						Extremely
1	2	3	4	5	6	7

3. Has the procedure proved useful to your goaltender?

Not at all						Extremely
1	2	3	4	5	6	7

4. Additional comments from the season procedures?

5. Reasons for success or failure of intervention? (based on observations of your goaltender)

6. Has this intervention changed your knowledge of, and/or attitude towards sport psychology and/or psychological skills training?

Appendix I - Goal Setting

Goals are targets, or standards of achievement that you strive to obtain. Goal setting is a technique commonly used by elite athletes, coaches, and sport psychology consultants to influence performance, motivation, anxiety, and confidence.

Goals work in several ways. Goals can help direct your attention and concentration towards the achievement of these standards, and provide motivation for goal related activities. Goals can also increase effort and persistence towards completing our goals and goal related tasks.

Goals can also be used in multiple domains of the competitive arena. Goals can be used in practice to maximize productivity. Especially for goaltenders, there is often downtime in practice when you are not being utilized. Setting technical goals during this time can make for a more productive session. Goals can also be used during off ice training sessions to get the most out of your workouts. Long-term goals can be used to maintain motivation over the course of a long season.

There are three different types of goals: outcome, performance, and process goals. Outcome goals refer to the achievements based on comparison with other teams/competitors, such as winning a championship or finishing top 5 in the league in GAA. Performance goals still refer to and objective standard, however these goals are self-referenced, such as decreasing your GAA from 2.60 to 2.20. Outcome and performance goals are important for maintaining drive and motivation in training and non-game situations, however focusing on outcomes during a game may divert attention away from the task at hand.

Process goals are what you actually do while you're performing. For example, in the upcoming game, I might set the process goals: 1) always staying on angle during rush attacks, 2) finding the puck through screens, and 3) controlling your rebounds. During competitions, it is important to focus on process goals that are relevant to the task at hand instead of focusing on performance or outcome goals, as these types of goals are not entirely under your control.

It is also important to set short- and long-term goals. Long-term goals, such as winning a league championship, are important to identify your overarching motivations, but it is easy to lose sight of these long-term goals without intermediary steps along the way. Short-term goals also allow for immediate improvements and feedback, which can enhance motivation.

SMARTS Goals

When setting goals, use the SMARTS guidelines in order to develop goals with successful characteristics. These are
S – Specific: make sure your goals are precise and detailed
M – Measurable: Be sure your goals are quantifiable
A – Action Oriented: Goals should focus your energy on certain actions that will accomplish them
R – Realistic: Your goals should be achievable given differing constraints
T – Timely: Your goals should be achievable in a reasonable time frame
S – Self-determined: These goals should be set by, and be meaningful to you.

An example of the SMARTS strategy is provided.

My goal for upcoming season is to finish in the top five in the league in GAA.

S – It's specific in the fact that I know exactly what you are aiming for.
M – Its measurable because it there is an objective standard to be aimed for.
A – This is where the performance and process goals come in. In order to have a top five GAA, I may have to improve my mobility, my rebound control, and finding pucks through traffic.
R – This goal may or may not be realistic, depending on different constraints.
T – It is timely in that there is a specific time frame in which it can be achieved, namely by the end of the season.
S – It is self-determined, as I was the one who set the goal, and it has intrinsic meaning to me.

Goals for the upcoming season

Choose two outcome goals for the rest of the season, and then for each outcome goal outline the performance and process goals that will guide your progress.

Outcome Goals:

1. _____
   _____
   _____
2. _____
   _____
   _____

Performance Goals:

1. _____
   _____
   _____
2. _____
   _____
   _____

Process Goals:

1. _____
   _____
   _____
2. _____
   _____
   _____

Process Goals

It is also important to monitor the progress of your goals. Without consistent feedback, it is difficult to know how far you've progressed. As well, if you monitor your goals, you can adjust them accordingly to make sure they remain challenging, but not so challenging that they cause stress. For each of the process goals you have chosen, rank your current status on a scale of one to ten, ten being the highest. Every week, chart your progress on each skill related to your process goals. An example is provided.
Process goal: Rebound control.

Skill	Current Status	Week 1	Week 2	Week 3	Week 4
Activate body over pucks	6				
Stick usage	7				
Maintain vision	6				
Stay forward	5				

Process Goal:

Skill	Current Status	Week 1	Week 2	Week 3	Week 4

Process Goal:

Skill	**Current Status**	**Week 1**	**Week 2**	**Week 3**	**Week 4**

Appendix J - Arousal and Anxiety

Anyone who has been involved in competitive sport can attest to the effects that arousal and anxiety can have on performance. Sport competition can cause a player to feel great anxiety and worry, which can change physiological and psychological processes, and in turn hinder performance.

Arousal has been defined as physiological and psychological activation in a person, typically ranging from deep sleep to extreme excitement. It is non-directional, meaning it is not associated with positive or negative events, only the activation of bodily symptoms. For example, an equal arousal level may be experienced by the sight of a bear (fear) and winning the lottery (joy), as it is merely the excitation of the system.

Every goaltender has an optimal level of arousal where they perform their best. For some people this is relatively high, and for others it is rather low. Therefore, it is first important to be able to identify your optimal level of arousal for peak performance. Once you identify your peak performance arousal level, you can learn techniques to actively program this peak state.

Anxiety is an emotional reaction to a stimulus perceived as threatening. It may occur in important games such as playoff or championship matches. Anxiety also consists of both psychological and physiological components. The psychological component is called cognitive anxiety, and consists of thoughts and expectations about oneself and the situation. The physiological component is called somatic anxiety, and includes symptoms such as increased heart rate and butterflies in the stomach.

Stress is a four-stage process that occurs as the result of a specific environmental demand (called stressors), an individual's perception of the environmental demand, the individual response, and the behavioral consequences. In your case, the environmental demands have to do with the upcoming game. Your perception of the demand has to do with your perceived ability to meet the environmental demands. If there is a large difference between your perceived skills and the skills required to meet the demands, then a negative anxiety response may be felt, and the behavioural consequence would be decreased performance. If there is only a small or no difference between your perceived skills and the required skills, the response may be low anxiety and high self-confidence, leading to increased performance.

Self-Awareness

The first step in taking control of your arousal and anxiety is to become aware of it. By bringing awareness to your current level of arousal in relation to your optimal arousal level, you can effectively monitor and change your current arousal level to bring it closer to optimal. One of the best ways to do this is to log your level of arousal in relation to performance. Below is the checklist of performance states. Take a few minutes, and try and recall these performance states in relation to a few of your best games and a few games where did not play very well. Try and do two of your best performances and two of your worst performances.

Checklist of Performance States

Played very poor	1	2	3	4	5	6	Played very well
Felt very anxious	1	2	3	4	5	6	Felt very relaxed
Felt very unconfident	1	2	3	4	5	6	Felt very confident
Felt out of control	1	2	3	4	5	6	Felt in control
Muscles were tense	1	2	3	4	5	6	Muscles were relaxed
Felt very fatigued	1	2	3	4	5	6	Felt very energetic
Self-talk was negative	1	2	3	4	5	6	Self-talk was positive
Felt very unfocused	1	2	3	4	5	6	Felt very focused
Felt great effort	1	2	3	4	5	6	Felt effortless
Had low energy	1	2	3	4	5	6	Had low energy

Checklist of Performance States

Played very poor	1	2	3	4	5	6	Played very well
Felt very anxious	1	2	3	4	5	6	Felt very relaxed
Felt very unconfident	1	2	3	4	5	6	Felt very confident
Felt out of control	1	2	3	4	5	6	Felt in control
Muscles were tense	1	2	3	4	5	6	Muscles were relaxed
Felt very fatigued	1	2	3	4	5	6	Felt very energetic
Self-talk was negative	1	2	3	4	5	6	Self-talk was positive
Felt very unfocused	1	2	3	4	5	6	Felt very focused
Felt great effort	1	2	3	4	5	6	Felt effortless
Had low energy	1	2	3	4	5	6	Had low energy

Checklist of Performance States

Played very poor	1	2	3	4	5	6	Played very well
Felt very anxious	1	2	3	4	5	6	Felt very relaxed
Felt very unconfident	1	2	3	4	5	6	Felt very confident
Felt out of control	1	2	3	4	5	6	Felt in control
Muscles were tense	1	2	3	4	5	6	Muscles were relaxed
Felt very fatigued	1	2	3	4	5	6	Felt very energetic
Self-talk was negative	1	2	3	4	5	6	Self-talk was positive
Felt very unfocused	1	2	3	4	5	6	Felt very focused
Felt great effort	1	2	3	4	5	6	Felt effortless
Had low energy	1	2	3	4	5	6	Had low energy

Checklist of Performance States

Played very poor	1	2	3	4	5	6	Played very well
Felt very anxious	1	2	3	4	5	6	Felt very relaxed
Felt very unconfident	1	2	3	4	5	6	Felt very confident
Felt out of control	1	2	3	4	5	6	Felt in control
Muscles were tense	1	2	3	4	5	6	Muscles were relaxed
Felt very fatigued	1	2	3	4	5	6	Felt very energetic
Self-talk was negative	1	2	3	4	5	6	Self-talk was positive
Felt very unfocused	1	2	3	4	5	6	Felt very focused
Felt great effort	1	2	3	4	5	6	Felt effortless
Had low energy	1	2	3	4	5	6	Had low energy

As mentioned, one of the ways that increased arousal and anxiety can interfere with athletic performance is through increased muscle tension. Think about what happens if you get nervous or worried. Do you clench your teeth, raise your shoulders, or tighten your arms? These are common sources of muscle tension in athletes. If excessive muscle tension occurs in an athlete, it can interfere with sport skills by preventing appropriate coordination of movements. It is important for athletes to understand the difference between tensed and relaxed muscles so that they can quickly and effectively scan and eliminate muscle tension while competing.

Set aside fifteen minutes and practice this progressive relaxation exercise. The more you practice it, the better you will become, and you will eventually be able to effectively scan and reduce tension in a matter of seconds. The following progressive muscle relaxing script was adapted from Williams (2010).

"Sit or lie down in a comfortable position, and try to put yourself in a relaxed state. Close your eyes and take a long, slow breath, inhaling as deeply as you can. Exhale slowly and deeply, allow the tension to leave your body as you exhale. Take one more deep breath and let all of the tension and problems escape your body with this exhalation. Relax as much as you can. Try not to move any more than is necessary to stay comfortable."

"As you progress through each of the muscle groups, you will first tense the muscle groups, you will first tense the muscles for 5 to 7 seconds, and then release and relax for 20-30 seconds.

"Begin with tensing the muscles in your dominant hand and lower arm by making a fist and bending your hand back at the wrist. Feel the tension through your hand and lower forearm. Now relax by simply letting go of the tension. Notice the difference between the tensed state and the relaxed state, pause for 20 seconds, now make a fist and tense your lower forearm again for 5 to 7 seconds. Release the contraction and relax for 20 to 30 seconds."

"Now tense the muscles of the dominant upper arm by pushing your elbow down against the floor or the back of the chair. Feel the tension through the biceps without tensing the lower muscles of the hand. Relax for 20 to 30 seconds. Tense again for 5 to 7 seconds, and release and relax for 20 to 30 seconds. Notice and contrast the difference between the tense and released muscles."

"Now with your non-dominant arm, make a tight fist and bend the wrist back. Now feel the tension in the hand and lower arm for 5 to 7 seconds, and release the tension. Drain all the tension out. Now tense the hand and wrist once more for 5 to 7 seconds, and release the tension. Be sure with every tension and relaxation you notice the difference between the tense and relaxed muscles. Now with your non-dominant arm, press your elbow into the floor or back of the chair, and tense the biceps. Okay relax. Tense the upper arm again and note the discomfort with tensed muscles. Now relax, and let the tension dissolve. Now recognize the feeling of relaxation throughout your arms. Perhaps there is a sort of flow, warmth, or heaviness."

"Now switch your focus to the muscles in your face. Tense the muscles in your forehead by raising your eyebrows. Now feel the tension in your forehead and scalp. (With these smaller muscle groups, you need to only need to contract for 3- to 5-seconds). Okay relax and smooth it out. Enjoy the spreading of relaxation. Now frown again, and relax. Release the tension in your forehead, it should be smooth as butter."

"Now squint your eyes tight, pucker your lips, and clench your teeth. Tense Now, and feel how uncomfortable this position is. Relax and let the tension dissolve, and tense again. Now release all the tension, allow your lips to part slightly as your jaw and cheeks relax."

"Next, move to the muscles in your neck and shoulders. Raise your shoulders upward as high as you can, while pulling your neck down into your shoulders. Tense now...notice the discomfort, and relax. Drop your shoulders down and feel the relaxation spread through your neck, throat, and shoulders. Let go more, now tense again by raising your shoulders and dropping your neck. Now relax again, and enjoy the deepening sensation. Remember this feeling is just the absence of tension."

"Now tighten your abdomen as if you are expecting a punch, while also clenching your buttocks together. Tense Now. There should be a great deal of tightness and tension. Relax, and let all of the tension drain out. Now tense again….and relax. Let go of the tension more and more, and enjoy this feeling of relaxation."

"Now focus on your legs. Tighten the muscles in your thighs by simultaneously contracting all the muscles of your thighs. Tense Now. Try to localize the contraction only to your thighs.

Note this uncomfortable sensation. Now relax, and contrast the tension with relaxation. Again, it is important to remember that this relaxation feeling is merely the absence of tension. Now…tighten the thighs again, and release the tension. Passively let it all drain out."

"Flex your ankles, as if you're trying to touch your toes to your shin. Tense Now. Feel the tension through your ankle, calf and foot. Release, now feel the tension drain out of your lower legs. Now tense again…and release. Again, remember to contrast these two sensations."

"Straighten your legs, and point your toes downward. Tense now. Feel the tension, and release. Now straighten your legs, and tense! Hold for five seconds, and release."

"Now relax all of the muscles in your body. Let them go limp. Breathe slowly and deeply. Let all traces of tension dissolve out of your body. You may feel a sensation of warmth and heaviness, as if you're sinking deeper into the floor or chair. You may feel as if you are lighter than air, as if floating on a cloud. Just go with whatever sensation you have, and enjoy this feeling of relaxation. Do a scan for tension, and anywhere you find tension try and release it."

"Before opening your eyes, take a few deep breaths and feel the energy and alertness flowing back into your body. Stretch your arms and legs if you wish. Open your eyes when you're ready."

Breathing for Relaxation

Now that you understand the difference between how tense and relaxed muscles feel, it is important to be able to quickly scan the body for tension. You should be able to completely relax your muscles without having to first tense them. Take a moment and scan your body for muscle tension and release any tension you may be feeling.

Another way to quickly relax yourself and reduce general levels of anxiety is to pay attention to your breathing habits. Breathing properly is relaxing, and can help performance. The great thing about breathing to improve relaxation is that it's very quick and simple, and can be done at almost any moment throughout the game, like during whistles or when the puck is in the opposing team's zone. Proper breathing happens from the diaphragm, not the lungs. Try the following breathing exercise outlined by Williams (2010) to improve the effectiveness of your breathing.
Imagine your lungs are divided into three levels, and that the inhalation occurs in three steps.

1) First, forcefully empty all the air from the lungs. To fill the lower level of the lungs, relax your belly and let it swell out as you deeply inhale from the diaphragm.

2) Now fill the middle portion of your lungs by expanding your chest cavity and gently raising your rib cage.

3) To fill the top portion of your lungs, raise your collarbones and widen your shoulder blades.

Progress through the exhalation phase in the same stages as the inhalation. Slowly empty the top of the lungs, then the rib cage area, and then the lower part of the lungs. Completely empty the lungs by pulling your belly in. Notice the stillness and calmness at the moment directly after all the air has escaped your lungs. If anxiety or tension occurs, try and create this moment of calmness.

Identifying Stressors

There are many situations in which negative thoughts or increased anxiety occur. This could be the night before a big game, trying to fall asleep, showing up to the rink, when your team takes a penalty, or when you're thinking about any other critical situations during the game. First, identify the situations which make you feel anxious or tense, and describe what your natural response is. After you've released tension and stopped the negative feelings/thoughts, identify what your ideal response would be to the situation. Think of a cue word that will help you refocus on what you can control.

Arousal Enhancement

SITUATION	CURRENT RESPONSE	IDEAL RESPONSE
List any situations where you feel anxious or stressed	How do they make you feel (tense, worried), and what are you thinking?	What could you do to make yourself feel better or think more clearly? Include a cue word.
Example: National Anthem	Tension, and worry about making the first save of the game	Stop cue. Followed by a quick mantra of "calm, powerful, confident."

When doing your checklist of performance states, it may have been the case that when you did not perform your best, you were too relaxed or did not have enough energy or, in other words, under-aroused. These are cases where you need to increase the activation of the bodily systems such as heart rate and respiration rate in order to get your body ready for the game. In the same way that it is important to identify situations where you need to relax and decrease arousal, it's important to identify the situations where you may need to activate. Take a few minutes and think about a few of these situations. Examples could be; if you didn't sleep well and feel fatigued, if you are playing a low caliber team, or in between periods where there wasn't much action.

Just as breathing can decrease tension and activation, breathing techniques can also be used to increase your activation. First of all, focus on your regular breathing rhythm, and then consciously increase the rate of your breathing. You may also want to try a series of longer inhalations and shorter exhalations. Now pair your increased breathing rhythm with self-talk cues to imagine that with each inhalation, you are breathing in energy, and with every exhalation you are releasing heaviness and fatigue. You can also use personally meaningful cues that enhance energy, such as "let's go!" or "get up!" You can also use positive or metaphorical images, which we will cover in a later session.

Now that you have an arsenal of techniques to both reduce arousal and anxiety, and increase arousal when necessary, it is important to repeatedly practice these techniques, as mental skills take training just like physical skills. You may want to systematically integrate them into your performance if you are not initially comfortable. Find a few techniques that work for you, and first try them at practice situations, then move on to scrimmage situations, and finally, if you are comfortable, integrate them into game situations.

Appendix K - Self-Talk in Sports

What we say to ourselves (our self-talk) has a profound effect on what we do and how we feel. When our self-talk is primarily negative, it produces both negative feelings (anxiety, nervousness, lack of confidence) and physical tension (tight muscles, heavy legs) which can lead to decreased motor coordination and a narrowed attentional field. It also takes your concentration away from the task at hand, which increases the likelihood of making a mistake or missing something important (such as a delayed penalty). When our self-talk becomes negative, it can affect our other mental skills such as concentration, confidence, and arousal regulation. And when these skills start to decline, performance is likely to suffer, which then reinforces negative self-talk ("I can't stop anything"), creating a downward spiral. Quite often we are unaware of this, and we can harm our performance without realizing it.

There are multiple ways that an athlete can use self-talk. Self-talk can be used to focus your attention on specific tasks, psych yourself up if you need energy, relax yourself to cope with anxiety, increase motivation and confidence, elevate your mood, or focus on improvement of technical and tactical skills (e.g., the 5 steps of a wide lateral movement). With practice, you can learn to change your self-talk in order to get the maximum benefits out of your successes and learn from shortcomings without being overly self-critical.

In order to use self-talk to enhance your performance, it is important to be able to recognize what you say to yourself in order to control it. Of course, this is easier said than done, but it is possible to learn to control your thoughts and stay positive when things go wrong.

There are several common mistakes that athletes make with their self-talk that can be detrimental.

1) **Focusing on past or future**: For example, "How did I let that bad goal in," or "I hope we don't take another late penalty," are instances where a person's self-talk has switched to things out of his/her control. All you can control is the present, and your self-talk should be about things that are controllable.

2) **Focusing on mistakes or weaknesses**: In competition, it is important to focus on positives and strengths. For example, thoughts like "I suck at post play," or "That bad goal I let in will be the difference in this game," can shake your confidence. Although focusing on areas for improvement in practice is important, you should do so in a positive light. In games, you should stay process focused on the present.

3) **Focusing on outcomes**: During competition, focusing specifically on objective outcomes, such as "We need to win" or "My save percentage is below 0.900 right now," diverts your attention to things that are not directly under your control. Maintaining a process focus, that is, focusing on the specific actions you need to do to be successful, is the trademark of the superior athlete.

4) **Focusing on things out of your control**: Similar to focusing on outcomes, focusing on things you can't control, such as the referee's calls, the other team, ice conditions, etc., takes your attention away from the task at hand.

5) **Demanding perfection from yourself**: Demanding perfection, for example, "I need to get a shutout today," can set you up for frustration, anxiety, and more negative thoughts. As well, it diverts your attention towards outcomes rather than the processes needed to succeed.

Awareness of your self-talk is key in order to determine situations when your self-talk has become negative, or detrimental to performance. There are a few techniques you can use to become aware of your self-talk.

Keep a log: If possible, try to document every time you have a negative self-statement throughout the day. After practice, you can keep track of whether your self-talk was positive or negative, and whether the practice was successful or not.

Recall through Imagery: Take a deep breath, close your eyes, and slowly exhale and relax. Imagine an especially good game as vividly as possible. Imagine what it looked like, how it felt, and what was going through your mind. As you relive this competition, become aware of your self-talk. Take a few minutes to imagine different situations, such as penalty kills, rushes, in zone activity, and when the play is in the other zone. After a few minutes, open your eyes and write down what your thoughts were during different situations. Now repeat this process, only this time imagine one of your worst performances. Imagine the same scenarios, and write down your thoughts and self-talk during this game. You can do this for two or three of your best and worst games in order to get more detail.

Using Video: Similar to the above technique, if you have videos of your games, you can watch video from your best and worst games in order to identify your self-talk during games where you played exceptionally well and games where you did not play up to standard. While you are watching, try to recall and log what your self-talk was like during each performance. This will help shed light onto how you speak to yourself and its relationship to performance.

Thought Stopping

Now that you have examined your self-talk in different situations throughout the competitive arena, and have understood the connection to your thoughts and performance, it is now important to control your self-thoughts in order to perform your best. The best athletes are able to curb their negative thinking and quickly change it to more positive and productive thoughts. Thought stopping and thought replacement are two of the simplest and most easily learned techniques to control your thoughts.

Thought Stopping involves three steps.

1) **Identify the thought**: As previously mentioned, negative self-talk can go unnoticed if you do not become aware of it. After you have assessed your self-talk, you should be able to identify recognize your negative self-talk when it happens, or even anticipate it based on the situations that precede it. If something does not go according to plan, having negative thoughts is normal, but it is important to identify them and release them as quickly as possible to move past the event. This will help prevent the negative spiral in performance and confirmation of negative self-talk.

2) **Stop the thought:** Once you identify a destructive thought or self-statement, you must stop it. Think of a signal that will tell you to stop the thought you are having. This could be saying the word 'Stop" to yourself, imagining a red light or stop sign, or just saying no. Choose the stop signal that is most meaningful for you. Every time you notice a negative thought, immediately use your stop signal.

3) **Practice:** As with any physical skill, it is important to practice mental skills to become proficient. At first, practice your thought stopping technique in imagery. Imagine yourself in one of your identified situations that commonly produces negative self-talk, and rehearse using your stop signal. Practice until it becomes automatic. Now try it out at practice. If there is a specific drill you don't like, or that produces negative thoughts (e.g.., 2 on 0 drills), practice your thought stopping technique here. Once it becomes automatic in drills, you can try your technique in simulated competitions, such as scrimmages. Once you feel comfortable enough, incorporate your thought stopping technique into your games. You may want to start at games that are less important to evaluate the effectiveness in a competitive setting.

Thought Replacement

Now that you know how to stop your negative thinking, it is important to prevent it from coming back. Simply stopping a negative thought does not banish it from your mind. Once a negative thought is stopped, it is important to replace it with a positive and productive thought. For example, if your team is up one goal in the last five minutes, a negative thought could be "I hope they don't get a breakaway," you could replace it with "I can stop breakaways," or whatever is meaningful to you. This will help you refocus your attention to things under your control and help you stay confident and motivated. You may also wish to use a deep centering breath to relax yourself, as negative thinking can produce anxiety and muscle tension.

Mikes (1987) six rules for constructing self-talk for improved performance

1) Keep phrases short and specific: Simply state what you need to do, and avoid having long phrases, as they may be distracting or hard to remember. For example, "Challenge, angles, calm"

2) Use first person and present tense: Remember that talking about past or future events takes your mind off what you need to do in the present. For example, saying things like "I have tons of energy," or "I can do this" helps to build confidence.

3) Construct positive phrases: Be sure to talk positively to yourself, as negative statements may cause tension and anxiety. Talking positively will help you build confidence and maintain motivation.

4) Say phrases with meaning and attention: Be sure that you are attending to what you are saying, and that it is meaningful to you. This will also help with your self-awareness. If you don't say phrases with attention, you may not remember or get the most of your self-talk.

5) Speak kindly to yourself: For example, although saying things like "I can't believe I missed that shot," brings attention to the mistake, it does so in a negative and demeaning way. Always try to talk kindly as well as positively, saying such things as "It's okay, I'll get the next one," or "confidence and control."

6) Repeat phrases often: Remember to pick a few short and positive phrases, and repeat them in order to automatize them in your mind.

Now, using your knowledge, take situations in which you have negative self-talk, identify what your thoughts go through your head, use your stop cue, and design replacement thoughts using the directions provided.

SITUATION	CURRENT THOUGHTS	STOP CUE	IDEAL SELF-TALK
Team takes a penalty	I hope they don't score	STOP!	Adjust depth, stay square, be aware

Appendix L - Concentration

During a practice or a game, have you ever had a coach tell you to "focus up" or "concentrate?" It is a common belief that poor performance often stems from the inability to focus on the relevant task cues while being able to ignore distractions. However, just having someone shout "focus!" doesn't always mean it will happen.

Nidiffer (1976) distinguished between two different dimensions which attention can vary: width (broad and narrow) and direction (internal and external). Width refers to how many cues are being perceived at once. Direction refers to whether the focus of attention is external, or outside the person, or an internal state. Combining these two dimensions, there are four attentional styles that emerge: broad-internal, broad-external, narrow-internal, and narrow-external.

For goaltenders, there are situations where every attentional style is needed. A narrow-external focus is needed when a goalie is focusing on the puck when there is a threat of a shot. A broad-external focus is used when identifying attacking players without the puck, as when you survey the ice. A narrow-internal focus is required to monitor your own mental states, as in checking your arousal level. And lastly, a broad-internal focus can be used when trying to visualize opposing team's set plays, such as a powerplay.

Ideal concentration consists of keeping the appropriate focus over the proper duration of time, as well as being able to shift the focus of attention when necessary. It is important for a goaltender to realize when each attentional style is necessary for competition, as well as to know ways in which attention can be shifted. Some research points to the fact that self-talk cues can be used in order to shift attentional focus. Take a few minutes and identify certain aspects of the competitive environment and which attentional style would be appropriate. An example is provided:

Situation	Attentional Style	Potential Cue
Whistle/break in play	Narrow-Internal = in order to check arousal level	Arousal check.

Although having the ideal focus of concentration for the proper time may seem like a trait of only elite athletes, with practice the average person can master the appropriate attention demands. In order to increase your awareness of each attentional style, try each of the exercises below outlined by Williams et al. (2010).

***Narrow-External*:** Place a puck on a table or chair at the far end of the room. Now draw your attention to, and observe every detail of, the puck. If there is a logo, try and identify what it is. Try and see if there are any scratches or gouges on the puck. This is a demonstration of what a narrow-external focus of attention feels like.

***Broad-External*:** Now continue to stare in the same direction of the puck, but widen your focus of attention. Look at the far wall and identify as many objects in the room as you can without moving your head or changing your gaze direction. Identify all the objects you can in your peripheral field. This is a demonstration of a broad-external focus of attention.

***Narrow-to-Broad External**:* Now place the puck as the focus of attention. Raise your arms and hold them straight out in front of you with your thumbs up, about 4 inches apart. Put the puck in the centre of this zone. Focus on the spot between your two thumbs. Now slowly move your thumbs apart from each other, and focus on everything in between them. Notice that the focus of attention continually gets wider as you move your thumbs apart. Extend your thumbs until they reach the edge of your periphery, and slowly bring them closer together, narrowing the focus of attention on the puck again. This is an example of switching external attentional styles.

***Narrow-Internal*:** Remember the relaxation exercises from earlier in the program. In these exercises, you focused on identifying your own breathing rhythm and muscle tension. Try to identify any muscle tension you may currently have, focus on the sensation, and relax the muscle. Focusing on the tensed muscle is an example of a narrow-internal focus.

***Broad-Internal*:** For an example of a broad-internal focus, try to remember a goal that was scored in your last game. Try and analyze every detail about the situation. Where was the shot from? What were your defense doing? Were you positioned properly? This form of analysis and review allows you to analyze what has happened around you, and it is internal since it is not happening at the present moment.

Intention Guides Attention: The intention of our focus also dictates the attentional style we will use. If we decide our primary intention is to maintain a puck focus during a game, we may forget to scan the environment for other attacking players without the puck. So, it is important to have the right intention of focus at the proper time when that particular focus style is needed.

Process Focus

You've probably heard coaches or other athletes mention that "winning is a process," or when they are going through a slump that they are "focusing on the process." As we discussed in the goal setting and self-talk portions of this program, the best athletes are able to stay focused on the process of succeeding rather than being focused on the outcomes of competition. A process focus simply means that you are concentrating on the actual steps or skills that you need to do in order to be successful. This keeps your primary focus of attention on things that are directly under control, rather than focusing on outcomes that are influenced by many factors.

One of the best ways to stay process focused is to develop a few holistic cues that will remind you what you need to do in competition to be successful. It is important for these cues to be short, and to encompass the execution of the whole skill rather than subcomponents. Cues must encompass whole skill execution, otherwise it can slow down or disrupt well learned skills. For example, if you want to develop a cue to impact your butterfly slide, it may be counterproductive and inefficient to go over all 5 steps (look, rotate, load, gather, extend), as you can tell this may drastically slow down the movement. Rather, it would be more beneficial to develop a one or two-word cue that is meaningful to you, such as "turn-push," to encompass the movement. Take a few minutes and develop four or five process cues that you could use in competition to stay process focused. An example is provided.

Cue	Meaning
Forward	Flexed at the knees and hips, hands out in front, proper head trajectory.

Appendix M - Imagery

Have you ever imagined yourself successfully performing a new skill, pictured yourself making a huge save at a key time in the game, or visualized yourself skating around the ice holding a championship trophy over your head? If so, then you've engaged in the mental skill of imagery. Imagery is one of the most used mental skills by athletes across many different sports, and many top performers attest to the relevance of imagery for success in their sport.

Imagery can be defined as "using one's senses to create or re-create an experience in the mind." Imagery can allow you to rehearse sport skills and strategies without actually physically performing them or being in a competitive environment. Although imagery cannot replace physical practice, it is a valuable supplement, since it is not always feasible to get on the ice. In fact, it has been demonstrated that when you engage in vivid imagery, the brain interprets the images as identical to actually being in the situation you are imaging!

There are several ways that you can incorporate imagery into your training regimen. Imagery can be used in order to develop and refine execution of skills. If you need to refine your post-integration, it may help to visualize yourself successfully integrating into your post without fumbling. It can also be used to visualize strategy and systems, such as visualizing your upcoming opponent's powerplay setup, and how you will handle it. You can also use imagery to increase your arousal, energy, and confidence, or you can use it to relax and decrease tension.

There are two areas in which imagery can be improved to make a performer more successful. The first has to do with the vividness of the images. The more vivid, sharp, and detailed the image is, the more of an impact it can have on performance. Try the following exercises, and rate the vividness and clarity of the image on a scale 1 to 5 (1 = not vivid, 5 = extremely vivid).

Imagine yourself in your home rink. There is no one else in the building but you. Picture yourself standing on the centre ice dot, and look all around you. Notice how empty and quiet the arena is. What can you pick out? Use as many senses as you can. What do you smell? What colour are the stands? Is there a logo at center ice? What colour are the walls? What do you hear? Are there any sounds around you? Now imagine you are back in your home arena, but you are standing in net waiting for the puck to drop. Imagine the stands are completely full. Experience this through your own body. See the starters up at center ice ready for the puck drop. What do you hear? The crunch of skates on the ice? The sound of sticks slapping against each other? Try to imagine the feeling you have just before the puck is dropped. Do you feel tense? Relaxed? A nervous anticipation for the game to start? How are you feeling?

Vividness Rating:

Not vivid at all	1	2	3	4	5	Extremely vivid

Think about the stick you primarily use for games. Focus on your stick. Imagine the fine details of your stick: What color is it? What colour is the lettering? Picture the tape on your stick. Is there a design on it? Now turn it over and imagine the backhand side of your stick. How does your stick feel in your hand? Is it heavy or light? Is the surface rough or smooth? Is it cold? Now imagine an opposing player driving down the wall and releasing a shot far side on the ice. Visualize yourself going down into a butterfly and perfectly using your stick to deflect the shot into the mesh. Repeat this play in your mind over and over. First, visualize it as if you are the one performing. She the shot from your own eyes. Now step into the stands, and watch the exact same play as if you are watching game video. Repeat this a few times. Now step back onto the ice and see the skill as if you are in net. Hear the sounds that accompany this skill. Listen to the slap of the puck coming off the players stick. Hear the puck hit your stick. Listen to the sound of it hitting the mesh above the glass and going out of play, and the referee's whistle to shortly follow. Put the sight and sound together, and image this play over and over again.

Vividness Rating

Not vivid at all 1 2 3 4 5 Extremely vivid

Controllability is the second way in which you can improve your imagery. Have you ever tried to form an image or picture yourself performing a skill, but have had difficulty manipulating the images and visualizing what you intended? Try these exercises and identify how well you can control your images. At the end, rate how well you could control the images, and track any deviations from the intended image.

First, choose a skill you commonly use in a game. This could be a t-push, butterfly slide, or whatever you choose. Any skill of your choice. Now imagine yourself performing this skill in a competitive situation. Make the image as vivid as possible. Now try and picture yourself executing a successful strategy, such as a depth adjustment, in relation to the movements of the opposing team.

If it was easy to switch and manipulate these images than you have demonstrated good controllability. If you had difficulty imagining situations, and also had trouble changing the images on command, you may need to improve controllability.

Now pick a sport skill that might be new to you or that you haven't mastered yet. Practice this skill over and over again. See and try to feel yourself performing this skill from the inside of your body. Feel the way your skates dig in to the ice, or the way your stick feels in your hand as you perform this skill. If you make a mistake or imagine performing the skill incorrectly, stop the image and try again. Attempt perfect execution every time. Now try and remember past experiences where you did not perform the skill well. Pay attention to what you are doing wrong. Now switch back to imaging perfect execution. Focus on how your body feels going through the different aspects of the skill, and notice the difference between now when you are performing it correctly and when you were performing it incorrectly.

This exercise will help you keep imagery positive. Sometimes negative images can creep in, and it is important to be able to control it and change it to positive images. This is one of the reasons why controllability is so important. Remember, if what you see is what you get, then seeing negative images may have negative outcomes. So, you must be able to control these images into positives.

Controllability Rating

Not very controllable	1	2	3	4	5	Very Controllable

Implementing Imagery

An imagery program works best if it is practiced for small amounts of time (about 5-15 minutes) as part of your regular training routine. We'll now go over several ways in which imagery can be used, as well as provide examples for when you use imagery on your own.

1) Learning and practicing skills.
   a) Imagery can be used to learn and refine skills. Remember that it may not always be feasible to get on the ice, or you may not have any practice time alone to directly work on skills. Imagery can be used to develop a blueprint for these skills so when you have time to work on them, your mind already knows what to do!
   b) In addition to imagery, you can pair self-talk cues with specific components of a skill to ensure perfect execution every time. Remember, with a lot of skills for goaltending there are multiple steps, and adding a cue for each step can help reinforce the proper form.
   c) For example, think about a post lean (or reverse VH). Imagine yourself becoming integrated into the post perfectly, widening your feet, collapsing your post side leg, and leaning your shoulder against the post with your back leg anchored. You can pair each of this steps with a single verbal trigger so that you remember each step. For example, you could say tight (as in a tight post-integration with no fumbles), wide (as in the widening of your feet), down (as in collapsing the post side leg), and lean (as in leaning your shoulder and anchoring the back leg).
   d) First pick two skills you are good at and try to picture yourself executing them perfectly. Explain the steps to doing this skill, and try to think of a few verbal cues that correspond with the skill.

      i) _____
      _____
      _____
      _____
      _____
      _____

      ii) _____
      _____
      _____
      _____
      _____

2) Correcting mistakes
   a) Imagery can also be used to correct errors. If you make a mistake, or an improper response, it is important to immediately visualize yourself making the correct response. You should visualize the desired correction, both see it and feel it as if you are playing. This can also be done alongside game video.

b) Practice first by trying to recall two goals that were scored in the last few games in which you may have executed an improper response. First, outline the situation and how the goal was scored, then visualize the correct response.
   i) _____
   ii) _____

3) Learning and practicing performance strategies
   a) Imagery can also help you learn and practice some of your game tactics. Goaltending is very much a read and react position, and there are many fine adjustments and decisions that can be the difference between a goal and a save. One way to practice these adjustments is to use imagery. You can image the opposition in different positions or different setups, and visualize your response to these different situations.
   b) One common adjustment a goalie needs to make is a depth adjustment based on a backdoor threat. First, visualize a shooter at the top of the circles, directly above the face off dot. You have beat the pass to your positional target, so you take a shoulder check to the weak side and identify there is no back-door threat. Visualize holding your position, or taking a bit more depth, making a good controlled save, keeping vision on the puck through the whole save process, and activating your body over top of the puck. Now try and visualize the same initial movement and position, only this time when you take a shoulder check, there is a weak side threat. After seeing the back-door player, you give up a bit of depth to be able to react to the back-door pass. Visualize the player with the puck passing it back door, and you execute a perfect butterfly slide, hitting position quickly, and making a good controlled save with vision on the puck the whole time. Now imagine that after you give back depth, the initial player with the puck decides to shoot instead of pass. Visualize yourself making a good save, activating your body into the puck, and maintaining vision the whole time. Now try to do this with a few different scenarios where you may need to make a tactical decision.

      i) _____
      ii) _____

4) Preparing a plan for mental focus.
   a) Remember earlier in the program when you were asked to identify stressors and distractors, write your current response, and develop your ideal response and cues to trigger this response? Well visualization is an excellent way to practice these responses. You can visualize your strong and unshakeable mental focus and confidence necessary for consistent success.
   b) This will be done in two steps. Go back to the stressor chart and first look through each stressor you have identified. Try to visualize these situations as vividly as possible. Imagine every detail you can think of, including how this stressor makes you feel. Now once you have this in mind, visualize how you would ideally respond to the situation. Image every detail to this response as well. Imagine implementing your planned response to the stressor instead of your initial reaction. Do this for two of your listed stressors. Imagery is a great tool you can use to practice how you would ideally respond to competitive pressures, distractions, setbacks, or any other type of performance obstacles.

      i) _____

      ii) _____

5) Energy Management
   a) Imagery can be used to both psych up for competition as well as for relaxation purposes if an athlete needs to manage anxiety. In order to psych yourself up, you may want to use motivational imagery directed at successful performances, or image increasing your somatic arousal symptoms. You can also use symbolic imagery along with the breathing techniques discussed to manage arousal. In order to control anxiety, you may want to use some similar techniques to those described above, to imagine successfully and confidently responding to situations that elicit an anxiety response. An example of each is presented.
   b) *In the dressing room before the game, you are feeling a bit sluggish, maybe your legs are a little heavy and you need to enhance your energy. Start increasing your breathing rhythm. Visualize that with every inhalation, you are breathing in energy from your*

surroundings. From your teammates, from the crowd, there is energy all around you. Imagine the energy pulsing through your body, all the way down your legs to the very extremities of your toes. Imagine the energy pulsing through your upper arms, down through forearms, all the way to the tips of your fingers. Now visualize the energy pulsing up your neck into your eyes. With every inhalation you bring in more energy. Now release all fatigue from your body with the exhalation. When you inhale, more energy pulses through your body, and when you exhale, the fatigue is released, so you are only left with pure energy in your body.

c) *If you are feeling like your arousal is too high, identify a situation which is making you feel this way. This situation causes your muscles to tense and your heart to beat faster. Now imagine that you are in control of these symptoms. You successfully release your muscle tension, and you are in control of your symptoms. You confidently overcome the distressing situation, and respond to the stressor successfully.*

Now that you have been educated about the potential uses of imagery for goaltenders, it is up to you to implement them into regular training and routine. We recommend an average of 10 minutes of practice a day. Mental skills are similar to physical skills in that it takes hours of practice to develop and refine them. Only by practicing will you improve the vividness and controllability of your imagery. You can practice using any or all types of imagery, but it's important to find out what works best for you. You can also pair your imagery skills with the other psychological skills we've discussed in the program. For example, if you set a goal to improve a certain skill, you can use imagery and self-talk to help develop your mental blueprint for that skill!

Appendix N - Why Routines Help Athletes Be Successful

Routines are extremely important for goaltenders, and athletes in general, to improve training and game performance. Routines allow you to ensure total preparation for your practice and game performance. They will let you be physically, technically, tactically, and emotionally ready for performance.

Routines can be used in several different situations. First, and most commonly, they are used before games to make sure you are prepared for optimal performance. Routines can also aid in preparation for practice and training sessions. As well, they are also important not only before, but during competition to help you stay at your optimal performance state.

Ultimately the only thing you can control as a goaltender is your performance. You are not in control the referees, the crowd, the opponents, or the play of your teammates. Having a set routine allows you take control over the things that you can have direct influence on. These include your gear (is everything in good condition to play), your body (proper hydration, nutrition, warm up) and your mental states (proper arousal level, optimally concentrated).

By having a routine, you can systematically cover every area that will impact your game, thus allowing your preparation to be more predictable. A routine also allows you to be prepared for unexpected events. You can plan for every possible event that may happen during a game. If you can reduce the possible things that could go wrong, and have a plan for other things that do, you'll be better able to stay focused before and during competition.

Everything done in your routine should have a specific purpose for getting you ready to perform at your optimal state. Routines can also be adjusted if need be, for example shortening the routine in case of a late arrival to the rink, or delaying a routine if the game cannot start on time.

Practice Routines

Just like any other skill, it's important to begin development of your routine in a practice situation. Start by developing a brief routine for practice to ensure you're prepared for every drill. First, check your arousal level and make sure it's appropriate. The breath control techniques we discussed earlier are appropriate here, as you only have a short period of time.

Once you've adjusted your intensity to the optimal level, now you can narrow your focus and set a quick process goal for what you can work on during the drill.

Once you find a quick routine that works for you, use it before every drill. This will help automatize your quick routine, as it should only take a few seconds.

Pre-Competition Routines

Now it is important to develop a routine for before your games. This should be an extended version of your training routine, although a pre-competition routine can take several hours to complete. Some athletes' routines can start the day before competition.

There is no "one size fits all" design for developing precompetitive routines. Routines are extremely individualized, however most routines involve physical, mental, and technical/tactical preparation strategies. The only way to decide what to put into your routine and how to structure it is to find out what really works for you.

However, two of the common mental elements you must consider are your arousal level and focus. As has been discussed, you need to identify your appropriate arousal level for peak performance. As well, trying to maintain a process focus, that is only focusing on things that you can directly control, as opposed to an outcome focus is more beneficial to performance.

Arousal Level

Your pre-competition routine should be tailored around your optimal intensity level. First of all, you need to make sure you periodically check your intensity, and then adjust it (either raise your arousal or lower it if need be using the techniques discussed earlier) accordingly. You should set aside time during your routine in order to do this. Ensure that after the warm up, just prior to competition, you do one final check and adjustment of arousal.

If you find you play best at a lower arousal level, you may want to find a quieter place to perform your routine. You'll want to go about it at a slower pace and have opportunities to take breaks and check arousal levels. You may want to perform your routine in a place by yourself if possible, or around other people who like to be more relaxed before they perform.

If you play best with a higher arousal level, your pre- competition routine should be done more quickly and with more energy. You may be better served performing your routine around people who are more energetic and are always doing something. If you have too much down time, you may lose the intensity. It is still important to build in arousal checks, to make sure that your arousal level is not getting too high.

Concentration

Some goaltenders prefer to be by themselves in their pregame routine, making sure that they focus on everything necessary for the upcoming competition. Other goalies prefer to distract themselves and are reassured to be with others before the start of a game. If you prefer to be alone before the game, with an internal focus, you will likely find it more productive to perform your routine in a quiet place by yourself, such as in the stands or the bleachers.

If you prefer to keep your mind off of negative thoughts, and find it reassuring to be with others, you may want to keep a wide focus to avoid overanalyzing the upcoming game. In this case, your goal is to keep an external focus and avoid focusing internally. It might be more reassuring for you to perform your routine in the dressing room with the rest of the players, doing things that will maintain an external focus.

Designing a Pre-competition Routine

The best way to start a pre-competition routine is to make a checklist of everything you need to do before competition. Some common elements include: meals, tactical review, equipment

check, physical warm up, and mental preparation. As well, there are other personal things that can go into routine, such as gear rituals.

You must then decide in what order to address each element as competition approaches. For example, the first thing you can do when you get to the rink is look over your gear to make sure there are no issues. For this you may need to consider availability of spaces, home/away games, where and when you can eat your pre-game meal, etc.

Now, based on your focus and arousal needs, as well as your knowledge of the arenas you play at, you can decide where each step of your competitive routine is to be performed. If you like to be by yourself, is there a place where you can get away from everyone before your game?

Lastly, you need a time frame in which to complete your routine. You must make sure that you have ample time for all of the activities in your routine.

Once you get your routine organized, try it out at competitions. You may find that some things do not quite work, and you will have to tweak and fine-tune your routine in order to identify what works best for you. As well, the routine needs to be used on a consistent basis. You must use it before every competition so that it can be automatized. As well, you can use imagery to go over your pre-competition routine to help make it automatic. Eventually, you won't have to think about it, and it'll just be the way you get ready to play.

Preparing for the Unexpected

In addition to forming effective pre-competition routines, the most successful athletes are able to recover from distractions and unexpected events during and leading up to competition. We briefly discussed having a distraction management plan in the self-talk and arousal components of the program. It is important to have an effective recovery routine. This can consist of breathing, self-talk, relaxation, and process goal techniques, and similar to the practice routine, should only take a few seconds to complete.

Now it's time to start deciding how to build your routine. You need to decide how you want to feel and focus throughout the day. This is completely individualized, and needs to be tailored to your personal competition needs. Try to recall what has worked for your previous best performances and what you feel you need.

Make a checklist of all the physical, technical, tactical, and mental needs for your competition preparation, and start thinking about when to implement them in your routine.

Physical	Technical	Tactical	Mental
-Pre-game stretch/skate	- Go over proper technique for movements w/ imagery	- Game video/imagery of opposing teams OZ setups	- Appropriate arousal level - Possibly include stress-inducing situations.

Now that you've outlined all of the things you need to address while designing your pregame routine, you can start planning your game day preparation. Remember, this routine can also be shortened in the event that you do not have time to complete it in its entirety. Be sure to select the most important parts, so that you have a plan should you not be able to perform the whole routine.

Preparation Phase	Preparation Strategy to address specific needs.
Wake-Up Time:	
Breakfast Time:	
Stretch/Pre-Game Skate Time:	
Pre-Game Nap: Time:	
Travel to Game Time:	
Arrival at Rink Time:	
Pre-Game Meeting: Time:	
Off-Ice Warm Up Time:	
On-Ice Warm Up Time:	
Leading up to puck drop Time:	

In Competition Routine

It is also important to develop routines for during competition. Although you put in the work before the game to ensure that you are ready to play, this doesn't always mean that this optimal performance state will last the entire game. During a game that lasts two hours, small adjustments need to made to maintain your peak performance state. Use your experience from previous competitions, as well as earlier work from part of this program to develop your arousal adjustment and refocusing plan for during competition.

Increasing Arousal
Decreasing Arousal
Self-Talk Cues (Positive/Process)
Refocus plan for the unexpected

5R's

Using the five R's is a quick and common routine that can help you rebound from a negative experience, such as allowing a goal or making a bad play. The five R's should be practiced in order to become automatized, so that in a game you can you can effortlessly bounce back from negative experiences.

1. Release: You must release the bad thought or feeling. Take a sip of water or go for a quick skate to release the negative energy.
2. Relax: Take one deep diaphragmatic breath (refer back to arousal worksheet) in order to release any excess muscle tension that may have built up as a result of the negative experience.
3. Review: Think about the play that just happened, and non-judgementally review the play. Using your imagery skills, visualize yourself making the correct play.
4. Regroup: Lift your head and shoulders up and maintain your confidence. What has just happened is in the past and will not dictate what happens the rest of the game.
5. Refocus: Quickly remind yourself of your positive and process cues that will shift your focus back to what you need to do in order to play optimally for the rest of the game.

Again, this may take some practice, so it may be a good idea to try this technique at practice first, and then progressively integrate it into more serious situations.

Appendix O – TOPS Scores

Table 9

P1 TOPS Scores

Skill	Practice				Competition			
	T1	T2	T3	T4	T1	T2	T3	T4
GS	-	3.00	4.00	4.25	-	4.75	5.00	5.00
ST	-	4.00	4.25	4.50	-	4.50	4.75	5.00
IM	-	3.00	3.25	4.00	-	4.75	5.00	5.00
REL.	-	3.25	4.50	4.25	-	3.25	4.75	4.75
AUT	-	3.75	3.75	4.00	-	3.75	4.00	4.75
ACT	-	3.25	4.25	4.25	-	4.50	4.75	4.75
EC	-	3.75	4.00	3.75	-	3.75	4.00	4.50
AC	-	4.25	4.25	4.25	-	-	-	-
NT	-	-	-	-	-	1.50	1.25	1.50

Note: GS = Goal setting, ST = Self-talk, IM = Imagery, REL = Relaxation, AUT = Automaticity, ACT = Activation, EC = Emotional control, AC = Attention control, NT = Negative thinking. Scales are on a 5-point scale (*1 = never, 5 = always).*

Table 10

P2 TOPS Scores

Skill	Practice				Competition			
	1	2	3	4	1	2	3	4
GS	3.50	4.00	2.75	2.50	2.75	5.00	5.00	4.00
ST	3.00	3.50	2.75	2.75	3.50	3.25	4.75	3.75
IM	2.50	3.00	2.50	2.00	4.50	3.75	4.75	4.50
Rel.	2.00	2.50	2.00	2.00	2.75	4.50	4.50	4.25
Aut	2.75	3.00	3.00	2.75	1.50	2.00	1.50	2.00
Act	3.25	4.00	3.25	3.00	4.00	4.50	5.00	4.25
EC	3.75	4.50	4.00	3.75	3.75	4.75	4.50	4.75
AC	3.25	4.00	3.50	3.50	-	-	-	-
NT	-	-	-	-	2.00	1.00	1.00	1.00

Note: GS = Goal setting, ST = Self-talk, IM = Imagery, REL = Relaxation, AUT = Automaticity, ACT = Activation, EC = Emotional control, AC = Attention control, NT = Negative thinking. Scales are on a 5-point scale (*1 = never, 5 = always).*

Table 11

P3 TOPS Scores

Skill	Practice		Competition	
	PRE	POST	PRE	POST
GS	1.75	3.00	4.25	4.75
ST	1.50	3.25	3.25	4.00
IM	1.50	3.50	3.25	4.25
REL	2.00	2.75	4.50	4.50
AUT	3.75	3.00	4.50	4.75
ACT	2.00	3.25	4.75	5.00
EC	5.00	3.75	3.50	4.00
AC	2.00	2.50		
NT			1.75	2.00

Note: GS = Goal setting, ST = Self-talk, IM = Imagery, REL = Relaxation, AUT = Automaticity, ACT = Activation, EC = Emotional control, AC = Attention control, NT = Negative thinking. Scales are on a 5-point scale (*1 = never, 5 = always)*

Appendix P – Subjective Performance Scores

Table 12

P1 Subjective performance scores.

	Pre	Post	Difference
Overall Performance	8.8	8.64	-0.16
Team Performance	7.8	7.39	-0.41
Physical Energy	8.6	8.83	+0.23
Shot Preparation	9.4	9.28	-0.12
Save Execution	9	9.33	+0.33
Post-save Response	8.8	9.0	+0.20
Reads & Anticipation	9.2	9.33	+0.13
Puck-handling/Decision making	9.8	9.44	-0.36
Communication	9.0	8.1	-0.90
Key Saves at Key Times	9.4	9.28	-0.12
Body Language	9.8	9.0	-0.80
Confidence	9.8	9.22	-0.58
Focus	9	9	=

Note: All scales are rated out of 10.

Table 13

P2 Subjective performance scores

	Pre	Post	Difference
Overall Performance	8.67	9.50	+0.83
Team Performance	6.22	7.83	+1.61
Physical Energy	8.56	9.17	+0.61
Shot Preparation	8.78	6.50	-2.28
Save Execution	8.78	9.67	+0.89
Post-save Response	8.89	9.50	+0.61
Reads & Anticipation	9.44	9.83	+0.39
Puck-handling/Decision making	9.89	10.00	+0.11
Communication	9.00	10.00	+1.00
Key Saves at Key Times	8.89	10.00	+1.11
Body Language	9.00	9.50	+0.50
Confidence	9.78	10.00	+0.22
Focus	9.89	9.17	-0.72

Note: All scales are rated out of 10.

Table 14

P3 subjective performance scores

	Pre	Post	Difference
Overall Performance	8.9	9.5	+0.6
Team Performance	9.6	7.9	-1.7
Physical Energy	10.0	10.0	=
Shot Preparation	9.5	9.6	+0.1
Save Execution	9.25	9.2	-0.05
Post-save Response	9	9	=
Reads & Anticipation	8.5	9.0	+0.5
Puck-handling/Decision making	7.5	8.5	+1.0
Communication	9	8.8	-0.2
Key Saves at Key Times	9.5	8.8	-0.7
Body Language	7.75	8.6	+0.85
Confidence	8.25	9	+0.75
Focus	8	8.4	+0.4

Note: All scales are rated out of 10.