Implementing a pressure training program to improve decision-making and execution of skill among premier league academy soccer players

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The present study evaluated the effectiveness of an intervention intended to improve academy players' performance under pressure. Male academy soccer players (n = 82; mean age = 14.12 years, SD = 2.28) completed a baseline pressure task producing performance scores (A) for decision making and skill execution. By completing a pressure task, players received pressure training (PT) (Wood & Wilson, 2012). Players were then randomly allocated to an intervention group (n = 41; receiving PT, three cognitive behavior workshops, and reflective diaries) or comparison group (n = 41; receiving PT only). Sixty-eight players (n = 29; intervention group; n = 39; comparison group) repeated the PT task at a six-week follow up (B), and of these, 26 (n = 15; intervention group; n = 11; PT only) also completed a re-test PT task (A) at 12-week follow up. Due to attrition at follow up, chi-square analysis was conducted across experimental groups A-B only. Analysis indicated intervention players scored significantly higher in their decision-making (p = .028) with a significant main effect of age-group on decision-making (p = .003) and skill execution (p = .005). Four players (highest scoring and lowest scoring player within intervention and comparison groups) from each academy age-group (n = 16) took part in individual interviews to explore intervention effectiveness. Thematic analysis found that some players perceived no benefits of the condition they completed, others perceived benefits to confidence, meta-cognitive skills, and challenge appraisals. Methodological implications for future pressure training interventions are presented.

Keywords: coping, resilience, mental-toughness, performance intervention

Lay Summary:

This study offers partial support in the effectiveness of contextualized pressure program to enhance elite academy players' ability to cope with performance pressure. Some players felt the intervention had no benefits, whilst others said there were benefits for confidence, ability to understand helpful emotions and thoughts when performing under pressure.

Implications for Practice:

- A contextualized pressure intervention comprising of pressure training, cognitive behavioral workshops and reflective diaries can facilitate performance under pressure by enhancing coping skills.
- Organizational support and endorsements from key personnel (e.g., academy manager, coaches, and senior coaches) for all components of pressure interventions is important in supporting player engagement.
- To optimize pressure training, practitioners should focus on how to incorporate pertinent situational and personal incentives within pressure training.

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Introduction

Around 12,500 male players between nine and 18 years of age are contractually signed to a premier league soccer academy. Players within soccer academies have a 'tenuous foothold' on their academy position and are subject to many incentives that bring about pressure to perform (Cushion & Jones, 2006). Pressure refers to "the presence of an incentive or number of incentives that increase the importance for optimal, maximal, or superior performance" (Baumeister & Showers, 1986, p. 362). The variability in performance outcomes under pressure is suggested to be underpinned by an individual's cognitive appraisal (Moore et al., 2015). Cognitive appraisal refers to how an individual evaluates the significance of performing optimally in comparison to resources to cope (Lazarus & Folkman, 1984).

Cognitive motivational relational theory (Lazarus, 1991) suggests that cognitive appraisals represent the proximal determinants of athletes' emotions. Subsequently, cognitive appraisal is central in understanding performance under pressure due to the distinct neuroendocrine and cardiovascular responses, which in turn influence two key performance variables; decision-making and skill execution (Moore et al., 2015). For example, where individuals may perceive insufficient resources, pressure may disrupt cognitive control and the automaticity of skilled performance causing a decline in the performance quality of skill such as executing shots and passes (Masters, 1992). Alternatively, when an individual perceives sufficient resources, pressure maybe appraised as a challenging or beneficial, which may in turn increase the allocation of additional processing resources resulting in decisions that are more effective than not under pressure (Wilson, 2008). Thus, interventions that aim to develop coping flexibility and increase coping resources can enhance an individual's performance under pressure (Bell et al., 2013; Lazarus, 2000).

Coping flexibility comprises of the individual's coping repertoire, variation, and goodness of fit (Kato, 2012). A coping repertoire is the number of coping strategies available. The identification and accumulation of resources supports coping flexibility by increasing the range of strategies available, thus increasing variation. Finally, goodness of fit reflects an individuals ability to modify coping behavior to fit the nature of the given situation (Kato, 2012). Any intervention which is aimed at improving coping, should therefore address coping flexibility as a core component.

Reviews of interventions intended to help individuals' perform under pressure (e.g., Gröpel & Mesagno, 2017; Kent et al., 2018, Low et al., 2020) have identified that coping resources can be developed from adaptive reflection following pressure exposure (Fletcher, 2019). Physically practicing domain-specific skills under simulated pressure is known as pressure training (Low et al., 2020). Pressure training (PT) may increase the coping repertoire of an individual (e.g., the knowledge of coping strategies available to an individual; such as, performing a penalty in a cup final), develop variation (e.g., ability to select and alternate coping strategies that are more effective; such as, thought-stopping in a one-v-one tackle) and extend understanding of goodness of fit (e.g., was the coping strategy helpful for performance?) (Kato, 2012). For adolescent soccer players, PT can also support psychosocial growth (e.g., increased appraisal of coping resources, developing reflective skills and abstract reasoning) which is essential in developing the resilience required to attain success at the highest level of sport (Fletcher, 2019).

In order to assist practitioners and researchers in the development and implementation of pressure interventions Fletcher and Sarkar (2016) proposed a 'pressure inurement' training programme. Pressure inurement training systematically manipulates and increased the training demands an individual faces (e.g., by introducing constraints on the rules of play) and/or the salience of an activity (e.g., by manipulating the players' perceptions of being

judged) throughout the programme (Fletcher & Sarkar, 2016). Van Rens et al. (2019) implemented Fletcher and Sarkar (2016) pressure inurement training within a team of female national level cricket players that was deemed to be effective. A post-intervention questionnaire identified limitations that players believed impacted upon intervention effectiveness. This included a failure to contextualize the pressure task for players who fulfilled different roles, and that pressure tasks were perceived as not always realistic and/or obtainable. Fletcher and Sarkar (2016) themselves recognize that their PT intervention has not been comprehensively evaluated and would 'undoubtedly be further refined and adapted' (p. 20). Subsequently, drawing upon the findings of Van Rens et al. (2019), intervention fidelity could be increased by creating a pressure training programme that aims to contextualize and simulate pressure. The objective of the present study is not to progressively increase pressure as with pressure inurement training, but to simulate meaningful incentives that are perceived by academy players to induce pressure within academy soccer.

Pressure training interventions can be effective without a practitioner explicitly teaching mental skills for maintaining performance (Low et al., 2020). However, many PT interventions have been complimented with mental skills support to avoid any harmful effects associated with pressure training environments (Bell et al., 2013). It is also important to consider the cognitive and social developmental changes during adolescence that can contribute to increased anxiety in evaluative domains, challenges in the applicability of coping skills and the awareness of dysfunctional cognitions (Westenberg et al., 2011). For instance, academy soccer players may try to avoid scenarios that are pressurized, feel ashamed in experiencing certain emotions or thoughts when under pressure, and develop perfectionist tendencies through unrealistic reflection. Moreover, while PT alone could be effective, complimenting pressure training through metacognitive activities is important to

ensure the development of holistic coping that is effective for both performance and well-being (Kegelaers et al., 2020).

Cognitive-behavioral (CB) workshops have been one method often provided adjunctive to pressure exposure interventions in order to promote an awareness and use of coping strategies (e.g., Driskell et al., 2014). However, a limitation across such interventions is a failure to establish individual or team needs and provide a contextual sensitivity which supports effective CB formulations (Poczwardowski & Sherman, 2011). Fletcher and Sarkar's (2012) framework identified five main families of protective factors that may facilitate coping under pressure: personality, motivation, confidence, focus, and perceived social support. The use of Fletcher and Sarkar's (2012) protective psychological factors can be helpful in the design of CB workshop content when recognizing context, relevance and the practicality of integrating factors within educational support (Fletcher, 2019).

Coping resources from pressure exposure experiences can also be impacted upon by reflection (Fletcher, 2019). Subsequently, pressure training should also include 'homework tasks' which aim to nurture reflective practice and critical thinking (Neil et al., 2013). The absence of an adjunctive reflective practice task alongside pressure interventions has been identified as a limitation in published pressure interventions (Driskell et al., 2014). Reflective practice offers an opportunity for individuals to enhance awareness of options for coping, coping potential, and performance accomplishments. Particularly for adolescents, reflection encourages exploration, thinking and questioning which can increase the depth of learning and enhance understanding (Porcellato & Knowles, 2013). This highlights the benefits of adopting a structured reflective practice approach, such as a diary, in pressure interventions (Gadsby & Cronin, 2012).

Alongside the development of knowledge pertaining to the content of PT interventions, general implications have also been drawn that can guide best practice for

intervention delivery (Bell et al., 2013; Van Rens et al., 2019). Brown and Fletcher (2017) note the importance of active social agents (e.g., coach) in supporting the delivery psychological skills interventions, as these agents may provide and reinforce resources facilitative of performer learning. As such, an important consideration for pressure interventions beyond content, are requirements for the intervention to be delivered in a multidisciplinary and transformational manner. Research indicates that this can be achieved where leaders (such as coaches) convey the importance of, and inspire engagement with planned interventions (Bell et al., 2013) and present athletes to access of support if required (Fletcher & Sarkar, 2016).

Drawing upon the key considerations of meaningful pressure manipulation, contextually relevant CB workshop content, and the inclusion of reflective practice and transformation delivery; the purpose of the present study was to deliver and evaluate a theoretically informed performance under pressure intervention. It was hypothesized that an intervention comprising of PT, CB workshops and reflective practice would enhance decision-making and skill execution to a greater extent than PT alone.

Method

A mixed method (e.g., Mesagno & Mullane- Grant, 2010; Van Rens et al., 2019) approach has been advocated to allow for interpretation of data from a relativist ontology (Gibson, 2016). From a pragmatic viewpoint, mixed methods was also utilised to add insight into intervention effectiveness, efficacy and considerations for future intervention development. An experimental design was applied to collate quantitative performance data and then test whether the outcomes of the intervention group differed to a comparison group. Player interviews explored intervention effectiveness and the experience of participating in the intervention.

Participants

The study was undertaken within a male premier league, category one soccer club (24 soccer clubs out of 84 within the UK have achieved this status). Eighty-two academy soccer players (Age M = 14.12 years, SD = 2.28) completed a baseline pressure task. Players were then randomly allocated to an intervention group (n = 41; PT, involving three CB workshops and reflective diaries) or a comparison group (n = 41; PT only). At six-week follow up, 68 players (n = 29; intervention group; n = 39; comparison group) repeated the PT task. At 12-week follow up, 26 players (n = 15; intervention group; n = 11; comparison group) completed a further re-test PT task.

Attrition was accounted for by match fixtures, illness or injury. Re-scheduling PT was not possible as each academy age-group is allocated specific times to use the academy facilities. Most notably, none of the 17-18 age-group were able to complete the 12-week follow-up PT due to match commitments.

Sixteen players were purposively selected for individual interview comprising of four players for each academy age-group (the highest scoring and lowest scoring player within the intervention and comparison group). This selection strategy allowed examination of different experiences of performing under pressure, the two intervention strategies followed, and recommended improvements.

Measures

Measurement of Decision Making and Skill Execution

Decision making and skill execution were selected as indicators of performance as both are fundamental to performance and may be subject to deterioration or enhancement under pressure (Kinrade et al., 2015).

Each age group had a designated lead and assistant coach, and these coaches were responsible for grading players of their respective age group on decision-making and skill

execution. Players were assessed against coach expectations to ensure that any reported deterioration or enhancement in performance was relative to the respective player's skill level (DeCaro et al., 2011). Whilst it may not be considered conventional, the scoring system of zero, one and three were selected to assist coaches' in understanding the marking criteria by mirroring a loss, draw and win in soccer. To avoid marking players on performance ability, grading was completed in accordance with the coach's expectations for each individual player, based on their experience of working with that player, as follows: '0 = below expectation', '1 = to expectation' and '3 = above expectation'. Thus, the possible range of scores for each PT repetition was 0-6.

Inter-rater reliability. Each coach scored the same five randomly selected pressure training clips from their respective age-group to assess inter-rater reliability. They were asked to grade the player first receiving the ball first on decision-making and skill execution. Overall agreement was observed in 23/30 trials. Differences in scoring are mainly accounted for within the 15-16 age group, where four trials differed. An explanation for this could be that the lead coach for the 15-16 age group was new to the academy. While this coach did receive full training and instructions regarding the aims, objectives and marking criteria he was not involved in the PT design or had sufficient experience with players to know skill level which may have decreased scoring precision and accuracy (Sattler et al., 2015).

Procedure

Following ethical approval from the author's institution, players within a soccer academy were recruited for the study. Informed consent was sought among coaches, and acting in loco parentis, parents provided consent for players, who themselves provided assent.

The duration of the pressure intervention program was 18-weeks. Gilbourne and Richardson (2006) suggest that practitioners will be more successful when working with sporting establishments if they can become embedded in existing regimes that the given club

already operate. Players within the focal soccer academy follow a performance cycle that targets different elements of performance every six-weeks. Thus, all players were scheduled to complete three PT at six-week intervals to align with their performance cycle. Players were assigned a number and entered into a random selection application and allocated to either an intervention group (n = 41; PT, comprising three CB workshops and reflective diaries) or comparison group (n = 41; comprising PT only). A comparison/control group is important to allow for estimates of intervention effects and causality to be inferred (Chambless & Ollendick, 2001). However, we acknowledge that by participating in a pressure task, players are afforded the opportunity to practice coping skills and gain familiarization through exposure to meaningful pressure (e.g., Wood & Wilson, 2012). The purpose of the present study is to compare and contrast the performance results of players that participate in a combined intervention offering of PT, CB workshops and reflective practice against a comparison group comprised of academy players' only participating in PT. The intervention group participated in three CB workshops and six reflective practice diaries over a six-week interval. It is important to recognize that the first author was embedded within the elite soccer academy environment as a probationary sport and exercise scientist (Levitt et al., 2018). By being positioned within the academy soccer club the lead author could develop rapport and trust among players and staff (Sharp & Hodge, 2013). This afforded the opportunity to develop a better awareness of the organizational culture, enhance staff 'buy-in', and design a multidisciplinary program that could be delivered using transformational methods.

Pressure Training (PT)

All players completed a pre-intervention pressure training (PT) task that produced baseline performance scores (A) for decision making and skill execution. Aligned with Baumeister and Shower's (1986) definition of pressure it was important to ensure that PT incorporated meaningful incentives for players to perform optimally. Coaches' and sport science staff

supported the creation of a pressure task that incorporated performance incentives and accounted for developmental differences among players (aged 11-18) identified by the same sample within Kent et al. (2020).

The PT was conducted within the academy's indoor venue to ensure weather conditions did not interfere with testing. The task took part in a 25 yard (metric used within soccer) coned section from the goal line. Ten soccer balls were placed upon three flat discs 25 yards from the goal line and positioned nine yards apart from each other. An exception was for players in the 11-12 age group with balls placed 18 yards from the goal line and positioned seven yards apart from each other.

The age-phase lead coach provided players (two attacking players and two defending players) with an explanation of the PT. PT was observed and assessed by the lead and assistant coaches. The PT commenced when crowd noise was played intended to simulate a full stadium. This was to ensure the incentive presence of others. Defender one played a floor pass to attacker one's feet. Upon receiving the ball attacker one and two proceed to attack the goal with the aim of scoring, whilst the defender's objective was to take the ball from the attackers. Players were given 30 seconds recovery between each PT, with players completing ten repetitions of the task. For each PT repetition, players were assessed on decision-making (e.g., movement, tackle, pass or shoot) and execution of skill (e.g., degree of accuracy in shot, tackle or pass) relative to their ability. For players aged 11-12, after five repetitions of PT they were asked to swap roles (e.g., defenders now attackers). As part of the long-term athlete development model (Football Association, 2018) this age group are not yet designated roles as an attacker or defender and so are evaluated in each role. For players aged 13-18 years, attacker one and defender one swapped roles with attacker two and defender two after five repetitions to ensure learning effects were minimized and to ensure that all players were equally challenged.

Performance incentives were established within PT as follows. Coaches informed players that this was an assessment of their ability to perform under pressure and evaluations of their decision-making and execution of skills would be published on a public leader board. This established the incentive of competition by emphasizing the comparative and evaluative nature of the task. The top three performers were allowed to select a reward from the following options; a) additional points for the leader board, b) to captain the team, c) play up an age-group (if a regular starter) or start the next game (if not a regular starter). The bottom three performers received consequences (e.g., do not start the next game, cleaning away equipment, pointless task, physical consequences) determined by the roll of a dice. This ensured presence of the performance incentive tangible outcomes. Finally, players were given 30 seconds recovery between each PT, with players completing ten repetitions of the task. This established a time incentive. Players aged 15-18 were asked to complete five 40-meter sprints with 35 seconds recovery to induce physical fatigue prior to PT (Baker, 2001). Sprint speed was measured using timing gates to ensure players achieved maximal velocity running. None of the players produced times perceived by the academy sport scientist to be indicative of a lack of effort.

Pilot testing. Pilot testing of the PT was undertaken with players from the under 23 and under 10 teams who were not part of the study. Following the pilot test, all lead age-group coaches agreed that the task as described above was suitable for players ages 13-18, but alterations were recommended for players ages 11-12, those being reduction of the distance between the flat markers by one meter and swapping roles after five balls. Swapping roles was deemed important to align with the long-term athlete development model (Football Association, 2018), whereby players under 11-12 are not yet designated as an attacker or defender.

Implementation of the intervention

Cognitive-behavioral workshops. Three CB workshops were undertaken by intervention group participants (11-12; *n* = *9;* 13-14; *n* = 11; 15-16; *n* = 6; 17-18; *n* = 3), with one week between workshops to allow players time to reflect on and practice the strategies discussed within the workshop. This also allowed completion of a reflective diary entry following weekly competition on a Saturday or Sunday. This format fit comfortably within the players' six-week training cycle (Gilbourne & Richardson, 2006).

An awareness of players' chronological age and developmental status is important to ensure CB interventions and reflective practice respect the players' worldview and cognitive capacities (Page, 2009). With players' permission, the content of reflective diary exerts were anonymized and used within CB workshops to facilitate discussion.

Workshop one provided players with an outline of the intervention program and aimed to enhance players understanding of pressure and coping resources (Lazarus & Folkman, 1984). Activities included engaging players in discussions about perceptions of pressure and coping skills that may be used to support optimum performance under pressure (Ludlam et al., 2017). Players ages 13-18 were also engaged in discussions regarding how different coping strategies may be used for different pressure scenarios.

Workshop two aimed to develop players' coping repertoire by presenting psychological skills they could employ when performing under pressure (e.g., self-talk). All players were asked to identify how they may take ownership over various aspects of their preparation (physical, mental, technical, and tactical). Self-reflective activity – 'thinking about thinking – lies at the heart of the construct of meta-cognition' (MacIntyre & Moran, 2010, p.228). Subsequently, to develop meta-cognitive thinking reflective diary extracts were used to prompt discussion on how thoughts and emotions are interconnected and influence performance under pressure. Following, the lead author presented an introduction to the

psychological skills of thought-stopping, positive self-talk and cognitive restructuring that have been used in previous research to avoid/lessen rumination over poor decision making and maintain effective decision-making under pressure (Kinrade et al., 2015).

Workshop three examined how appraisals associate with emotional responses and the 'goodness of fit' of these responses (Lazarus, 2000). For example, what anxiety is, how anxiety is not always detrimental to performance, and the importance of reflecting on perceived coping resources that could underpin challenge or threat states in response to pressure (Blascovich, 2008).

Each workshop included extracts of video interviews with senior first team players to illustrate key concepts alongside a practical activity to support their application (Paulus & Moore, 2014). This helped to spark discussion and maintain players' engagement. All workshops lasted 30 minutes and were delivered in the academy gym studio. The only exception was for the 17-18 age-group. Coaches finished training late on all scheduled CB workshop days, and so full content had to be condensed to 15 minutes meaning it was not possible to complete the planned practical activities.

Reflective Diary. When promoting the use of reflection within an adolescent population it is important to encourage an awareness of what has been learnt, how they felt, and what they can do to build upon the experience (Epstein, 2003). Reflection for adolescents can be challenging and therefore structured reflections are encouraged to ensure players are able to learn from their pressure experiences and actions (Epstein, 2003). Every player across ages 11-18 years had access to an online player management application (PMA). This provided the means for both players and coaches to share feedback on competition and training. A structured reflective section, specific to the management of pressure, was added to the PMA that presented the reflective diary.

The questions within the reflective diary encouraged players to reflect upon the CB workshops content and its application (Kato, 2012). For example, players were asked to re-call a specific moment of pressure from their most recent game (knowledge), their perception of their cognitive and somatic responses during this pressure moment (goodness of fit), the strategies they could employ if they were to have that moment repeated (coping variation). Example questions that guided reflection include: 'Describe a moment in the game where it was important for you to perform at your best' and 'take a minute to replay this moment in your mind, what did you think and how did you feel?' As shown in Table 1, adherence to completing the reflective diary was lower across the older age-groups (15-18 years).

[Table 1. Number of players participating across A-B-A conditions: Place here]

Post Intervention Interviews

One week after the 12-week follow up PT, 16 players (see participant section) were selected for individual interview. All interviews took place within a private room in the academy grounds. A semi-structured interview guide was developed, which was informed by existing literature on pressure training (e.g., Bell et al., 2013), coping (Kato, 2012; Lazarus, 1999), and factors influencing performance under pressure (Fletcher & Sarkar, 2012). Interviews examined intervention satisfaction, intervention effects and intervention importance (Page & Thelwell, 2013).

Interviews began with introductory questions to initiate discussion and preface the topic (e.g., Could you tell me a little bit about your experience of performing under pressure?). Players were then asked about the perceived importance of being able to perform under pressure (e.g., How important is it for you to be able to perform under pressure?). Assessing the significance of being able to perform under pressure would establish if a coping

skills intervention would be of importance and congruent with the goals of the player (Page & Thelwell, 2013). Following this, players were asked to describe their experiences of PT (e.g., How important was it for you to perform in the PT? Could you describe to me what you think pressure was?). For those participating within the CB workshops and reflective diaries players were asked about their experiences of, and outcomes following participation (e.g., Did CB workshops and reflective practice help you to prepare to perform under pressure? Why was this/ wasn't this helpful?). By capturing players' experiences with the PT, CB workshops and reflection, the researchers are able to establish whether the treatment procedures were acceptable and effective (Page & Thelwell, 2013). Finally, players were asked for recommendations to enhance their intervention experience and support performing optimally under pressure (e.g., what could have been done differently to enhance your pressure intervention experience?). A conversational tone was used to create a natural flow of discussion and the players were encouraged to elaborate unreservedly on their experiences of the intervention and/or pressure task (Patton, 2002). Probes were used to stimulate elaboration and clarification (Patton, 2002). All interviews were conducted by the lead researcher and lasted between 10 and 15 minutes.

Ethical considerations

A researcher's primary responsibility is to protect participants from physical and mental harm during the investigation and not be exposed to risks greater than or additional to those encountered in their normal lifestyle. There has been contention that the fear of the negative emotional and motivational consequences that may be associated with PT could impact player well-being (Bell et al., 2013). However, PT is intended to replicate the pressures of elite sport that players will naturally be exposed to during performance. Subsequently, one may argue that it is unethical to not prepare players to deal with the pressures they will face. In research involving adolescents, caution should be exercised when discussing PT

results with parents and coaches. There is need to emphasise the developmental purpose of the intervention and remind all that it will not be used to inform contractual decisions.

Data Analysis

Quantitative Analysis. Cross-tabulation with chi-square analysis was used to examine players made better decisions or performed better following PT or CB workshops and reflective diary intervention (A-B). Test-retest differences were calculated giving a range of scores from -3 to +3. Due to attrition at follow up, chi-square analysis was conducted across experimental groups from baseline to intervention (A-B) only. The frequency of players scoring in the categories for above expectation, at expectation and below expectation with respect to both decision-making and execution of skill across age groups was used.

Frequency distribution was also used across A-B-A to show percentage change in player's baseline and follow up performance scores between age-groups. Thus, the percentage shows a positive change towards being above expectation (a positive percentage) or a negative change towards below expectation (a negative percentage).

Qualitative Analysis. Interviews were audio recorded and transcribed verbatim. NVivo-2 (Thousand Oaks, CA, USA, 12 Pro) was used to facilitate analysis. Thematic analysis can be an adaptable and flexible methodology allowing the researchers to utilise a pragmatic position for the detection, analysis, and reporting of themes in data (Braun & Clarke, 2006). Deductive thematic analysis (TA) was used to identify, organise, evaluate, and report patterns within the data (Clarke & Braun, 2013). A pool of items relevant to known incentives that induce pressure within academy soccer (Kent et al., 2020) were used to identify and organize perceived pressure during PT. These included the following; presence of competition, time, presence of others, tangible rewards and performance lifestyle, self-orientated and public-self-consciousness. The presence or absence of these variables would be used to evaluate whether PT induced performance pressure. Factors known to be protective of performance

under pressure were used to examine intervention effectiveness (including Kent et al., 2020; Fletcher & Sarkar, 2012). This included the effects of the intervention on motivation, confidence, focus, and perceived social support.

The complexity of the social world is a central aspect of qualitative research and no standardised procedure can guarantee true interpretations and valid theoretical inferences (Ronkainen & Wiltshire, 2019). Therefore, the focus on the validity and rigor of the analysis was not in a 'list-like' procedure but rather consideration to how the author has answered key questions throughout their analysis that may pose (descriptive, interpretive and theoretical) threats to validity.

The lead author conducted the focus groups and also transcribed transcripts verbatim to allow and enhance descriptive validity through familiarisation with the data and notes being made with regards to anything that grabbed the lead author's attention during the interview process (e.g., body language). Transcripts were then imported into NVivo-2 (Thousand Oaks, CA, USA, 12 Pro) where initial codes were identified from the data set that were of relevance to the presence of pressure during PT and intervention effectiveness. Following initial coding, the process of theme development required the grouping of codes to identify 'higher-level' patterns that involved identifying ways of grouping codes together around a meaning or concept that they all shared. Deductive analysis was then used to identify themes aligned to the presence of pressure and the development of psychological factors known to be protective of performance under pressure. Themes could then be refined and reviewed to ensure identifiable distinctions between themes, and that sub-themes were appropriately condensed (Stage Four). Where appropriate, subthemes within descriptive themes were generated to identify notable, distinct patterns within a theme. For example, 'facilitate the practice of psychological strategies' and 'understanding helpful thoughts' came under the descriptive theme of 'Meta-cognition.' Ontological plausibility during this stage

was important to ensure that codes accurately underpinned features of the phenomena that it is intended to describe, explain but also engage in explaining why those experiences may or may not occur. This was achieved by themes being reviewed to ensure they formed a clear pattern, and best reflected the meanings within the complete data set and theory. Irrespective on the view of rigor and quality, both Smith and McGannon (2018) and Ronkainen and Wiltshire (2019) discuss the use of 'critical friends.' The second co-author acted as a 'critical friend' to present the themes and allow the lead author to engage in critical dialogue and reflect upon and explore alternative explanations and interpretations in relation to the data. This critical friend also enabled a process of critical dialogue to take place regarding theme construction (Smith & McGannon, 2018). The role of the critical friend was utilised to 'not to "agree" or achieve consensus, rather to offer critical feedback and encourage reflexivity. The different perspectives offered by the critical friend increased the trustworthiness of the data due to the unpacking and challenging of the interpretations made by the researcher as themes were constructed. By engaging in conversation with the co-author allowed for the lead author to reflect on key questions of descriptive, interpretive and theoretical validity (Ronkainen & Wiltshire, 2019). These criteria included: topic worthiness; the substantive contribution of the work to developing an understanding of intervention effectiveness and future developments (Ronkainen & Wiltshire, 2019). The coding framework and construction of codes and themes was finalized. To demonstrate that findings are grounded in the evidence the use of player quotes and excerpts that captured the meaning of the themes were selected and reported (Levitt et al., 2018).

Results

The mixed methods reporting standards were used to structure and guide the presentation and inclusion of information within the results of this study (Levitt et al., 2018). Performance data was quantitatively analyzed across A-B-A conditions to examine if an intervention comprising of PT, cognitive-behavioral workshops and reflective practice would enhance decision-making and skill execution to a greater extent than PT alone. Performance data was also analyzed to explore for any differences between age-groups. Qualitative data was used explore players experiences with the pressure intervention and its influence on their perceived ability to performance under pressure (Levitt et al., 2018).

Quantitative Results

A series of Chi-squared tests were conducted to identify if there was a relationship (a = .05) between the variables of intervention group and quality of performance on either skill or decision making (below expectation, to expectation and above expectation), and between the quality of performance and age. Chi-square results revealed a significant relationship between the intervention group and decision-making effectiveness under pressure (X^2 = 7.15; *df= 2*; p = .028). Chi-squared results also showed an association between decision making and age-groups (X^2 = 19.98; *df*= 6; p = .003). No relationship was observed between execution of skill and intervention group (X^2 = 1.57; *df= 2*; p = .457). However, there was a significant relationship between players' execution of skill and age-groups (X^2 = 18.33; *df= 6*; p = .005). This is explored in more detail below.

Decision-Making Across the Whole Sample

In order to establish if an intervention comprising PT, CB workshops and reflective practice would enhance decision-making to a greater extent than PT alone, percentage change from the combined sample on decision-making are presented. Between PT A-B, the frequency of decisions that were "below expectations" for both the PT only group and intervention group remained consistent. Players decision-making "to expectation" improved by 7% for the PT

intervention group. Finally, there was a minor reduction within the intervention group regarding the ability of players to perform “above expectations” (-5.8%).

Between PT B-A, no clear change was identified in players’ performance “below expectation”. Decision-making "to expectations” improved by 26% for the PT only group and by 8.7% for the intervention group. PT group (-17%) and the intervention group evidenced a reduction (-8%) in performance “above expectations”.

Execution of Skill Across the Whole Sample

This section presents the combined results of execution of skill across the whole sample to examine whether an intervention comprising PT, CB workshops and reflective practice would enhance execution of skill to a greater extent than PT training alone. Between PT A-B, results of players’ performance “below expectations” marginally increased for the intervention group (5.5%). Execution of skills “to expectation” and “above expectation” were consistent for both experimental groups.

Between PT B-A, results of players’ performance “below expectations” marginally decreased for the PT only group (-12%). The intervention group demonstrated a marginal improvement in execution of skill (9%) “to expectation”. The PT only group demonstrated a decline (-10%) in performance “above expectation”.

Decision-Making Between Age-Groups

Table 2 presents differences in decision-making between age-groups. Decision-making scores between A-B improved “above expectation” for intervention group players ages 11-12 (17%). Intervention group players across ages 15-16 (25%) and 17-18 (17%) performed “to expectation”. In contrast, players ages 13-14 within the PT only group enhanced their performance “above expectation” (28%). Across B-A, both intervention and PT only groups there was a large reduction in performances “above expectation”. It was observed that players had also decreased in their performances “to expectation” across ages 11-12; PT only group

(-23%) and intervention (-21%) and ages 13-14; PT only group (-23%) and intervention group (-15%).

[Place Table 2. Decision-making for players ages 11-18 across PT training A-B-A here]

Execution of Skill Between Age-Groups

As identified in Table 3, there was a notable increase in execution of skill errors for intervention group players ages 15-16 due to the increase in performance below expectation (45%). The execution of skills "above expectation" were notably improved by intervention group aged 17-18 (20%).

Between B-A, notable improvement in players performance "to expectation" for the PT only group in players ages 11-12 (39%), but also a notable decline in performances "above expectation" (-17%). In PT only, among players ages 13-14 it was observed that performance "to expectation" reduced (-39%) as did performance "above expectation" (-17%). In contrast, an improvement in PT only group players ages 15-16 was evidenced through a reduction in error (-15%) and improvement in skill to expectation (12%).

[Place Table 3. Execution of skill for players ages 11-18 across PT training A-B-A here]

Qualitative Results

Pressure Manipulation

For PT to be most effective it is important to expose individuals to meaningful and contextualized pressure (Kent et al., 2018). Player interviews were deductively coded in accordance with Kent et al. (2020) who identified the contextualized pressure incentives that should be present within soccer PT training.

All players interviewed perceived the presence of competition, use of tangible rewards or consequences and time as increasing pressure for example Player B, under 15 player discussed; “it had like a bottom three and top two (presence of competition)… it was like if you come bottom three in the league or anything like you have to do a punishment (tangible consequences)…you could not as many touches ‘cause like you take too long the person behind you’s going to catch you so like got to be sharp (time)”.

Players also discussed the presence of others; namely crowd noise and coaches’ and self-orientated incentives, for example Player C, under 13 discussed how “you could hear the crowd and stuff and everyone’s watching and all the coaches were watching you and judging you (presence of others), you’re under pressure like you really wanted to show how you can perform your very best. (self-orientated incentives)” However, some incentives were not discussed by players which are deemed to be important for inducing contextual pressure within soccer (Kent et al., 2020). All age groups did not discuss public-self-consciousness, the presence of senior coaches’ and parents. Physicality and opposition were not cited by any 17-18 aged players. Opposition was also not cited by any of the 15-16 aged players.

Perceived Intervention Effectiveness

Players perceived PT, CB workshops and reflective diaries as having beneficial effects on confidence, meta-cognitive skills and challenge appraisals.

Confidence

Players reported an increase in confidence to perform effectively under pressure following PT, CB workshops and reflective diaries. Specifically, Player C discussed how ”I am going into games believing in myself more… you can only take a few touches so this [PT] like helps to learn to do it quick so you know you can do it when you are under pressure in a game.” (Player C, age 15).

CB workshops and reflective diaries were perceived as increasing confidence ”it [workshops] teaches us…we know what you can do to cope with it [pressure]… and I believe now I could cope with it [pressure]” (Player B, age 13). Players noted that videos of senior players enhanced confidence through vicarious experiences; “we felt like we wasn’t alone cause even professionals deal with pressure as well, so I now feel more confident in myself and don’t doubt myself if I feel pressure” (Player A; age 17).

Meta-cognition

PT was described to facilitate the practice of psychological strategies (e.g., self-talk, thought stopping) and knowledge of their application when under pressure:

> I think it [pressure training] worked… during the derby games we had the same sort of noise…all the parents shouting and stuff like that, we didn’t let the pressure get to us …like in my pressure test I was sort of was listening to it and transferring into a positive energy. (Player A, age 14)

CB workshops were described to assist players understanding of pressure and of thoughts which contribute to helpful and unhelpful emotions (e.g., “I think it [workshops] helped…before I used to not be able to control my emotions as well … I remember to think positive and encourage teammates and not give as much negative information I just try to use that” (Player B, Age 11). Some players described how the reflective diary increased understanding of how negative reactions to errors and helped them develop coping strategies (e.g., “the box where it said ‘what would you do next time?…I think that helped me cos

> sometimes I just do things I’m not supposed to”) (Player C, age 13)

Challenge Appraisal

Challenge appraisal referred to players viewing pressure moments more favorably, controllable and as an opportunity for growth (Blasovich, 2008). CB workshops were perceived to develop understanding of appraisal and controllability (e.g., increasing effort) of

pressure situations (e.g., “see pressure as a positive …like how we should think about it [pressure] and what we can do to help dealing with it” (Player C, Age 14).

PT enabled players to practice and refine appraisal of pressure as challenging, rather than threatening:

> I think the pressure testing helped me a lot…it made me realise in the games I should work harder and uplift my game… not just ‘oh I don’t want to do this because it’s too hard (Player B, age 12).

No Perceived Benefits

It is important to highlight that some players did not perceive any perceived benefits or PT, CB workshops or reflective practice diaries. Some players discussed the CB workshops to be “a bit confusing*”* (Player C, age 11) or found the difficulty in transferring skills discussed within CB workshops to the competitive context because ”I don’t really think things like that [workshop content] come into my head when I’m playing a game.” (Player B, age 17)

A lack of perceived pressure during PT was reported by some individuals. One reason for a lack of perceived pressure was no perceived tangible reward or consequence (e.g. “‘I think the lads already knew that it [rewards and punishment] wasn't going to be carried out…you could tell by the coaches body language” (Player A, age 17). A lack of an audience was also discussed to not evoke meaningful pressure so “it just felt like a normal training session really…so I don’t think it really helped me deal with pressure that much.” (Player D, age 16).

Discussion

This study designed a contextual and theoretically underpinned pressure intervention within academy soccer. The intervention served opportunity for adolescents to practice coping through pressure training. Alongside, CB workshops and reflective practice diaries were incorporated to examine if this may evidence additional benefits to pressure performance.

The results of the present study lend partial support for the research hypothesis that participation in PT, CB workshops and reflective diaries enhance decision-making and execution of skill more significantly than PT alone. Post intervention interviews have also provided additional social validation to enhance the understanding of intervention effectiveness and process (Page & Thelwell, 2013).

A significant difference between groups was observed for decision-making, whereby all age-groups maintained or enhanced their decision-making under pressure across PT from baseline to six-week follow up. The intervention was particularly effective for intervention group players aged 11-12 who enhanced their decision-making performances above expectation. The development of metacognition was discussed within the post intervention interviews and captured how players, mainly ages 11-14 perceived that CB workshops and reflective practice assisted in the ability to understand thoughts, appraise thoughts adaptively and maintain attentional control for optimal decision-making. However, some players did not perceive the CB workshops as beneficial and had no involvement at all within the structured self-reflection, particularly across age group 17-18. Although engagement within CB workshops emphasized the importance of reflective practice merely asking individuals to engage in CB workshops and adopt reflective practice is unlikely to help them engage in an effective experiential learning process (Cropley et al., 2010). As reflection can be difficult, its value may not be understood or appreciated if perceived to be boring or some players may have had a reluctance to disclose unsuccessful moments for fear of revealing some character weakness that they believe will harm their professional prospects (Porcellato & Knowles, 2013).

Execution of skill appeared to be maintained or enhanced across age-groups, except for players ages 15-16 who performed worse across PT A-B. The intervention was particularly helpful for ages 13-14 and 17-18 who improved in performances above

expectations. The variation in results across age-groups could be explained by some players who discussed how taking part in the intervention or PT enhanced confidence which can minimize negative reactions to poor decisions (Dixon et al., 2017). Subsequently, any inefficient decision-making processing could have be responded with an increased effort in their execution of skill. Alternatively, the lack of perceived importance to perform within the PT could have explained the no benefits discussed by players but an increase in quantitative skill due to players' attempting the execution of superior skill to gain more points without fear of repercussions. Pressure manipulation could also underpin the large reduction in decision-making and execution of skill above expectation was captured across B-A for both intervention and PT only groups. Within social validation interviews PT did initially generate performance importance, but repetition of the same PT task was discussed by some players to reduce the importance and investment of effort. Given that subjective appraisals of pressure can be influenced by unpredictability and novelty (Thatcher & Day, 2008) repetition of the same soccer drill could have undermined intervention fidelity. Additionally, players across age groups 17-18 reported the lack of coaches' administering consequences and rewards which could have also undermined the generation of pressure and subsequently, the soccer drill was actually developing technical skill rather than coping (Low et al., 2020).

Applied methodological implications for pressure interventions

In compliance with standards in psychological intervention guidelines (e.g. Consolidated Standards of Reporting Trials (CONSORT) (Grant et al., 2013) it is also important to to provide details about contextual constraints that may have threatened the fidelity of intervention delivery (Grant et al., 2013). First, a lack of perceived pressure pertaining to the presence of parents and senior coaches was discussed across all age groups. Although educational workshops were provided to parents with the aim of the intervention, there was potentially a lack of awareness on how they may support the intervention through

their presence. Coaching behavior and a lack of coaching co-operation may have also inhibited the manipulation of pressure, particularly within the age group of players 17-18. Players over age 16 are signed on a two-year soccer apprenticeship and begin to see the prospects of a professional career as they begin to play within a play a competitive league structure, in which the other age-groups do not (Mitchell et al., 2014). Both coaches' within the 17-18 age group were also new to this role during the implementation of the intervention and subsequently not involved within the design. This could explain why coaches for the 16-age group re-arranged the PT and discouraged the use of tangible rewards and consequences due to the perceived disruption this may have on their match preparation. Such behavior was noted by players within age group 17-18 and subsequently could have influenced the importance players placed upon the PT, CB workshops and reflective practice. The lack of perceived importance may have also influenced intervention effectiveness through placebo and nocebo effects (Beedie et al., 2019). The placebo effect is a desirable outcome resulting from a person's expected and/or learned response to a treatment or situation (Beedie et al., 2019). Placebo effects may have enhanced confidence in performing under pressure due to the attributed beliefs that partaking in PT, CB workshop or reflective practice may enhance coping. For players who did not perceive the PT relevant (e.g., beliefs), important (e.g., goals), or to have meaningful consequences (e.g., punishment) would have not reported such change in self-efficacy to perform under pressure.

Future research

A key strength of this paper was the use of an individualized assessment that sought to quantitatively measure and qualitatively evaluate the performance of players under pressure through known performance components decision-making and skill execution. Another key strength to this research was the compliance with standards in psychological intervention guidelines (e.g., Consolidated Standards of Reporting Trials (CONSORT). However, by

following such guidelines the researcher has clearly documented the number of contextual constraints to intervention delivery. Researchers are now in a better position to anticipate and be better protected against such threats to intervention fidelity to ensure effective application of an intervention. For instance, the changes of coaching and senior staff that may occur within elite soccer illuminate the implications this may have on both inter-rater reliability and transformational delivery. This study did attempt to draw on the recommendations of Bell et al. (2013) by delivering the pressure intervention in a multidisciplinary and transformational manner. However, coaching behaviors observed, and the lack of attendance from parents and senior coaches evidenced that this was not necessarily achieved. Future research should seek to include the development and evaluation a brief training program for coaches' that aims to increase transformational delivery and inter-rater reliability to enhance reliability and intervention fidelity (Sattler et al., 2015). With the low participation rate in reflective practice across age groups 15-18, coaches' should also be advised on the importance of reflective practice to highlight the value to their players and ensure it is adequately promoted alongside PT and CB workshops (Brown & Fletcher, 2017).

Future interventions could also provide parents with an updated schedule and further education on their role in PT. For parents that are unable to attend, pressure sessions could be recorded so the incentive for players to perform knowing the parent will re-watch the testing could be induced. The lack of presence of senior coaches was also a logistical challenge where for some age-groups PT clashed with training sessions and games and therefore not possible for senior coaches to attend. It is important in the planning of pressure interventions to ensure the senior coaches are able to be present.

The intervention was also designed with scientific rigour in mind, but repetition of the same PT may have created a dose effect (Oudejans & Pijper, 2010). Dosage also refers to the number intervention sessions (CB workshops and reflective practice tasks), there is some

evidence that higher doses produce more optimal results in certain intervention contexts (e.g., Hofmann & Gomez, 2017). Future pressure interventions should also create different contextual PT tasks to reduce predictability and novelty of the soccer task and implement the intervention over different time periods to determine both minimum and maximum amounts of PT and CB workshops. It would also be recommended that social validity interviews to be undertaken in as many phases of the intervention design as possible (Page & Thelwell, 2013). What this could do is identify dosage effects and any contextual constraints at the beginning of the intervention (e.g. intervention understanding, coaches' importance) which will enable the researcher to attempt to address any factors that could impact intervention fidelity as soon as possible.

Conclusion

Overall, the findings suggest that PT, CB interventions and reflective practice in combination could assist academy players to evaluate highly pressurized competition more adaptively, encouraging more favorable emotional and attentional responses to facilitate performance under pressure. Based on the results of the present study, researchers and applied practitioners are encouraged to investigate further the use of PT and CB workshops and reflective practice diaries in academy soccer training contexts. Whilst this research may present limitations in terms of experimental control, it presents a strength in terms of ensuring that researchers explore different ways of effectively operating within organisations and gaining organisational support for intervention development across all age-groups.

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Table 1. Number of players participating across A-B-A pressure task conditions

	Number of players participating across A-B-A pressure task conditions												
	A					B				A			
Player age-groups	11-12	13-14	15-16	17-18		11-12	13-14	15-16	17-18	11-12	13-14	15-16	17-18
	26	23	21	12	Intervention group	9	11	6	3	8	3	4	0
					Reflective diary completion	6/9	6/11	2/6	0/3	4/9	2/3	1/4	0
					Pressure training only	11	6	13	9	1	6	4	0

Table 2. Decision-making for players ages 11-18 across pressure task A-B-A

Decision-Making					
Pressure task A-B				Pressure task B-A	
Age		Pressure training Only	Intervention	Pressure training Only	Intervention
11-12	Deteriorated	-3%	4%	-15%	2%
	To expectation	2%	-21%	38%	19%
	Above Expectation	1%	17%	-23%	-21%
13-14	Deteriorated	-5%	-7%	3%	-1%
	To expectation	-23%	9%	20%	17%
	Above Expectation	28%	-2%	-23%	-15%
15-16	Deteriorated	-5%	3%	16%	-3%
	To expectation	11%	25%	21%	-10%
	Above Expectation	-6%	-28%	-6%	11%
17-18	Deteriorated	-4%	-7%	-	-
	To expectation	21%	17%	-	-
	Above Expectation	-17%	-10%	-	-

Table 3. Execution of skill for players ages 11-18 across pressure task A-B-A

Execution of skill					
Pressure task A-B				Pressure task B-A	
Age		Pressure task Only	Intervention	Pressure task Only	Intervention
11-12	Deteriorated	7%	9%	-22%	-3%
	To expectation	-13%	-1%	39%	-3%
	Above Expectation	6%	-8%	-17%	6%
13-14	Deteriorated	-4%	1%	0%	-10%
	To expectation	5%	-7%	-39%	5%
	Above Expectation	-2%	6%	-17%	5%
15-16	Deteriorated	-5%	45%	-15%	22%
	To expectation	11%	-15%	12%	25%
	Above Expectation	-6%	-5%	3%	-13%
17-18	Deteriorated	-11%	-33%	-	-
	To expectation	11%	20%	-	-
	Above Expectation	0%	13%	-	-