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The role and creation of pressure in training: Perspectives of athletes and sport psychologists

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ABSTRACT

To prepare athletes for psychological pressure of competition, pressure training (PT) systematically applies pressure on athletes during training. This study explored how to create pressure for PT and how PT improves performance in competition. Specifically, it aimed to explore the views of sport psychologists and athletes on: (a) common properties of effective pressure manipulations, and (b) PT's mechanisms for improving performance under pressure. Eight sport psychologists and eight international-level athletes participated in semi-structured interviews. Thematic analysis identified three properties of effective pressure manipulations: (a) extending the reach of consequences, (b) simulating psychological demands of competition, and (c) approximating, but not replicating, intensity of competition pressure. Analysis also produced three themes that described how PT benefits performance: (a) learn and practice coping skills, (b) "change the relationship" with pressure, and (c) increase the quality of training. Understanding these benefits can help communicate to athletes why they should participate in PT.

Lay summary: Pressure in training can help athletes adjust to pressure in competition, and this study found that practitioners can create pressure by applying psychological demands and consequences that have an extended impact on athletes. Athletes can then practice coping skills and learn that pressure does not have to hurt performance.

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APPLIED IMPLICATIONS

- To create pressure in training, practitioners should implement pressure manipulations that increase the sense of importance to perform well.
- These pressure manipulations include consequences that have extended reach or demands that emphasize psychological challenges of competition.
- PT helps athletes train mental skills learned in workshops or one-on-one consulting.

From taking a penalty kick in soccer to competing at an international competition, athletes can experience psychological pressure in many situations. This pressure is defined

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by athletes' perceptions of increased importance to perform well and can lead to choking, in which performance decreases despite effort (Baumeister, 1984). An intervention to help athletes perform in these situations is pressure training (PT), which strategically increases pressure on athletes while they practice their sport (Stoker et al., 2016). Researchers have used different names for PT, such as "pressure inurement training," "anxiety training," or "acclimatization training," but their interventions all attempted to improve performance under pressure by increasing pressure in training (Beseler et al., 2016; Oudejans & Pijpers, 2009; van Rens et al., 2021). Importantly, experiences of pressure (e.g., anxiety and self-consciousness) are distinct from distraction, and Gröpel and Mesagno (2019) found that PT increased performance under pressure whereas distraction training did not.

PT matches or exceeds other interventions in the magnitude and consistency of their effects on performance. In Low et al.'s (2021) meta-analysis of PT interventions, the moderate magnitude of PT's effect (Hedges' $g = 0.67$) was similar to the effect that Brown and Fletcher (2017) found for other performance-enhancement interventions (Hedges' $g = 0.57$). Although the exact effect may vary across each individual study, all but one of the 14 included studies showed that PT improved performance to some extent. Similarly, Kent et al. (2018) reviewed different categories of interventions and found that all five PT studies enhanced performance whereas the other interventions (e.g., cognitive behavioral workshops) had mixed results. However, rather than replace these interventions that teach mental skills, PT can complement them by allowing athletes to practice those mental skills in environments that represent the mental demands of competition.

More research is still needed because, despite PT's effectiveness in experimental or training settings, there is only limited evidence that PT improves performance under pressure in competition (Kent et al., 2018). Recent interventions may have been too short in length to measure competitive performance and expect improvements, but longer interventions may require more than repeating the procedures of shorter ones. The level of pressure from some manipulations may fade over time (van Rens et al., 2021), and other manipulations may not increase pressure for some individuals who do not find them meaningful or incentivizing (Kent et al., 2018). Thus, practitioners need versatility in how they create pressure. Understanding how and why effective pressure manipulations create pressure could provide such versatility. Although pressure is central to PT, little research has guided practitioners in creating pressure in applied settings.

Early PT studies created pressure but focused on evaluating that pressure's effects. Manipulations included monetary rewards (e.g., Oudejans & Pijpers, 2009), judgment from a coach (e.g., Alder et al., 2016), and posting results in the team's changing room (e.g., Beseler et al., 2016). Manipulation checks indicated that pressure increased, but studies did not thoroughly explain how pressure manipulations were chosen and developed. Combining manipulations in a single study also obscured each one's contribution to the increased pressure. These studies aimed to establish whether training under pressure has the potential to improve performance under pressure, so researchers did not necessarily claim that their pressure manipulations would generalize beyond their study. For example, some pressure manipulations, such as monetary rewards, would not be practical for a team with limited resources. Interventions did still improve performance

and therefore supported subsequent research to examine implementing PT with athletes in their existing training.

Applied interventions have continued to focus on PT's effects, but few have provided rationale for their pressure manipulations that produced those effects. One exception is Bell et al.'s (2013) study that punished cricketers if they did not meet standards in batting drills. The intervention was grounded in systematic desensitization training, which exposes individuals to stressors to overcome phobias and anxieties. The threat of punishments allowed the players to practice coping with professional cricket's threatening environment in which mistakes could be costly to one's career. However, no subsequent studies have further explored the use of punishments or similarly explained their pressure manipulations. van Rens et al. (2021) had cricketers choose which forfeits to use because such autonomy could increase motivation during the training, but allowing players to choose the forfeits assumed that the players knew sources of pressure for themselves and feasible ways of simulating those sources. The absence of manipulation checks left the effectiveness of the chosen forfeits unclear. Providing stronger rationale for pressure manipulations could help practitioners translate interventions to other sports and populations.

Recognizing the lack of attention to the systematic creation of pressure, Stoker et al. (2016) interviewed coaches who had used PT. The resulting framework classified pressure manipulations into consequences and demands. Consequences included rewards, forfeits, or judgment. Demands increased the difficulty to perform, such as by adding noise to the surroundings or rules to follow during a drill. In research that tested this framework, consequences or a combination of consequences and demands created pressure whereas demands alone did not (Stoker et al., 2017, 2019).

Because the category of consequences still encompasses many potential pressure manipulations and combinations of them, more guidance is needed to develop ones that successfully create pressure. Forfeits have included cleaning changing rooms (Bell et al., 2013), running sprints (Kegelaers et al., 2021), and not starting the team's next game (Kent et al., 2021). Evaluation by coaches (e.g., Alder et al., 2016; Beseler et al., 2016) and leaderboards that display performance scores (Kent et al., 2021) have been used to produce a sense of judgment. Differences between individuals, sports, and levels of performance could mean that one of these consequences might work in one context but not in another. Therefore, practitioners may benefit most from learning how to adapt, rather than duplicate, a previously-used pressure manipulation to fit their particular sport setting.

Numerous conceptualizations of stress exist, but Lazarus and Folkman's (1984) transactional approach is one that could guide creating pressure. An individual's level of stress depends on one's appraisal of the current situation (Lazarus & Folkman, 1984), and individual differences mean that any given event cannot be assumed to be a "stressor" for everyone. Alternatively, there may be more value in identifying the properties of stressors that prompt individuals to appraise them as stressful (e.g., novelty or amiguity; Lazarus & Folkman, 1984). Thatcher and Day (2008) applied this conceptualization to sport and suggested that practitioners can help athletes reduce stress by reducing the presence of the properties in situations leading up to competition. For PT, Fletcher and Arnold (2021) have suggested that practitioners can instead manipulate properties of stressors to intentionally create pressure. There are many possible pressure manipulations for PT, but effective ones might share certain properties. Practitioners could aim to create manipulations that have one or more of these properties.

Unpleasantness may seem like an obvious property of effective pressure manipulations, but it alone might not be sufficient for raising pressure. If the unpleasantness of a consequence is too mild or temporary, the threat of it might not create the increased importance that defines pressure (Baumeister, 1984). Practitioners also cannot always rely on increasing the degree of unpleasantness (e.g., making athletes run more and more sprints) because of the risk to athletes' wellbeing (cf., van Rens et al., 2021). Considering that Thatcher and Day (2008) found support for as many as 10 properties of stressful events, effective pressure manipulations likely have more properties than only unpleasantness.

Practitioners could apply knowledge of properties when designing and preparing PT. In Fletcher and Arnold's (2021) multi-phased approach to PT, practitioners work with coaches to tailor pressure to the specific context, such as the sport or level of competition. Properties could provide practitioners with a wider vocabulary for guiding discussions on creating pressure. As coaches contribute knowledge of the sport and athletes, practitioners can then identify specific consequences and demands that have the properties that would likely increase pressure.

In addition to creating pressure, practitioners and coaches might increase PT's effectiveness if they understand how PT improves performance. In Fletcher and Arnold's (2021) approach, preparation includes educating athletes and significant others (e.g., parents) about the purpose and procedures of PT. Explaining the role of PT might generate buy-in because it is difficult to expect athletes to embrace a new way of training if practitioners themselves cannot explain how it achieves its results. Furthermore, transparency about PT's role could communicate the supportive culture that Fletcher and Arnold (2021) recommend should balance the challenge of PT. If athletes realize that PT is a form of training, not punishment, they may more likely view it as a challenge and opportunity to perform.

Despite potential benefits of understanding the mechanisms through which PT helps athletes perform, the mechanisms are still unclear (e.g., behaviors or psychological constructs that are developed). Several studies have explored the question, but they have had little consensus. Oudejans and Pijpers (2009, 2010) suggested processing efficiency theory as one explanation for improved performance. This theory states that athletes naturally increase effort to maintain performance, and PT teaches them how to direct this effort toward productive coping strategies. Other studies have measured psychological constructs related to coping, but they have each measured different ones. Kegelaers et al. (2021) measured resilience whereas van Rens et al. (2021) measured emotion regulation, challenge and threat states, and confidence. Although multiple mechanisms could exist, studies are unlikely to narrow down the possibilities if each study tests a different one.

To address the gaps in the literature outlined above, the current study's purpose was to explore sport psychologists and athletes' views on: (a) common properties of effective pressure manipulations, and (b) PT's mechanisms for improving performance under pressure in competition.

Method

Philosophical approach

This study followed a pragmatic approach to research because the study attempted to identify useful information that practitioners can apply when conducting PT. Rather

than pursue underlying truths about reality, pragmatism focuses on providing solutions to practical problems (Giacobbi et al., 2005). Pragmatic methods are driven by the research question and chosen to provide a "practical level of truth" that can be judged on its usefulness, and dialogue among stakeholders and the scientific community helps test this "truth" (Giacobbi et al., 2005, p. 22). The current study advanced the dialogue on PT by adding the perspectives of sport psychologists and athletes to Stoker et al.'s (2016) study of coaches.

Participants

Participants were eight sport psychologists (4 male, 4 female) and eight international-level athletes (3 male, 5 female). They were purposefully sampled to ensure that they had conducted or participated in PT. Two factors influenced the sample size (8 athletes, 8 sport psychologists). First, the sample was subject to pragmatic concerns (i.e., time and resources), as is common in most research (Braun & Clarke, 2019b). Second, after preliminary analysis, the researchers determined that the data collected provided enough insight to construct deep and nuanced themes. Although data saturation is a common benchmark for sample size in qualitative research, Braun and Clarke (2019b) have questioned the possibility for saturation in thematic analysis because "there is always the potential for new understandings or insights" (p. 10). Data collection and analysis were instead aimed at constructing themes that could be useful to practitioners and coaches.

For psychologists to be included, they needed to have experience conducting PT with international-level athletes or junior/podium athletes preparing for future international competitions. They also needed to be chartered as a sport psychologist by the British Psychological Society and registered with the Health & Care Professions Council, the regulatory professional body for practitioners in the UK. The psychologists had conducted their PT in various individual and team sports. Ages ranged from 31 to 40 years ($M = 34.8$ years; $SD = 3.8$). Experience as a sport psychologist ranged from six to 17 years ($M = 9.3$ years; $SD = 3.8$).

For athletes to be included, they needed to have: (a) trained under pressure that sport psychologists and/or coaches had intentionally created, and (b) competed at the international-level. Each athlete had competed in major international competition, including Olympics, World Championships, or Paralympics. One athlete had retired from sport two years before data collection, and the rest were still active. They competed in various para and able-bodied sports including table tennis, boxing, shooting, basketball, trampoline, archery, gymnastics, and taekwondo. Ages ranged from 19 to 47 ($M = 28.5$ years; $SD = 8.7$). Experience in their sport ranged from seven to 20 years ($M = 11.5$ years; $SD = 4.1$).

The sample's variation in sports and roles (sport psychologist or athlete) offered advantages for achieving the study's purposes. When variation is maximized, themes can be especially notable because they represent common patterns found across a diverse sample (Patton, 2015). The differences in participants' specific examples of PT encouraged researchers to analyze data beyond descriptive themes in favor of latent or implicit themes that would better represent underlying properties and mechanisms of PT (Braun & Clarke, 2021). The sampling of both athletes and sport psychologists could provide balanced data with perspectives of two of the key stakeholders for PT.

Psychologists were anticipated to have observations of athletes' responses to PT and have insight into developing pressure manipulations. Meanwhile, athletes are the ones who participate in PT, so they may have had experiences that are not visible to psychologists.

Procedure

The research was approved by a university ethics committee. Through personal contacts, the researchers identified eight sport psychologists known to have conducted PT. Although not all used the term "pressure training," all had intentionally increased pressure on athletes during training to improve the athletes' performance in competition. Athletes were identified through the researchers' contacts or through snowball sampling by asking the sport psychologists to recommend athletes who had participated in PT. A request for an interview was sent to each participant via e-mail or text message. Each sport psychologist and athlete agreed to participate. Informed consent was obtained, and each individual participated in a one-on-one semi-structured interview with the first author via Skype or Zoom.

An interview guide was developed for sport psychologists, and another one was developed for athletes. After the first author developed an initial draft of each guide, the coauthors reviewed it and provided feedback on its length and content of questions. Multiple drafts of each guide were created before they were finalized. The final guide for psychologists consisted of two sections. The first asked the psychologists about their intentional creation of pressure during PT (e.g., "What methods have you used to intentionally increase pressure during training?"). These questions focused on the demands and consequences used to create pressure and their properties that increased pressure. The second section focused on the role of PT in preparing athletes for competition (e.g., "How has pressure training impacted the way athletes perform in competition?").

The athlete interview guide asked about athletes' first-hand experience of participating in PT. The guide consisted of two sections that resembled the interview guide for psychologists. The first section asked athletes to describe their PT sessions, such as methods used to create pressure. The next section focused on effects of PT (e.g., "How has PT helped you cope with pressure, if at all?"). Questions were open-ended to provide participants with flexibility to discuss the ideas that they felt were most relevant and to encourage participants to provide in-depth answers (Smith & Caddick, 2012). The semi-structured nature of interviews allowed the researcher to ask follow-up questions for the participants to elaborate on answers. An example was, "What is it about [these pressure manipulations] that increases pressure on athletes?" Interviews lasted 35–55 min. They were recorded and then transcribed verbatim by the first author. Names of participants were replaced with ID numbers, such as "A1" and "SP1".

Analysis

Reflexive thematic analysis of interview transcripts was conducted according to Braun and Clarke's (2012) guidelines. This method of analysis systematically identifies patterns across a data set, which aligns with the study's aim to find patterns among the sample's

varied experiences of PT. Compared to more complex methods (e.g., grounded theory), thematic analysis better aligned with pragmatism because results can be accessible to wider audiences, such as practitioners and coaches (Braun & Clarke, 2012). The first author conducted the initial analysis by first reading and re-reading each transcript to gain familiarity with the data. Next, he coded the transcripts. Segments of text that related to the research purpose were assigned codes that described the segments' meanings. Some codes were semantic (i.e., described what participants said) and helped identify what participants did in PT (e.g., "make athletes perform on demand"; Byrne, 2021). Other codes were latent (i.e., interpreted meaning or underlying ideas of what participants said), and these codes helped understand how and why participants made choices or had a certain experience.

The third phase of analysis involved reviewing the codes to find similarities, and themes were then constructed to reflect patterns in the data. Next, these themes were reviewed to assess their quality. To ensure themes were supported by the data, they were organized on a Word document with their associated codes and text segments. Construction of themes depended more on their contribution to answering the research questions than their number of codes or text segments (Byrne, 2021). Related themes were collapsed into one, and themes that did not answer the research question were discarded. Although each analytical step served a distinct purpose, analysis was not a linear process (Byrne, 2021). Instead, coding and theming were frequently repeated and refined throughout analysis.

Thematic analysis was also a reflexive process. Constructing themes involved frequently reflecting on assumptions and aims of the research when making analytical decisions (Braun & Clarke, 2019a; Trainor & Bundon, 2021). In a reflexive journal (Culver et al., 2012), the first author wrote memos after conducting and coding interviews to record questions and observations about the data. In a memo after initially coding the first two interviews, one example of a note was: "Value of discussing demands and consequences? Repetitive of Stoker et al.'s (2016) study on coaches?" The research team discussed this question of whether the initial analysis merely rehashed previous findings, and a subsequent memo recorded the decision to "either extend or find alternatives to Stoker et al.'s framework." This decision led to an effort to generate themes that described "a core, shared meaning" between data (e.g., "consequences with 'extended reach'") rather than mere categories (e.g., "consequences"; Braun & Clarke, 2016, p. 740). Categories, or general dimensions, did help to organize themes, but it was the themes themselves that met the study's purposes by answering *how* consequences and demands created pressure or helped performance.

To enhance trustworthiness of the analysis, the second and third authors also reviewed the initial analysis as "critical friends" (Smith & McGannon, 2018). They read and analyzed one of the transcripts to share their approach to coding and theming, and they also reviewed the themes presented by the first author. Researchers play an active role in constructing themes (Braun & Clarke, 2019a), and the different perspectives from critical friends helped the first author see patterns and alternative interpretations of data. The first author and critical friends met several times and produced multiple iterations of analysis. The intent was not to reach total agreement but to enhance the defensibility of findings and their relevance to the research purpose (Smith & McGannon, 2018).

For example, an initial theme described the "permanence" of consequences, but critical friends' questioning of this language led to the final theme of "extending the reach of consequences" that better communicated the theme's meaning.

Findings

Thematic analysis generated two general dimensions: (a) properties of effective pressure manipulations, and (b) benefits for athletes' performance. Table 1 displays each dimension's three themes. These themes were supported by data from both athletes and psychologists. Raw data quotes are presented below to clarify the meaning of themes and allow readers to interpret data independently. The data that support the findings of this study are available upon request from the corresponding author.

Properties of effective pressure manipulations

Although participants described different rewards, forfeits, demands or other sources of pressure, many of these pressure manipulations shared common properties. These properties are described by three themes: (a) extending the reach of consequences, (b) simulating psychological demands of competition, and (c) approximating, but not replicating, intensity of competition pressure.

Extending the reach of consequences

Data from a majority of psychologists and half of the athletes supported this theme that described one way of creating the increased sense of importance that defines pressure. Sport psychologists did not necessarily rely on the intensity of consequences (i.e., severity of forfeits or value of rewards). Instead, pressure could be increased if consequences impacted athletes beyond a brief moment in time or affected more people than the

Table 1. General dimensions and themes from thematic analysis of interviews.

General dimension	Theme	Description
Properties of effective pressure manipulations	Extending the reach of consequences	Consequences that affected more individuals than the athlete practicing under pressure or consequences that prolonged a sense of judgment beyond a single practice or drill.
	Simulating psychological demands of competition	Demands were effective when they simulated *psychological* challenges of high-pressure situations.
	Approximating, but not replicating, intensity of competition pressure	Athletes still benefited from PT even though pressure was lower than pressure in competition.
Benefits for athletes' performance	Learn and practice coping skills	PT was an opportunity to develop coping skills for pressure in sport-specific settings.
	"Change the relationship" with pressure	Athletes learned to view pressure as a condition that they could accept and cope with.
	Increase quality of training	Athletes were more focused and gave more effort when they felt pressure to perform in training.

individual who was practicing under pressure at that moment. For example, performance could be monitored. SP4 described tracking each soccer player's success rate on penalty kicks throughout a training camp. Even if no other reward or forfeit was attached to it, "The sheer knowing and visibility of it is … quite a stressor and quite a pressure for some." This monitoring could remind athletes that performance in a given drill could continue to impact coaches' judgment of them over time, not just in that moment. Athletes might repeat a skill frequently over the course of a training session, but they could feel more pressure on each repetition if monitoring allowed coaches to remember or account for each athlete's performance even after a drill or session finished.

Sport psychologists also made monitoring visible. Leaderboards displayed each athlete's scores in drills and enabled comparisons with teammates, which increased competitiveness during training. Use of social media made performance visible to an even wider audience. When athletes did not perform up to standard in training, their consequence was sometimes to make a social media post that explained their performance. For A6, this forfeit was "the most pressureful." She explained, "I'm not one for social media, so … the mere idea of it, like, freaks me out. Like, having to post to the world that I failed in my target is just, like, the worst thing." Posts before practice could increase commitment to a training exercise in the first place:

> I've asked athletes, if they would put out a commitment to their Facebook followers or Twitter followers … to say, "Okay, on this training session, I'm now going to do this." And we might video [training] or they'll put an announcement after, and they would have committed to make a contribution to something if they don't make the task. So I think there's some really big opportunities through social media and that social presence that combine a bit of social judgment and actually athletes committing to what they're going to do, which is quite powerful. –SP6

If monitoring and visibility extended importance of performance beyond one moment in time, then consequences for teammates extended the importance beyond one individual. One athlete might be asked to perform, but his or her performance could result in a forfeit for teammates. SP7 attributed a corresponding increase in pressure to athletes' fear of letting their team down. While the nature of a given reward or punishment itself may not create pressure for the athlete, the idea of causing others to experience that consequence could increase the pressure. SP2 said:

> There's a lot of athletes in diving who love competing, so doing a "Right, we're doing a competition. Winner gets a coffee," they'd be like "Right, this is the best thing ever." And they won't actually have a pressure response that will hurt their performance. They'll just fly. Whereas … if you change the scenario of actually, "Yeah, there's a forfeit here for your friend," that might trigger them.

In short, extending the reach of consequences made judgment or forfeits more meaningful. A consequence on its own could be temporarily unpleasant (e.g., tiring or mildly embarrassing), but consequences with extended reach often kept attention on the athlete's performance. When a forfeit for teammates was at stake, an athlete had a chance to show teammates that they could count on him or her. Similarly, athletes might regularly face potential judgment from coaches and teammates, but monitoring performance and making it visible amplified perceptions of that judgment. While athletes could "get

through" a forfeit, extending the reach of consequences meant the consequences had implications directly related to the sport (e.g., selection), rather than just temporary unpleasantness.

As with any pressure manipulation, these consequences represent only one component of PT. Practitioners and coaches should also balance the challenge of PT with an environment that encourages athletes to learn from that challenge (Fletcher & Sarkar, 2016). Fletcher and Sarkar (2016) have also emphasized the gradual exposure to pressure, so the specific consequences that participants discussed (e.g., posting on social media) are not necessarily the first or only consequences that practitioners should use. In line with Fletcher and Arnold's (2021) approach to PT, psychologists stressed the importance of collaborating with athletes to agree on any consequences, such as posting on social media, before expecting athletes to participate in PT.

Simulating psychological demands of competition

Athletes and psychologists discussed demands that simulated the psychological conditions or challenges that athletes would face in competition. The physical surroundings and flow of a practice could be structured to resemble competition settings. SP5 arranged table tennis courts as "match courts" that resembled the set-up that players would see in competition. SP1 simulated the lead-up to a fight when preparing a boxer for a pressurized spar in training, including reminding the boxer about the spar early in the day, going over tactics, and having the boxer warm up properly. Other techniques included bringing in referees or judges to officiate during PT. Simulating competition settings could familiarize athletes with competition settings and seemed to signal the importance of the training session. However, these settings were not necessarily enough on their own to constitute PT. In diving, SP2 contrasted PT with "run-throughs," which simulated competition procedures (e.g., announcing the name of the diver) but without pressure manipulations.

Half of the psychologists and half of the athletes discussed how demands that directly targeted psychological aspects of competition complemented simulated performance settings. Competitiveness in several examples was increased by creating competition between teammates, simulating specific types of opponents (e.g., an aggressive and vocal player), and simulating high-pressure tactical situations. Increasing competitiveness within training could magnify both the level of challenge and athletes' motivation to win or perform their best. This competitiveness could be missing from some non-PT sessions, as A2 acknowledged: "Normally in sparring, it can be quite relaxed and [I] pretty much do what I want, because … I'm not taking it very serious." Competing against teammates could also increase the perceived importance of a consequence. A small reward could be even more desirable if teammates were also competing for it. SP6 said, "You know, even if it's just for a pound, that becomes the most important pound in the world if their mate has put it in the mix." Competitiveness and consequences seemed to interact to increase pressure: Neither the chance to win money nor the presence of teammates may have increased pressure as much as competing with those teammates for that money.

Sport psychologists also manipulated demands to add uncertainty, unfairness, or other uncontrollable factors that the athletes could not avoid or stop. SP4 observed

performance decline rapidly for female soccer players when teams for small-sided games were made unfair. When players were taken out of the game to disadvantage their team, "then there is just a desperation and then you get sloppy passing, you get sloppy decision making, you get frustration, you get irritability." Another way to accentuate uncontrollable factors was to manipulate the score of a match during training. SP5 conducted a table tennis drill in which players would draw a card to see how many points they needed to win, without knowing how many points their opponents needed. Because an opponent might be close to winning, this uncertainty resembled the end of a match with a close score in which "all of a sudden this perception of how important that point is goes massively up."

Another uncontrollable situation was when athletes had to perform on demand without advanced notice or multiple chances. Instead of letting BMX freestylers try and fail multiple times, SP8 would sometimes request that they "deliver that [trick] now and practice that ability to execute it at a specific point in time." Performing on demand resembled competition because athletes often do not have multiple chances to perform their best when competing. SP8 explained:

> When someone goes, "I want you to do that *now*, like warm up and ten minutes time we're going to ask you to do that trick on request," that then brings in an element of pressure doesn't it? Because all of a sudden … you've been asked to do something and you're going to get judged on—pass or fail—whether you do it.

Whether they were uncontrollable factors, performing on demand, or competitiveness, the demands did not just make a task more difficult in any way possible. They targeted situations and the ensuing psychological challenges that athletes would face in competition. If consequences seemed to increase the importance of the outcome of a drill, then demands seemed to increase the importance of executing physical skills or applying mental skills to achieve that outcome. For example, proper technique was more important if athletes had only one chance to complete a task, or the ability to focus was especially needed if they faced more uncontrollable factors than in a normal practice. Consequences and these demands were not mutually exclusive. Sport psychologists often combined pressure manipulations, requiring athletes to cope with demands during a drill while facing the threat of a consequence if they did not win or meet performance standards in the drill.

Approximating, but not replicating, intensity of competition pressure

Intensity referred to the amount of pressure that PT created during a given session, and some psychologists and athletes reported that the pressure in PT did not match the level of pressure of competition. True replication of competition often was not possible. A8 said, "You can't create it when you've got … 10,000 people watching and if you lose this fight, you don't make it to the European Championships." But true replication was not necessary. A8 added that PT "will give you, you know, the best possible chance of practicing your psychology strategy." SP4 further explained how athletes can still benefit:

> It's [competition's] always going to be slightly unique, but what you can do is understand, learn about, really deeply understand where the individual goes to under stress, what stress and pressure looks like for that individual, and then [do] capacity building to manage that response.

As this observation from SP4 suggested, athletes, psychologists, and/or coaches played an active role in learning from experiences during PT. Perfectly replicating competition pressure was less critical than having athletes practice the thinking and behaviors that would help them cope with that pressure. Approximation was also usually sufficient because building up to performance under pressure was a process. Psychologists were not attempting to inoculate athletes to the highest pressures possible all at once. The next section details *how* this process improved athletes' performance.

Benefits for athletes' performance

PT did not necessarily lower the amount of pressure that athletes feel in competition. A8 explained, "You're not going to step onto a competition area and then be like, 'Oh bloody hell, I've done three pressure situations last month, and now I just feel normal and I'm not even worried.'" Three themes did explain how PT helps athletes improve performance: (a) learn and practice coping skills, (b) "change the relationship" with pressure, and (c) increase quality of training.

Learn and practice coping skills

Some psychologists and all of the athletes reported that PT helped athletes learn coping skills to manage anxiety, attention, and self-talk while under pressure. A3 described the routine that she practiced when distracted during PT: "Put the gun back down, [deep breath], bring it back to self." Developing this routine took time, and PT allowed her to deliberately add or remove elements, such as the deep breath, to see how she would respond and determine if they were needed to help her cope. A5 discussed how practice coping with pressure in practice translated to coping in competition:

> The closer it comes to the competition or the practice competition, these thoughts will be more active and happen more frequently. Or be stronger and more intense but also, like, it means I'll get more practice in to be able to deal with it quicker. And so that almost if I'm better at understanding it and navigating those thoughts quicker, it means I don't get as big of a physiological response, so I won't have to lower my nerves, or my anxiety as, as much.

Practicing these coping skills led to observable changes in behavior in competition. SP2 described how coaches could notice the difference:

> And the coaches, often they'll focus in on those main moments. "Ah they [the divers] were much better … they kept focus 'til the end of the competition" or, you know, "Last time they were in this situation, I felt like I couldn't get through to them" or "Last time they were in this situation, they didn't listen to what I had to say. I could see that they weren't concentrating. Whereas this time, they made eye contact." So you often have conversations around those crucial moments and the differences that the athletes are doing, that the coaches are seeing, as the evidence of what they've been practicing in the meantime.

Although sport psychologists can introduce coping skills in workshops or other settings, PT had several advantages for learning and developing these skills. First, PT increased athletes' self-awareness of their responses to pressure. It highlighted tendencies under pressure that were less evident when training was not pressurized. A8 explained that the desire to win a match in PT would tempt him to watch the

scoreboard, and this distraction would allow his opponent to score. Coaches and psychologists could point out such tendencies during debriefs, but PT also helped athletes notice their responses in the moment during a drill or practice competition. For A1, this self-awareness allowed him to adjust appropriately: "I can sort of go, 'Okay, I know I'm nervous,' so I can take a step back, take a deep breath now and go play this way, and I'll do this tactic compared to this tactic."

Another advantage of PT was that the pressure prompted athletes to practice their coping strategies while training their sport. Merely talking about self-talk or emotion regulation was not necessarily sufficient for athletes to apply strategies under pressure in competition. Practicing these strategies under pressure allowed athletes to develop them into reliable skills that they knew how and when to use. Without pressure in training, competition might be the only time athletes would find themselves having to learn how to cope:

> I know how to manage and deal with it [pressure] a lot better now that I've had more exposure to it and sort of—not on a daily basis—but I feel it weekly or maybe even monthly sometimes, but a lot more often than I used to. Which is a lot better. I think before we did start the pressure training, the only time I ever really felt that much pressure was in competition. -A6

This focus on learning to cope with pressure distinguished PT from other training that was intended to develop tactics or physical skills. A5 summed up PT as training her "skill at competing." She and other participants recognized that more and more physical repetitions were not sufficient to prepare for competition. Practicing specific behaviors or mental skills increased their ability to perform physical skills in competition consistently.

"Change the relationship" with pressure

> Data from all athletes and some psychologists supported the idea that increasing exposure to pressure could "change the relationship athletes have with that pressure," as SP2 described it. PT did not just train a behavioral response to pressure (e.g., coping strategies). Athletes changed how they view and interpret pressure. SP2 explained that athletes reached an understanding "between not necessarily 'good' and 'bad' pressure, but that feeling you get when you think you're under pressure but actually just not assuming that's going to hurt your performance." A1 experienced this change: "I used to treat it like nerves is a bad thing, and the pressure training taught me to feel the pressure's natural and there's a way I can handle it by doing X, Y, and Z rather than sort of going into my shell and sort of playing defensive."

Developing this kind of "relationship" with pressure took time. Some athletes admitted to being skeptical of PT initially, either because they doubted that PT would help or because they did not want to feel pressure while training. But the exposure to pressure shifted how athletes viewed pressure and their ability to perform under it. Rather than sport psychologists simply telling athletes to look at pressure differently, PT provided athletes with evidence that they could cope with the pressure. A7 said, "I think everyone kind of dreads it at the beginning, but then I think you, you do get better with the pressure. It does get you used to the pressure, and you feel more comfortable in that atmosphere."

PT did not completely erase discomfort. A5 admitted, "I think I would always prefer to not feel the pressure and just go out there and, like, just try and do my best and not worry about the outcomes." But she also understood that pressure is "something I have to deal with and accept it and kind of veer my way through it." Athletes acclimated to the feeling of being under pressure and performing under it. In particular, exposing athletes to a specific source of pressure during PT gave them confidence when they encountered that same source in competition. A1 gave an example of dealing with pressure from adversity:

> I remember coming into one tournament … when I won a match from 9-7 down, I'd come back and I'd be like, "Did that last Friday about 10 times, didn't we?" … It's just like, if you're almost in that, in that split second, be like, "I've been in this situation so many times, I know I can do well in it. I'm so used to winning in from 9-7 down. This situation is not different."

This changed relationship with pressure was evident when some athletes would initiate PT. SP6 said, "I think when I've seen it done best and when I felt it's had its most impact is when I've actually had athletes say to me, 'Cool, we could really do *this* or … - what about if we tried *this*?'" Athletes seemed to realize that they could not avoid pressure or the discomfort associated with it, so they would prefer to have sufficient time to practice adjusting to it. A5 said, "And I would prefer to be uncomfortable and do more [PT] because, because of it benefitting me in such a way that I'm either going to learn from it or I'm going to gain confidence from it."

Increase quality of training

Although the main purpose of PT was to prepare athletes for pressure in competition, most athletes and one psychologist said that the added pressure also increased the quality of training itself. The athletes had reached elite levels in their sports but acknowledged that they still did not always have the same effort and energy in every training session. Repeatedly training each day could become monotonous, and a session might become too relaxed when it did not represent competition. Some drills were inherently less competitive than the simulated competition often used in PT. For example, combat-sport athletes sometimes took sparring less seriously when they would not keep score. They admitted to reducing effort when they became tired or did not face consequences, which contrasted spars or "test matches" that had consequences for either losing or failing to meet standards. Being around familiar teammates also sometimes created a social atmosphere that distracted athletes from training. Added pressure, however, focused athletes on performing their best:

> There's an increasing level of application and seriousness that is more aligned to what you might get in a competition as opposed to a training session where things might slip a little bit. Processes delivered much more effectively and in line with how it would be to be delivered effectively in competition. So I think increased levels of attention are what I see. So there's definitely a change, or I sense much more committed behavior. –SP6

Athletes also reported that they were more motivated to perform well and increase their effort during PT. Because PT often involved simulating competitions (as opposed to drills), it allowed athletes to gauge their readiness for competition. A5 said, "Leading up to the Olympics last time, I felt really prepared and it was almost like 'Let's see how I can do at this practice competition because it gives me a real good indicator of how I

might do it at the competition.'" After gaining experience with these practice competitions, she felt they could boost her confidence if she performed well in them. It is true that coaches could have athletes practice full routines or matches without added pressure, but adding consequences further increased athletes' motivation to perform well in that instance. For A7, PT included an audience of her family and friends, which she said "gives you that more motive to do it better" because it was her "chance to kind of show them what I'm doing."

Athletes did not advocate for pressurizing all training. They noted the importance of balancing PT with physical recovery and chances to learn and develop skills. Nevertheless, the increased focus and motivation during PT did also contribute to developing physical and technical skills:

> I think what it did help me with though is the actual … the actual like physical bit in boxing. Because sometimes I can go into a spar and just do what I like, but this time around I had to practice more on the important things that are going to help me when I fight, so, therefore, like, say for example, keeping my hands up, moving my feet when I need to—sometimes I wouldn't move my feet—so if I don't move my feet on a spar, it's going to be … there's going to be less chance I do it when I fight … But when I had the pressure on me—"You need to move feet. You need to defend."—when I got into a fight, I was better at it. –A2

Discussion

Through interviews with athletes and sport psychologists, this study examined creating pressure in training and that pressure's role in enhancing performance. Findings advanced Stoker et al.'s (2016) framework for creating pressure by identifying common properties that might distinguish some effective demands and consequences from the multitude of options that practitioners could try. When training under pressure, athletes developed coping skills and learned to challenge their assumptions about pressure. Guided by pragmatism (Giacobbi et al., 2005), thematic analysis described these findings in themes that could inform how practitioners and coaches design and prepare for PT.

Many effective demands described by the participants simulated psychological challenges of competition. Coaches might already change the task (e.g., rules of a drill), environment (e.g., noise), or performer (e.g., fatigue), but these physical or tactical demands do not increase pressure unless combined with consequences (Stoker et al., 2017). Psychologists in the current study more directly targeted psychological demands by fostering competitiveness, adding uncontrollable factors, or requiring athletes to perform on demand. Baumeister (1984) defined pressure as an increased importance to perform well, and psychological demands increased this importance of a task without changing the task itself. For instance, performing a skill on demand could magnify a single repetition because the athlete would not have multiple chances to try again, refocus, or learn from a first attempt as they would in a repetitive drill. The emphasis on psychological demands distinguishes PT from a constraints-led approach to training. Whereas a constraints-led approach trains technical skills and relies on manipulating environments and tasks (Renshaw et al., 2019), PT seeks to train abilities to perform such skills under pressure.

When implementing a consequence, psychologists often extended its reach beyond one individual or moment in time. One consequence with extended reach was athletes having to post about training on social media. Posts exposed one's performance to a wider audience for judgment and for a longer length of time than just the training session. Similar to psychological demands, extended reach seemed to raise the importance of performing well in training. When training with a forfeit at stake for teammates, athletes faced not just the forfeit's unpleasantness but also the possibility of letting down teammates. When results of drills were monitored and displayed publicly, athletes could not as easily downplay or forget about poor results because those results were visible to coaches and teammates.

Many psychological demands and consequences with extended reach resembled the pressures of competition. Stoker et al. (2016) considered whether benefits of PT transfer to competition better if sources of pressure are similar in PT and competition. Some forfeits, such as running sprints, may increase pressure, but they are unrelated to consequences of competition. In contrast, athletes may realistically feel pressure to impress coaches or avoid letting down teammates such as when facing certain consequences with extended reach. Psychologists also structured psychological demands based on scenarios that athletes are likely to face in competition. When describing benefits of PT, A5 indicated why representative pressure might help those benefits transfer to competition. PT gave her practice coping with negative thoughts that would also arise in competition, so she was able to train the response that she needed to cope with those specific thoughts.

Although PT could simulate the sources of pressure encountered in competition, it did not have to replicate the intensity of that pressure. Oudejans and Pijpers (2010) found that training with mild anxiety can improve performance under higher levels of anxiety, and participants in the current study also described PT that only approximated competition's pressure. Athletes practiced how they want to think and behave under pressure, and this effort may contribute to PT's effectiveness as much as the amount of pressure. In fact, the purpose of developing coping skills suggests that pressure should be increased gradually, rather than maximized immediately, to promote learning. PT has been based on stress inoculation training and systematic desensitization, which first expose individuals to low levels of stress that are gradually increased as the individual becomes more comfortable (Bell et al., 2013; Kegelaers et al., 2021). In sport, Driskell et al. (2014) also advocated progressing PT or "stress exposure training" in phases that allow athletes to acquire physical and mental skills and practice them under "realistic stressors" before they are tested under higher pressure (p. 35). Until athletes can perform optimally under moderate pressure, practitioners need not worry about the difficulty of maximizing pressure. This strategic approach to pressurizing training contrasts occasional punishments or incentives that practitioners or coaches might implement without a clear intent to improve coping skills.

Developing coping skills also supports processing efficiency theory as an explanation of PT's effect on performance. Psychologists and athletes in this study observed a learning process that paralleled findings of recent interventions (Kegelaers et al., 2021; van Rens et al., 2021). First, PT increased athletes' self-awareness of the need for coping skills by highlighting sources of pressure and unproductive tendencies under pressure. Next, athletes practiced those coping skills under pressure in sport-specific settings and

learned to quickly apply them when in competition. The current study demonstrated that this experience was consistent across several sports at international levels of competition. Although more research is needed to determine optimal amounts of PT (Low et al., 2021), this view of PT as a skill-building process suggests athletes would need to train under pressure long enough to learn, practice, and refine how they will cope with pressure.

PT did not necessarily change the amount of pressure that athletes felt in competition, but it did change their "relationship" with pressure. As the athletes described, critical situations in competition were unlikely to feel any less important after facing pressure in training. PT did, however, show athletes that pressure would not necessarily hurt performance. Oudejans and Pijpers (2009) similarly found that PT-trained athletes outperformed a control group under highanxiety even though they still felt as anxious as they did before the intervention. PT seems to provide athletes with evidence that they have already coped with challenging tactical situations and pressure-induced anxiety, and such mastery experiences can be a primary source of self-efficacy (Bandura, 1977). If increased self-efficacy does explain PT's effects on performance, it further supports introducing PT both early and regularly enough so that athletes experience mastery under pressure before competition.

Applied implications

To create pressure in training, practitioners should increase importance of performing well in drills. Importance should not be confused with a drill's difficulty. As Stoker et al. (2017, 2019) demonstrated, demands that increase difficulty often do not increase pressure. Athletes may perform worse but not feel pressure if they do not have more reason than usual to maintain performance. Coaches and practitioners also should not assume that a consequence will create pressure just because it is unpleasant to athletes. A mild forfeit can be unpleasant but only temporarily. In contrast, consequences with extended reach amplify an impact that might already matter to athletes (e.g., judgment from coaches). In the preparatory phase of PT, Fletcher and Arnold (2021) suggest that coaches should learn about pressure and its effects on performance. This education should include distinguishing between increasing importance to perform and other aspects of stressors. Understanding this distinction can help coaches identify the most relevant aspects of the competitive environment that will train athletes to cope with pressure, not just acclimate to other aspects of that environment (e.g., crowd noise).

Practitioners should collaborate with coaches and athletes to design PT (Fletcher & Arnold, 2021), and underlying properties found in this study can guide the creation of pressure. Fletcher and Arnold (2021) suggest that pressure can be created by manipulating stressors' "relevance, importance, and consequences" or "type, property, or dimension" (p. 276), and the current study's findings provide insight into *how* to manipulate those aspects so that pressure manipulations are likely to increase pressure. Collaboration involves practitioners, coaches, and athletes discussing possible manipulations, and considering underlying properties could lead to relevant pressure manipulations. Whereas the question "what creates pressure for you?" could be too broad and

abstract for athletes, properties could provide direction during discussions. For example, practitioners should steer discussions about adding demands toward psychological ones.

Regardless of the pressure manipulations that they use, coaches and practitioners do not have to take an "all-or-nothing" approach to creating pressure. That is, PT seems to prepare athletes even if the pressure only approximates the levels of pressure in competition. The level of pressure should be increased as athletes develop their coping skills (Fletcher & Arnold, 2021). Thus, practitioners and coaches should continue to manipulate conditions to increase pressure, but they should also recognize that lower levels of pressure can still be beneficial and even desirable when athletes are in early stages of developing coping skills. For a complex task, training under a mix of low and high anxiety has improved performance better than training under only high anxiety (Lawrence et al., 2014). Introducing anxiety too early in the learning process could disrupt the process and increase time needed to learn the physical skills. Therefore, coaches do not need to wait to conduct PT until they can perfectly replicate competition and may even enhance PT by more gradually increasing pressure.

When introducing PT to athletes, explaining its benefits could help build culture that balances the challenge of pressure with support from coaches and staff members (Fletcher & Sarkar, 2016). PT should take place within a culture that encourages athletes to respond positively to the challenge of pressure, and practitioners can explain that the intervention is an opportunity to practice coping skills that are essential for performance. Doing so can clarify PT's intent to help prepare athletes and allay fears that added pressure is meant to bully athletes. Whereas improving outcomes under pressure can take time, understanding how PT works can remind athletes that PT is part of a learning process.

Limitations and future directions

In light of recent advances in qualitative methods, future studies can enhance data analysis and trustworthiness of findings while preserving themes' depth of meaning. The current study followed Braun and Clarke (2012) guidelines for thematic analysis, so it relied on the primary analyst's reflexivity to generate deep and nuanced themes. As "critical friends" (Smith & McGannon, 2018), coauthors then reviewed coding and initial themes to ensure that different interpretations of data were considered. This approach prioritized nuance over consensus, but Wiltshire and Ronkainen (2021) have argued that nuance does not have to come at the expense of consensus. They have advocated consensus-building procedures that can increase validity of findings and still yield nuanced themes (Ronkainen & Wiltshire, 2021). Examples include member checking and collaboration of multiple researchers to generate themes. When designing future studies, researchers should consider the wide range of qualitative approaches, such as Wiltshire and Ronkainen's (2021) realist approach, and guidelines for methodological integrity (e.g., Levitt et al., 2017).

Although a strength of this study is that themes are based on examples of PT that have been feasible and accepted in applied practice, there is insufficient empirical evidence to advocate for using any specific pressure manipulation described by the participants. Intervention studies are needed to empirically test how well specific

consequences with extended reach and psychological demands create pressure. Manipulation checks can compare these manipulations to non-pressurized training or other demands and consequences, and studies can also continue to examine properties of manipulations in more detail. For example, the consequences described in the current study tended to involve the potential for athletes to "lose" (e.g., forfeits, negative judgment) rather than win something (e.g., a reward), so there may be even more nuances within the properties described in this study.

There are also limitations to the varied sample of psychologists and athletes from various sports. Varied sampling did allow patterns to be detected between diverse examples of PT, but a more homogenous sample could reveal even greater nuance or other themes that are more relevant to athletes from a specific sport or type of sport (e.g., closed or open-skilled). For instance, within the theme of "extending the reach of consequences," it would be interesting to examine if manipulating judgment creates more pressure in sports in which outcomes are determined by judges. Furthermore, because participants were recruited via snowball sampling and the researchers' contacts, another limitation is that the sample generally had a positive view of PT and discussed effective PT. Future research could be equally useful if it explores ineffective pressure manipulations or perspectives of individuals who have not found PT effective.

Conclusion

This study explored the creation of pressure in training and PT's mechanisms for improving performance. Because themes reflected participants' experiences in actual training and competition, they demonstrate how applied practice can inform understanding of how an intervention works. Although they do not necessarily represent the only common properties of effective pressure manipulations, the findings illustrate how practitioners can look beyond the severity of consequences or difficulty of a task when considering how to create pressure. Findings on performance benefits suggested that PT enhances performance by providing athletes a chance to practice coping skills and to realize that pressure does not have to hurt performance. Practitioners can explain these benefits to help athletes and coaches understand the value and purpose of PT.

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