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Sources Of Target Panic In Archery

[1]Jolly Roy , [2]Swedha Murali,

[1]Professor & Research Supervisor, [2] PG Scholar

[1]Sri Ramachandra Faculty of Sports & Exercise Sciences

[1]Sri Ramachandra Institute of Higher Education and Research, Chennai, India

1.Introduction

Target panic is a psychological condition among archers with an unintended loss of control while shooting, normally associated with aiming and shooting the arrow .[1] Target panic is release-related anxiety that hinders accurate and smooth shots, commonly characterized as flinching, snap-shooting, freezing, and punching.[2] In archery, precision and accuracy play a major role in performance. Accuracy in archery is concerned with how close an arrow is to the center of the target, while precision is concerned with how close the shafts are to each other.

Archery is a single-action precision sport that demands fine and gross motor skills, [3] which requires a high level of motor skills that contribute to high performance in sports. Given that high levels of fine motor skills are essential, competitive archers frequently experience target panic,[4] a challenge that can impact their performance. Thus, physical and psychological factors, like balance, motivation, confidence, anxiety control, resilience to overcome any pressure, and focus, are necessary for high accuracy. [5] Archers shoot arrows from a predetermined distance, using two types of bows: 1. recurve bows (also referred to as Olympic bows) with curved limbs and precise technique requirements, 2. Compound bows with systems of cams and pulleys to store energy.[6] Archers require precise technique, consistency and accuracy to achieve a good cumulative score.[7] For this, the archers need to have mastery of the technique and a calm mind.

1.1 Target panic as a performance block in archery

Target panic, a performance block in archery, causes body stiffness, hindering the technique and challenging proper movement.[8] Target panic manifests differently between bow categories due to differences in drawing and release technique. More specifically, recurve archers use their fingers to manually draw the bowstring, while the compound bow archers use mechanical release aids.[6] Li and Zhao indicated that the effect of target panic varies depending on several factors, including gender, skill level, and competition pressure. The authors added that female archers experience a greater decline in performance compared to male archers when they are at the point of failure.[9] Additionally, Baumeister and Showers states that even novices can experience target panic, [10] but Wang suggests that choking occurs in archers who have progressed to the level of performing routine processes. [11]

1.2 Factors of target panic

Target panic in archery arises from a variety of factors, such as performance anxiety, high self-expectation, and social demands. Jones et al.'s research indicated that the need to control the shot leads to reflective thinking, increasing pressure, resulting in avoidant behaviours characteristic of target panic. [12] Jackson indicated that heightened pressure combined with a focus on technical skill results in compromised performance.[13] Research suggests that prioritising results over skill/technique (outcome-focused) can lead to increased pressure, resulting in task failure.[14] Eysenck et al also indicated that pressure related to performance draws focus away from the task towards irrelevant factors. This attention diversion creates a dual-task scenario, where situational anxiety interferes with task execution, impairing performance.[15] Research suggests that pressure can cause overthinking and self-consciousness, resulting in anxiety, drawing excessive attention to skill process and control, and interrupting well-learned skills. [16,17] Drinan stated that anxiety and improper placement of attention combine to cause debilitating target panic.[18] Enhanced pressure can exacerbate target panic characterised by choking,[14] disrupting skill execution, rather than the loss of skill.[19]

Target panic can vary in individual athletes, with some athletes manifesting a stronger effect of target panic at greater distances.[1] The findings of Prior and Coates suggest that target panic resulted from several factors that were unique for each individual. The above findings highlight the complex interplay between pressure, attention, performance, and personalised phenomenon.[1]

1.3 Prevalence and impact of target panic in archery

Currently, there are no exact prevalence data for target panic in archers.[1] However, 90% of archers may experience target panic at least once during their careers, but it is not frequently discussed in the archery context. [20] Prior and Coates revealed that the impact of target panic is complex, ultimately making the shot uncontrollable, where archers overly focus on the outcome, showing signs of performance blocks.[1] Jones et al reported that the desire to control the shot to achieve the expected outcome leads to self-focused thinking, increasing performance pressure, anxiety, and avoidant performance-related actions. These further surfaces as physical and psychological symptoms of target panic.[12]

Limited studies document the sources of target panic in archery,[1] and few studies have reported sources of target panic in Indian National-level recurve archers. Most studies have dealt with general psychological issues that impact performance blocks in other sports. We were interested in eliciting Indian National archers' perceptions and subjective experiences of target panic in the competitive context. Therefore, the current study examines the sources of target panic among Indian archers to capture the complexity of their experiences. In addition, this qualitative exploration would allow the archers to share their unique perspectives about target panic. By identifying the various sources of target panic, archers, coaches, and sports psychologists can plan targeted interventions to minimize its impact and enhance performance. This study responds to the research question of "What are the various sources of target panic experienced by the National-level recurve archers?"

2.Methodology

2.1 Participants

The participants were Indian National-level recurve archers (*n*=07; Male=4 and Female=3), aged M=21.57 (SD=1.27). Purposive sampling was adopted to recruit participants with a minimum of three years of exposure at the National-level archery competition to obtain in-depth data. [21]

2.2 Procedure

Following the ethical approval from the Institutional Ethics Committee (CSP-III/24/MAY/05/162), the participant's informed consent was obtained. Two experienced sports psychologists (one sport psychology professor and one lecturer) and a national archery coach validated the semi-structured interview schedule, which consisted of 10 questions focusing on archers' target panic experiences. The first author conducted the interviews, which lasted between 35 and 48 minutes, and the responses were audio recorded and transcribed verbatim, resulting in 110 pages of double-spaced transcripts. The data was further analysed with Inductive Content Analysis. [22]

Three independent experts holding a master's degree in sports psychology read the transcriptions. The first expert was a practitioner and researcher, with playing experience for 11 years. The second expert was also a practitioner currently engaged with a sports academy and has six years of sports experience. The third expert is a sports psychologist and a researcher with National participation in archery for 10 years. Each expert was given the transcripts to read and extract meaningful units. The extracted data by the experts was subsequently coded as follows:

Stage 1: For open coding, [23] the data were carefully read, and statements related to research questions were identified, and each statement was assigned a code. Following this, the relevant statements were organised along with short notes.

Stage 2: Using the codes developed in stage 1, the statements were organised into categories, which is referred to as axial coding. [24]

Stage 3: The researchers further analysed the data, looking for patterns and explanations in the codes to relate certain codes under one general code. The categories that emerged in coding were then refined so that they could be connected in the form of relationships. [25]

Stage 4: Selective coding was done, analysing contradictory and confirmatory concepts.[26]

2.3 Research rigor

Data triangulation was incorporated post-coding, which addresses the aim of the study from multiple perspectives to build a broader and reliable representation of the phenomenon. [27] Data reduction was used to make the data more readily accessible and understandable. [28] The interview data extracted and transcribed generated 76 raw data themes, which were grouped. Initial reliability was checked, [29] and the results obtained were only 82.4%. With subsequent debate and discussions, an improved reliability score of 94.9% was achieved. Following this, the raw data themes were grouped into the first, second, and third-order themes until saturation, resulting in identifying the general dimensions. [22]

3. Result

The focus of the study was to identify the sources of target panic among National-level recurve archers from the raw data themes from the transcripts. The higher-order themes were then further abstracted into seven general dimensions, which summarized the sources of target panic as follows. 1) Psychological influences, 2) Physiological factors, 3) Performance concerns, 4) Environmental aspects, 5) Athletic pressures, 6) Equipment-related issues, and 7) Social evaluation.

3.1. Dimension 1: Psychological

The 30 raw data themes (39%) yielded 15 first-order, five second-order, and three third-order themes converging into the general dimension of psychological influences (Fig.1), which explained mental and emotional experiences.

The examples of statements illustrate the themes referred to as cognitive (e.g., *"I start overthinking everything, and it makes so much confusion.")*; confidence (e.g., *"It takes me days to get my confidence back after one poor performance.")*, motivation (e.g., *"I lost motivation and enjoyment to shoot."),* and result-oriented pressure (e.g., *"I feel anxious when I calculate how many points I need to qualify while shooting").*

The five second-order themes are referred to as cognitive interference (e.g., *"My mind gets distracted from the process often."*), performance anxiety (e.g., *"I'm afraid of messing up, so I get stuck at full draw."*), negative self-perception (e.g., *"I keep thinking, what if I don't score well?)*, low motivation (e.g., *"I lost motivation and enjoyment to shoot.")*, extrinsic motivation (e.g., *"Earning money and winning medals keeps me going, nothing else."),* and outcome-focused thoughts (e.g., *"Being very focused on the scores messes up my technique")*.

The two third-order themes were abstracted from the second-order themes and referred as distracted attention (e.g., *"Sometimes, my mind is just somewhere else while aiming.")* and controlled motivation (e.g., *"I only feel like practicing when there is a competition or selection trials").* All the themes converged to create the dimension 'psychological influences'

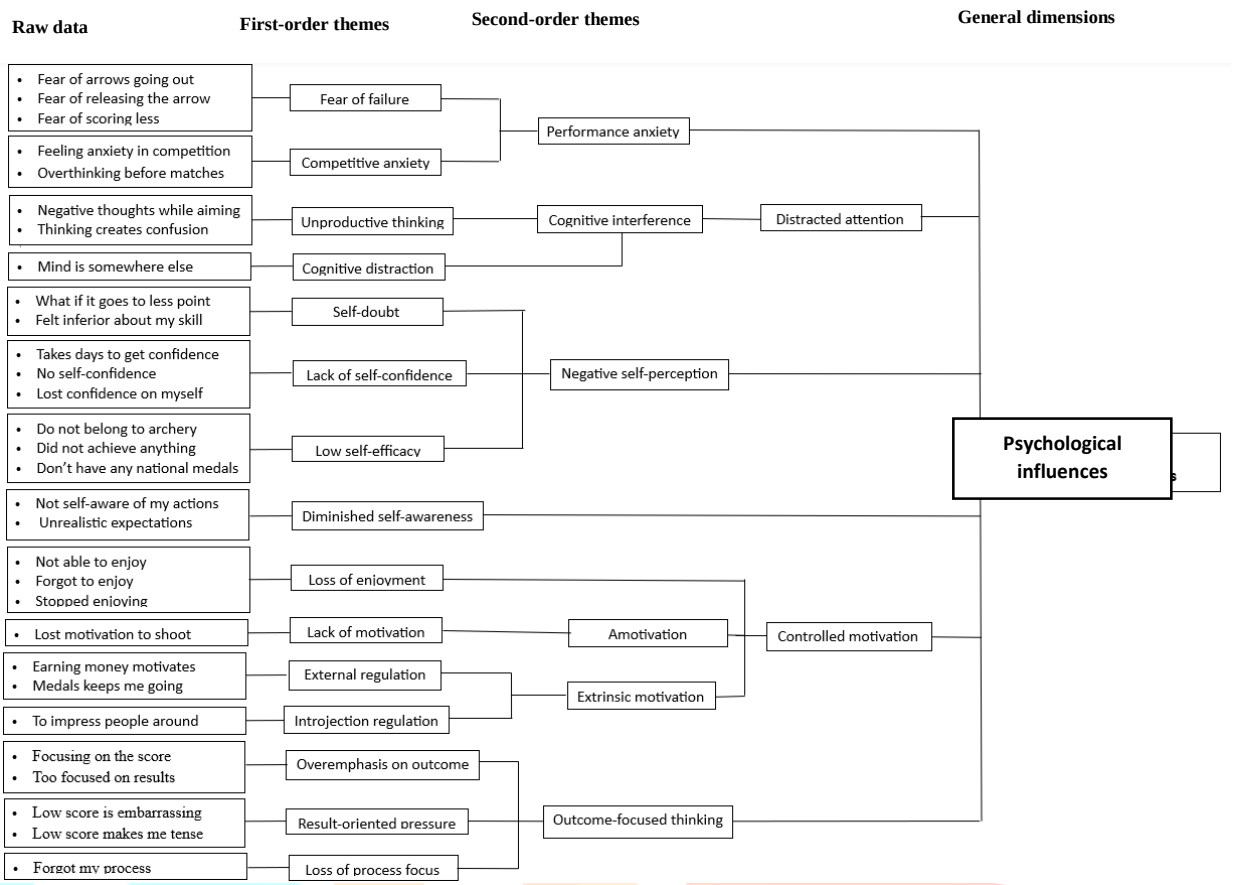

Figure 1. Psychological influences

3.2 Dimension 2: Physiological Factors

The 11 raw data themes (14%) yielded five first-order and three second-order themes converging into the general dimension of physiological factors (Fig. 2), which reflected physical discomforts and physiological body reactions of the archers.

The five first-order themes were grouped from the raw data themes and referred as hand inconsistency (e.g., *"Sometimes my hands just shake… unable to hold a proper and firm grip."*), muscle fatigue *(e.g., "My muscles get tired very fast while holding the bow."*), energy depletion (e.g., *"There's no stamina left after long hours of training."*), cardiovascular responses (e.g., *"My heart races before I release the arrow")*, and perception of apathy (e.g., *I feel that I am not physically strong enough to handle the bow poundage").*

The three second-order themes were combined from the first-order themes, referred to as decreased fine motor skills (e.g., *"I don't feel stable with my aim for some shots."),* physical exhaustion (e.g., *"Sometimes my arms and palms feel numb after repetitive shooting."*), and bodily stress responses (e.g., *"My body feels tense and unsteady during competitions").* All the above themes merged to form the dimension of 'physiological factors'.

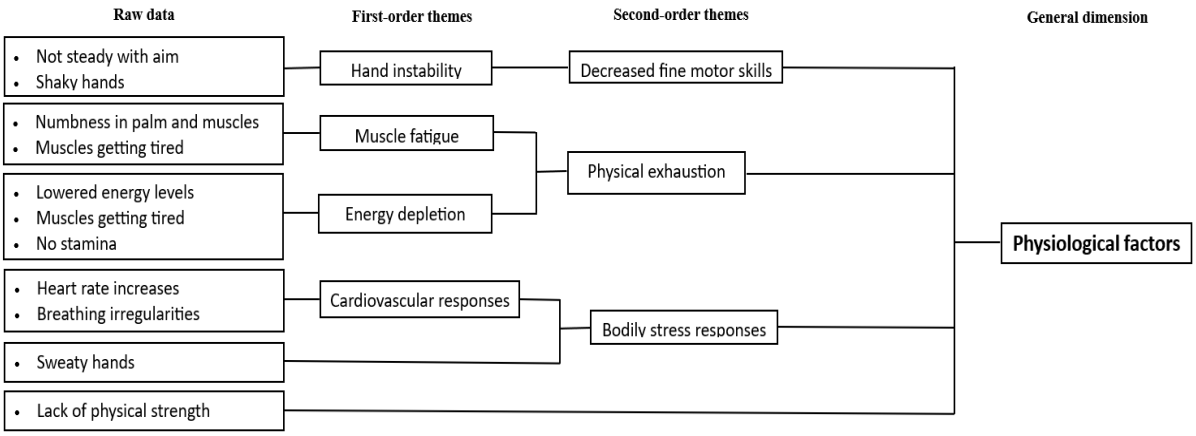

Figure 2. Physiological factors

3.3 Dimension 3: Performance Concerns

The seven raw data themes (9%) were grouped into three first-order and two second-order themes, leading to the general dimension of performance concerns (Fig. 3), which highlighted the technical and procedural interruptions experienced by the archers.

The three first-order themes were elicited from the raw data themes, were inducted as fear of execution *(e.g., "I hesitate before releasing almost every shot"),* mental blocks *(e.g., "I feel like losing control at any moment"),* and uncertainty (e.g., *"I keep switching techniques").*

The two second-order themes were categorised from the first-order themes, *which were referred* to as deterioration of technique (e.g., *"I feel like my technique has become poor now."*), and performance block (e.g., *"Overthinking breaks my flow completely").* The dimension of 'performance concerns' emerged from the above themes

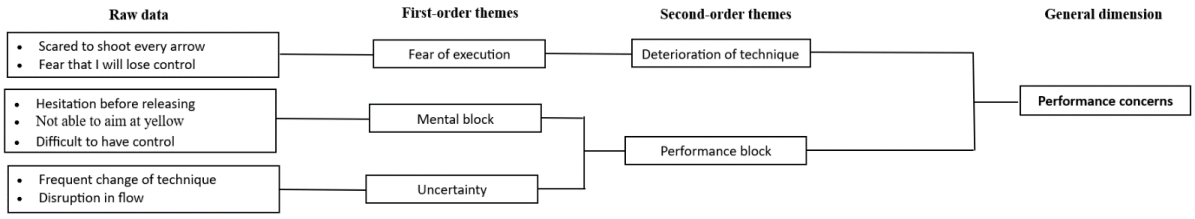

Figure 3. Performance Concerns

3.4 Dimension 4: Environmental Aspects

The five raw data themes (7%) yielded five first-order and two second-order themes, which contributed to the general dimension of environmental aspects, expressed how varying climatic and weather conditions interfered with archers' performance aspects (Fig. 4).

The first five first-order themes were merged from the raw data themes and positioned as wind interference (e.g., *"Windy conditions affect my mindset. It becomes hard to stay confident."),* poor visibility (e.g., *"Foggy weather makes it so difficult to focus properly."),* heat-induced fatigue (e.g., *"Sunny days drain me out quickly, I get tired faster."),* stiffness (e.g., *"My hands freeze in winter, so I can't hold the bow properly, and I feel numb."),* and inconsistent weather conditions.

The two second-order themes were further grouped and referred to as climate and whether conditions (e.g., *"When the training climate is different from competition, my body doesn't adjust well").* The themes collectively formed the dimension of 'environmental aspects'

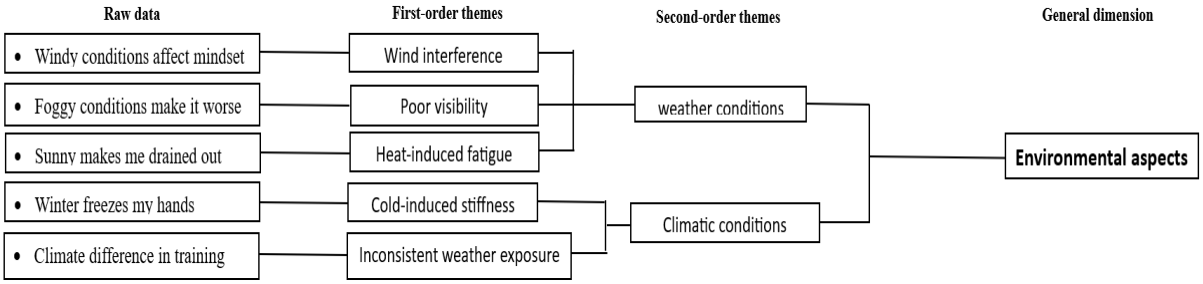

Figure 4. Environmental Aspects

3.5. Dimension 5: Athletic Pressures

The 11 raw data themes (14%) were combined into seven first-order and three second-order themes, merged further into the general dimension of athletic pressures emerging from various internal and external demands (Fig. 5).

The seven first-order themes were inducted from the raw data themes, organised as achievement standards (e.g., *"I don't want to let myself down, I have to win."),* perception of pressure (e.g., *"I feel everything is pressuring me."),* competitive demands (e.g., *"The number of competitors adds pressure."),* time constraints (e.g., *"Limited time makes me tense."),* societal pressure (e.g., " *I keep thinking that others will say if I don't perform."*), familial pressure (e.g., *"I feel like I am burdening my parents with this sport."),* and role conflicts (e.g., *"It's difficult to manage both studies and archery"*).

The three second-order themes were combined from the first-order themes, referred to as self-expectations (e.g., *"There is pressure I put on myself to qualify in the team."),* situational pressure (e.g., *"I feel pressured in a competitive setting… just seeing other archers around me performing well makes me nervous."),* and social demands (e.g., *"It is because of the peer pressure that adds up to stress").* All the themes converged to define the dimension of 'athletic pressures'.

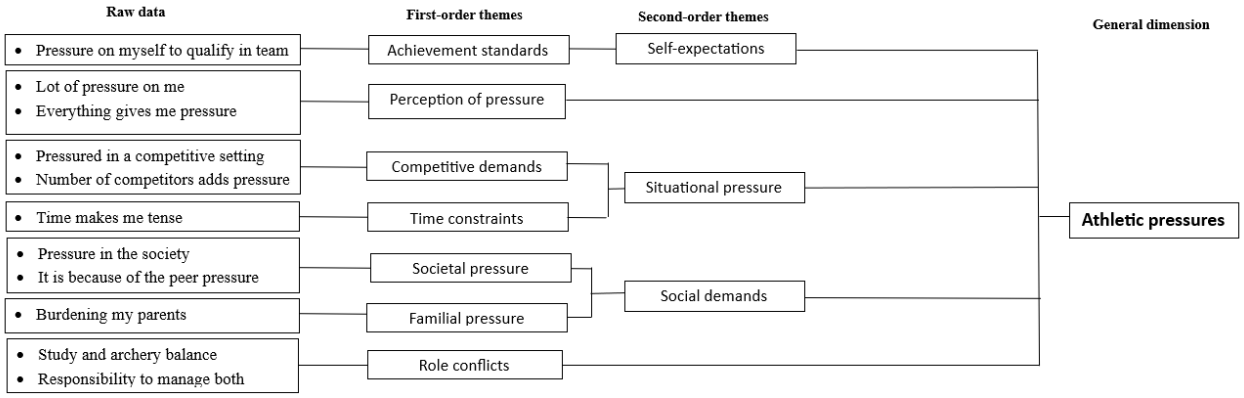

Figure 5. Athletic Pressures

3.6. Dimension 6: Equipment-Related Issues

The six raw data themes (8%) categorised into four first-order and one second-order theme, leading to the dimension of equipment-related issues, reflected that uncertainty or failure with equipment interfered with performance (Fig. 6).

The four first-order themes were extracted from the raw data themes, referred to as equipment inconsistency (e.g., *I couldn't settle with one bow that disturbed my shooting."),* improper setup (e.g., *"Tuning issues and string problems messed with my confidence."),* equipment failure (e.g., *"Technical failure was the worst."),* and equipment-related anxiety (e.g., *"That equipment problem…it stuck with me. I kept thinking it might happen again").*

The one second-order theme was organised as equipment malfunction (e.g., *"When the arrows break…I just froze").* All the above higher-order themes were combined into the dimension of 'equipment-related issues'.

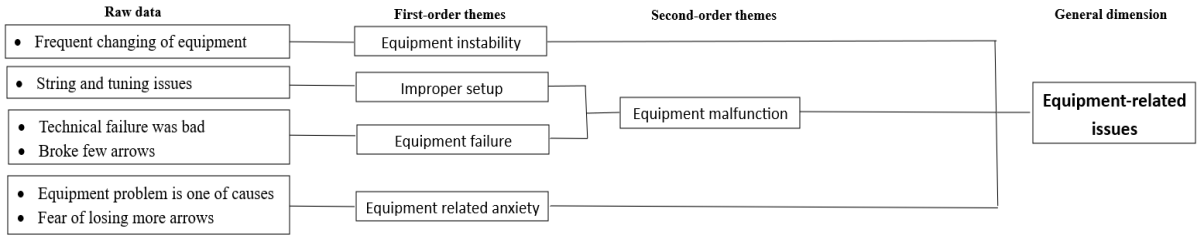

Figure 6. Equipment-Related Issues

3.7 Dimension 7: Social Evaluation

The six raw data themes (8%) were inducted into four first-order themes, converging to the dimension of social evaluation, reflecting athletes' worries about how others viewed them (Fig.7).

The four first-order themes were grouped from raw data themes and referred to as fear of social judgement (e.g., *"I even changed my form just to prove them wrong. It's always in my head."*), peer comparison (e.g., *"Around me are all the medallists. It makes me question if I am good enough."*), approval seeking (e.g., *"Coach's disappointment hurts me a lot."*), and desire for recognition (e.g., *"Nobody notices what I do. I work so hard, but when it becomes invisible"*). All the above higher-order themes were merged into the 'social evaluation' dimension.

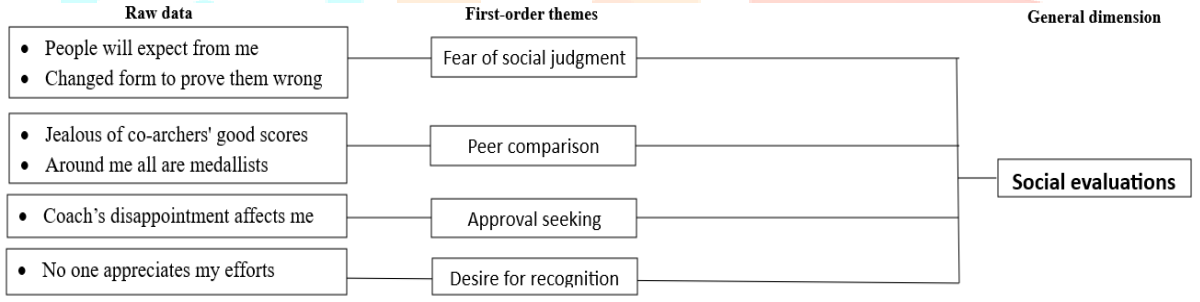

Figure 7. Social Evaluations

4. Discussion

The study explored the sources of target panic from the archer's perspective, an underrepresented area. We gathered archers' reflections regarding target panic, and captured the individual meanings archers' assign to target panic. The interview script provided deeper insights unfolding the sources of target panic, which was segmented into seven different dimensions: 1) Psychological influences, 2) Physiological factors, 3) Performance concerns, 4) Environmental aspects, 5) Athletic pressures, 6) Equipment-related issues, and 7) Social evaluation.

4.1 Psychological Influences

The majority of the participants expressed psychological concerns as a primary source of target panic, influenced by performance anxiety, negative thoughts, self-doubt, and the outcome. Eysenck et al.'s research supported these findings, suggesting that increased anxiety influences athletes' attentional capacity, hindering performance in a task and cognitive interference during competition. [15] Similarly, self-doubt and excessive focus on results can lead to loss of control, inducing target panic.[1] Baumeister also indicated that an excessive focus on outcomes, like obsessing over points or scores, detracted from executing based on process and often led to performance disruption resembling choking instances. [16] Research also suggests that outcome-oriented thinking can lead to inner pressure. [12,16] Target panic is rooted within the mental process of an archer, where overthinking can lead to premature arrow release,

causing freezing. [30] This dimension provides insights into the archer's psychological experience in a competitive context.

4.2 Physiological Factors

The study revealed a significant relationship between physiological factors and target panic, with athletes citing physical exhaustion, decline in fine motor skills, and bodily response as reasons to be out of their optimal zone, affecting performance. Research by Hanin stated that trembling, premature muscle fatigue, and overexertion were manifested when athletes are outside their optimal zone. [31] For instance, shaky hands and lack of steadiness resulted in a decline in fine motor skills, affecting the technique, making it difficult to control the shot, resulting in compromised performance. Madsen et al reported a physical decline in technique under stress, particularly when approaching or during competitions. [32] Likewise, the greater the muscle tension and tremors in precision athletes' arms, interfere with their usual shot rhythm, which was also mentioned by the archers. [5,33]

The study highlighted that muscle tightness and shallow breathing resulting from inconsistent performance also evoke target panic in archers. Congruent with the above, Beenen et al. indicated that muscle tightness, shallow breathing, and fatigue are all common among athletes who experience performance anxiety. [34]

Cardiovascular changes and sweaty hands due to increased arousal lead to target panic, impacting shooting accuracy. Kidwell explained how somatic responses tend to be early warning signs of target panic.[7] Greater physiological arousal tended to heighten experiences of panic, leading to a cycle of emotional and bodily disruption. This interplay was also supported by Park, who emphasised that physiological anxiety usually increases perceived stress, especially in self-paced, high-precision sports. [35] The physiological responses significantly impact the accuracy and score in a precision sport.

4.3 Performance Concerns

The performance disruptions outlined in this dimension indicate how archers perceived target panic as a performance-oriented breakdown in their execution. Technique deterioration, fear of task execution, mental blocks, and lack of flow state contribute to triggering target panic. Pijpers et al. highlighted the association between movement instability, performance anxiety, and disrupted automaticity during self-paced tasks. [36] Athletes under stress generally revert to conscious control of automatic motor processes, and this finding aligns with the reinvestment theory, [37] disrupting the natural flow of movement and impairing performance fluidity. Archers reported purposefully thinking about technique, "double-checking" each step, and experiencing target panic during task execution. Malhotra et al. also support our findings, highlighting that athletes competing in evaluative contexts prefer to reinvest in the technicality of movement, hindering performance efficiency. [38]

Weather conditions can significantly affect an archer's performance, requiring instant adaptations to achieve shooting accuracy. Bravi et al. indicated that windy conditions increase instability and reduce concentration, suggesting the importance of sensitivity to external interference in precision sports.[39] Thus, weather conditions can induce a sense of uncertainty and lack of control, leading to target panic. Consistent with the above research, Renshaw et al. also highlighted the psychological effect of unpredictable environmental situations on performance. [40] Environmental distress, in the form of heat exhaustion or stiffness during cold temperatures, also intensified symptoms of target panic.[19] This aligns with the suggestion of Tossici et al, who stated that environmental stressors can serve as situational antecedents to athletes' stress reactions when they are combined with other psychological susceptibilities.[41] In summary, the environment dimension highlights the significant contributions to the target panic.

4.5 Athletic Pressures

Athletic pressures revealed that most archers went through considerable psychological pressure from high self-expectations, competitive and social demands, and balancing studies and sports. Research also documents that the internal pressure due to unrealistic self-expectations corresponds to maladaptive perfectionism, [42] resulting in target panic. In addition, high-stakes competitions build athletic pressure where athletes extend themselves to overtraining and become vulnerable to emotional exhaustion. [43] Hagger et al. indicated that appropriate psycho-regulation is crucial to maintain focus and accuracy to achieve the desired score. [44] In addition, Stoyel reported that athletes internalise both societal and personal

demands to execute perfectly in all roles, resulting in added competitive pressure. [45] Besides this, Kidwell suggested that the time constraints of shooting an arrow (within 30 seconds) can exacerbate target panic. [7] Vendrame et al. indicated that time pressure can affect fine motor performance and decision making, especially in sports like archery. [46]

4.6 Equipment-Related Issues

Equipment-related issues can lead to mental distress, affecting concentration and confidence, and impacting performance. Chen et al. stated that the recall of previous technical faults continues to disrupt concentration in upcoming events. [47] Pellerite highlighted the significance of familiarity and consistent equipment setup in allowing one to build trust in performing one's skill.[48] Archers indicated that equipment malfunctions (e.g., broken arrows) during critical performances left residual anxiety.

4.7 Social-Evaluation

The social-evaluation dimension described the need to live up to external expectations, gain recognition, peer comparison, and avoid judgment, which creates emotional tension that affects confidence and performance. Archers reported feeling inferior in the presence of medal-winning peers with greater performance capabilities. This indicates the impact of social comparison on archers' self-perception. Walton et al. suggested that athletes without external validation are more vulnerable to self-criticism and emotional distress when put under pressure. [49] Other studies also reported that fear of disappointing significant others impacts individual performance, athletic identity, and overall emotional well-being. [50,51] Koivula et al. also stated that perceived performance gaps between peers tend to be associated with lower self-esteem and increased anxiety, especially in a competitive environment. [50] Besides this, negative interactions undermine athlete motivation, promoting fear-based performance states. [52]

5. Conclusion

The target panic is not a single trigger event but a complex phenomenon arising from multiple sources. The general dimensions of sources elicited were: 1) Psychological influences, 2) Physiological factors, 3) Performance concerns, 4) Environmental aspects, 5) Athletic pressures, 6) Equipment-related issues, and 7) social evaluation. Results also demonstrate that target panic is not a sudden occurrence but an accumulated outcome originating from various sources. The model provided (see Fig. 8) can serve as a guiding framework for effective intervention to empower archers in managing target panic.

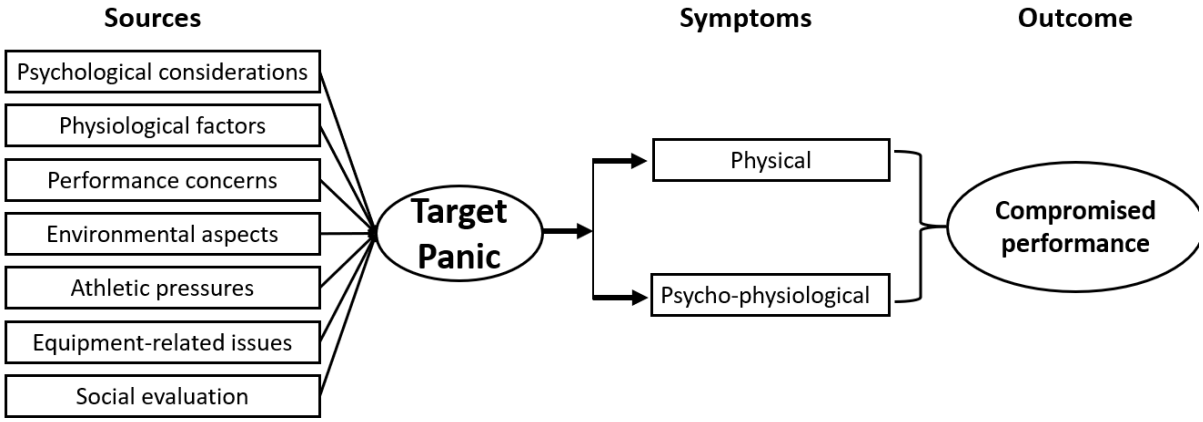

Figure 8. Sources and Outcome of Target Panic

6. Strengths And Limitations

The primary strength of the study was the inclusion of National-level archers' experiences, lending credibility to the result, providing trustworthy data to plan interventions. The interview transcripts provided opportunities to amplify the archers' experiences during performance. Another strength of the study was that all participants were National-level athletes and articulated their experiences readily.

As a limitation, we acknowledge that the research scope excluded the target panic in different bow categories and para-athletes. Secondly, we acknowledge that memory distortion could have affected the recall of the target panic experiences. We caution the readers to bear in mind the 'recall' factor when generalising the findings. This study did not examine how target panic develops, fluctuates, and resolves over time.

7. Considerations For Coaching

The current study emphasises the necessity of addressing target panic as a complex interplay of psychological, physiological, technical, environmental, and social influences in archery. Coaches can identify when the athletes experience pressure or technical issues, which leads to target panic and work with the archers to help them adjust their arousal, focus and execute the shot confidently. With the evidence of the sources of target panic, coaches can gradually introduce challenging targets during competitive preparation, enhancing self-efficacy. Research suggests that by identifying the underlying sources, targeted individualised psychological support can be considered for self-regulation and attentional control.[53] Athlete-centred psychological support can result in optimising archers' psychological state during crucial situations in competition. The findings can lay a foundation for planning targeted intervention addressing the root cause.

8. Future Directions

Future research can include larger and more diverse samples across various competitive levels and geographical locations. Future studies can focus on the difference between recurve, wooden, and compound bow archers, and gender-balanced samples to identify bow-specific and gender differences in target panic. Experimental studies can be considered to further examine the effectiveness of the intervention on target panic.

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