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Competitive Anxiety and Self-Confidence in Archery: A Narrative Review of the Empirical Literature

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A B S T R A C T

Objective: Archery gives the athlete complete control over when to shoot and several seconds in which to change their mind. That combination makes psychological state consequential. Researchers have been measuring it in archers since the mid-1990s. This review examines what is known about competitive anxiety and self-confidence.

Methods and Materials: 23 studies reporting data on archers were identified, alongside evidence from shooting and from the wider sport psychology literature that supplies the field with its instruments and its assumptions.

Findings: Anxiety and performance are negatively associated wherever the association has been tested. Seven of the 23 studies used one questionnaire family whose factor structure was rejected on a sample of over 1200 athletes. No other instrument was used more than once. Self-confidence is collected in almost every study and investigated in almost none. However, wherever it has been measured with instruments and compared against real competition scores it outperformed every other predictor. The intervention literature reports success with striking regularity but its only randomized controlled trial is null.

Conclusion: The available evidence remains limited by methodological heterogeneity, small samples and inconsistent measurement approaches. Four study designs are outlined that would address the principal gaps identified

Keywords: *Archery, Competitive Anxiety, Self-Confidence, Precision Sport, Sport Psychology*

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1. Introduction

There is a moment in every archery shot when nothing external is happening. The archer is at full draw holding roughly twenty kilograms of limb tension steady. The arrow will leave only when the archer decides to let it. No clock runs down in any meaningful way. What fills that gap is entirely internal. It is the reason archery has been described as a mental sport by the people who compete in it. For the same reason, it is treated as useful research setting by the people who study the sport (1).

The structural features that produce this are shared with a small family of sports. Archery is closed skill, meaning the environment does not change in ways the performer must react to. It is self-paced, meaning execution is initiated by the athlete rather than by an event (2). Rampp and colleagues (2022) used archery for exactly this reason when they wanted a motor learning task in which the decisive movement is small and internally regulated (2). The reason why it was chosen was different, but it amounted to the same thing namely that scoring is continuous, granular, and objective. The archer has one dominant strategy which never varies (3).

The earliest work went about it through the body. The state of cardiovascular and cortical activity during self-guided marksmanship was noted by (4). They observed a distinctive attentional state before the archer takes the shot. During the process of an archer taking the aim, there was a greater level of alpha change in the left hemisphere. Salazar et al., (1990) extended the approach to 28 elite archers and reported the same pattern (5). Landers et al., (1991) converted the observational approach into an intervention by feeding corticol activity back to 24 pre-elite archers (6). The developmental baseline for adolescent archers for autonomic measures was set by (7). Gonzalez et al. (2017) showcased that expert archers normally tend to hold a longer fixation before the act of release (8). The do so particularly when visual conditions are made challenging.

There is a parallel tradition of self-reporting that focuses on how the archer feels rather than on what the archer's body is doing. The primary instrument for this is the Competitive State Anxiety Inventory-2 (9) and revision of the said inventory (10). The inventory comprises three subscales that are administered just before the competition. These are self-confidence, cognitive anxiety and somatic anxiety. This field has been shaped largely by this instrument, more so than by any theory. It is also why the two constructs are treated together here rather than separately. Confidence is not measured in archery because researchers set out to study confidence. It is measured because it arrives bundled with anxiety, operationalised as anxiety inverted rather than as the sport specific construct described by (11).

These traditions have produced a body of work that is larger than it looks. Interventions have been tested using relaxation, most recently by Rizal et al. (2019) and by Verawati & Valianto (2020) (12, 13). Imagery protocols have been trialed by Indahwati & Ristanto (2016) and by Isar et al. (2022) (14, 15). Mindfulness has been trialed by Wu et al. (2021) (16). Meditation has been trialed by Billy Yachsie et al. (2023) (17). Biofeedback has been trialed by Paul et al. (2012) (18). A yoga module has been built and validated specifically for archers by Baishya et al. (2025) (19). Machine learning has been applied to psychological coping profiles in archers by Taha, Musa, Abdul Majeed, et al. (2018); Taha, Musa, Abdullah, et al. (2018) (20, 21). Qualitative work has examined the sport specific breakdown known as target panic (Prior & Coates, 2020). It has also examined the conditions under which archers choke (22). A Korean meta-analysis has aggregated seventeen psychological skill training trials (23).

What has been missing is a synthesis asking whether the combined findings support the confidence with which conclusions about archery psychology are drawn. Coaching practice treats anxiety management as foundational. Adjacent constructs have received closer attention. Attentional networks in elite precision sport athletes have been examined by Lu et al. (2021) and P. Li et al. (2021) (24, 25). Mood and burnout have been addressed by Xu et al. (2024)Xu et al. (2024) (26). The review addresses three questions. What does the evidence show about the relationship between these constructs and archery performance. How sound are the instruments and designs that produced it. Where does the field claim more than it can support.

2. Methods and Materials

The corpus includes case observation of 5 athletes (27). It includes cross sectional surveys, quasi experiments with and without controls, structural equation models (28). It includes support vector machine classification (SVM) (20). It also includes Poisson modelling of a decade of archived competition results (29).

The review is reported in accordance with the Scale for the Assessment of Narrative Review Articles (30). PubMed and Google Scholar were searched on 2 February 2026.

PubMed was searched on the population term alone, using archer[tiab] OR archers[tiab] OR archery[tiab] OR recurve[tiab] OR compound bow[tiab]. Google Scholar was searched with four title restricted strings entered using the allintitle operator, so that a record is returned only where every term appears in the title. These were allintitle archery anxiety, allintitle archery confidence, allintitle archery self-confidence, and allintitle archer anxiety. Together they returned 65 records.

No instrument name was searched, since instruments are rarely named in titles. A broader string pairing archery with the quoted phrase competitive anxiety, without the title restriction, returned approximately 1,890 records and was not used. Further studies were identified from the reference lists of the articles retrieved. No date limit and no design filter were applied. Every study discussed was read in full text.

Studies were included where archers were the sole or primary sample and at least one of competitive anxiety or self-confidence was measured with a named instrument. Studies of rifle and pistol shooting were retained separately where they address a question the archery evidence cannot, namely the trials by Dana et al. (2022), Lee et al. (2023) and Zhao et al. (2024) (31-33). Instrument development and validation sources were retained for the section on measurement. Only English language full texts were assessed. It is a substantial restriction in a field whose most productive programmes publish in Indonesian, Malay, Turkish, and Korean. One Persian language study of skilled archers was identified and could not be read. The 17 trials aggregated by Kim et al. (2021) are not individually available in English (23).

23 studies measured competitive anxiety or self-confidence. Other work is cited where it bears on the argument but is not counted among the 23. Studies of archers that measured no anxiety or confidence outcome, including the psychophysiological, gaze, attention and archived competition literature, are cited as background. Studies of shooting, fencing, golf and darts are named as such wherever they appear and are never offered as evidence about archers. Sources describing an instrument or a theory are cited as framing.

Included studies are reported in three categories, identified in the final column of Table 1. Competitive archery evidence comprises the 15 studies of archers competing at provincial, national or international level. Non-competitive archery evidence comprises the four studies of novices, university classes and club participants. Related and mixed sample evidence comprises the four studies in which archers were not the only participants. The conclusions rest primarily on the first category, and where a claim depends on the second or third this is stated where the claim is made.

Studies of archers measuring autonomic control, concentration, trait emotional intelligence or self-efficacy are treated as background, since these are constructs distinct from competitive anxiety and sport confidence.

Four questions guided that reading. Whether the sample was large enough for the estimate reported, since nine of the 23 analysed fewer than 30 participants. Whether performance was measured from recorded scores or not measured at all, since six studies report no performance outcome. Whether any condition was controlled or withheld, since only five studies compare conditions rather than naturally occurring groups and only one is randomised. And whether the instrument was named with its reliability reported in that sample. The Table 1 records the principal limitation of each study in these terms. The 23 met these criteria. In table.1, 19 of archers alone are listed first, followed by four in which archery data are identifiable but archers were not the only participants. The principal limitation column records the feature that most constrains what each study can support, and is intended to be read alongside the finding rather than as a score. Every value was read from the full text of the source.

Table 1: Characteristics and principal limitations of the 23 studies discussed in this review.

Study	Country	N	Level	Design	Instrument	Timing	Performance	Principal finding	Principal limitation	Study category
(27)	Japan	5	University kyudo club	Within subject, three conditions	Somatic anxiety scale with heart rate	Practice and match	Competition score	Heart rate and somatic anxiety move differently across conditions	Five participants. Findings are illustrative rather than estimable	Non-competitive
(34)	Greece	70	Elite, national championship	Cross sectional survey	ACSI-28, Greek version	Before competition	Not measured	Experience differences on freedom from worry, concentration and confidence. No sex differences	Cross sectional with no performance outcome. Group	Competitive

									comparison only	
(35)	India	30	Senior national	Cross sectional comparative	CSAI-2	30 min before	Not measured	Women higher on both anxiety subscales and lower on confidence	Thirty participants. No performance outcome. Abstract contradicts the results table	Competitive
(14)	Indonesia	19	Provincial, Porprov V East Java	Pre post quasi experiment, no control	SCAT with Grid Concentration Exercise	Before and after nine sessions	Not measured	PETTLEP imagery associated with reduced anxiety and improved concentration	Nineteen participants and no control condition	Competitive
(36)	Turkey	39	Novice, aged 18 to 27	Correlational, median split on personality	CSAI-2 with heart rate variability	Before shooting	First 10 shots	Link between somatic anxiety and autonomic activity is conditional on personality	Median split on personality reduces power and is data dependent	Non-competitive
(20)	Malaysia	50	Development programme, university and state	Support vector machine classification	ACSI-28	Before shooting tests	Archery score	Coping skills profile classifies high potential archers	Classification accuracy reported without external validation	Competitive
(21)	Malaysia	32	Archery programmes, Terengganu	Supervised pattern recognition	Psychological coping skills inventory	Before shooting tests	Archery performance	18 archers classified as higher and 13 as lower performing	Thirty-two participants and no control condition	Competitive
(37)	Korea	18 of 24 recruited	University, national trials	Comparative repeated measures with biomarkers	Single item ten point anxiety rating	30 min before, 3 min before, 30 min after	36 arrows at 50 m	High performers lower anxiety throughout. Low performers still anxious after competition	18 analysed of 24 recruited. Anxiety measured by a single item	Competitive
(13)	Malaysia	28	Novice undergraduates	Randomised controlled trial	CSAI-2R with pulse oximetry	Before and after three weeks	20 arrows at 10 m	No group or interaction effects on anxiety, heart rate or performance	28 across two arms. Novices shooting at ten metres, well short of competition	Non-competitive
(22)	Italy	115	Competitive, mean age 39	Explanatory model fitting	Anxiety, coping style, decentering	Not competition specific	Self-reported choking frequency	Ruminative worry directly implicated in choking frequency	Choking frequency is self-reported. Cross sectional, so direction is not established	Competitive
(38)	Indonesia	12	School age club archers, Banyumas	Correlational, purposive sampling	Twenty item confidence questionnaire	Before shooting	Ability at 50 m	Confidence distribution related to shooting ability	12 participants. Confidence questionnaire not validated beyond this sample	Non-competitive
(28)	China	61	National team, three grades	Cross sectional path model	SSCI-CV and ASCI with EAAT and ERQ-CRV	One week before competition	Qualification and match play score	Sport-confidence total effect 0.574, attention 0.344, reappraisal near zero	Cross sectional, so the causal ordering is assumed. 61 is modest for this many paths	Competitive
(39)	Malaysia	45	Sports school adolescents	Quasi experimental, three active arms	CSAI-2R with SIAM and BSQ	Before and after six weeks	Archery score	Combined imagery and self-talk outperformed either alone	Three active arms with no untreated control, so a common effect cannot be separated	Competitive
(40)	Malaysia	44	National, aged 18 to 24	Cross sectional correlational	Sport Anxiety Scale-2	Before competition	36 arrows at 70 m	Competitive anxiety and performance correlated, r = -.45, p = .002	Cross sectional. Coefficient reported with an ambiguous parenthetical	Competitive
(41)	Malaysia	32	Junior recurve	Cross sectional web survey	CSAI-2R	During training isolation	Shooting performance	Lower level archers higher on anxiety and lower on confidence	Thirty two participants, surveyed under training isolation that is unlikely to recur	Competitive
(39)	Malaysia	20	Intermediate and elite	Comparative with correlation	Psychophysiological measures with cognitive anxiety	Around shooting	Shooting performance	Psychophysiological and performance	20 participants across two levels.	Competitive

			compound, aged 13 to 21					differences by competitive level	Compound archers, limiting transfer to recurve	
(26)	China	16	National team	Single case withdrawal, mixed methods	POMS, ABQ and a sport-confidence inventory	Across ABA phases	Not measured	Medium to large effects on mood, burnout and confidence	16 participants. Withdrawal designs suit behaviours that reverse, and psychological skills largely do not	Competitive
(42)	Indonesia	63	Provincial competition entrants	Descriptive comparative	CSAI-2R	Before entering the arena	Not measured	No difference in anxiety by shooting distance, F = 0.478, p = .622	Reports a single combined score from an inventory with three subscales	Competitive
(19)	India	14	Elite	Feasibility, pre post, no control	CSAI-2R with cognitive and balance measures	Before and after two weeks	Accuracy	Reduced competitive anxiety and improved self-confidence reported	Fourteen participants with no control condition. Feasibility rather than efficacy	Competitive
(43)	Turkey	407 total, 70 archers	Individual sport athletes	Cross sectional	Trait anxiety inventory	Not competition specific	Competitive success	Trait anxiety related to success. Archery results reported separately	Archers are a subgroup of a multi sport cohort. Trait rather than state measurement	Related or mixed
(44)	Turkey	52	College students in an archery class	Predictive, cross sectional	Anxiety and self-confidence measures	Before final examination	Examination outcome	Five factor traits and narcissism predict anxiety and confidence	College students in an archery class. Examination is not competition	Related or mixed
(45)	Turkey	22	University, aged 20 to 24	Within subject, virtual and real archery	Perceived anxiety and confidence with heart rate variability	During shooting	Score in each condition	Real and virtual archery elicit different autonomic and psychological responses	Twenty two participants not described as competitive archers. Ten arrows per condition	Related or mixed
(46)	China	110, 66 male and 44 female	Shooting and archery athletes, aged 12 to 35	Comparative, four groups by sex and anxiety status	Generalised Anxiety Disorder Assessment, GAD-7	Not competition specific	Not measured	Sex differences in gut microbiota composition by anxiety status	Combined shooting and archery sample not disaggregated. Anxiety measured by a clinical screening tool	Related or mixed

1. Results

1.1 Defining Features of the Selected Studies

Three features of this literature constrain the conclusions that can be drawn from it.

1.1.1 Small Samples

All 23 studies report a sample size. Nine analysed fewer than 30 participants. Eight analysed between 30 and 60. Three analysed between 61 and 100. 3 of the total exceeded 100. The smallest was the 5 kyudo archers followed by Miyamoto (1994) (27). Among the core studies the largest was the 115 competitive archers of Diotaiuti et al. (2021) (22). Every one of the 23 reports a single unambiguous total, which was verified against the full text in each case.

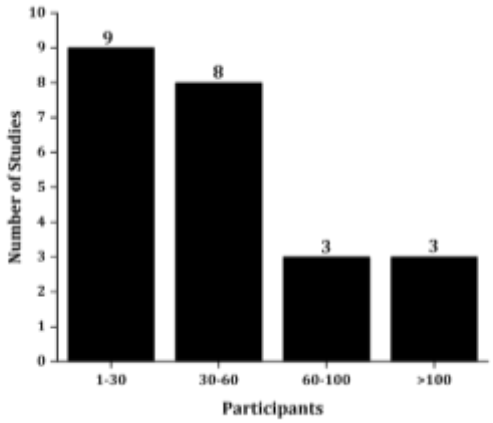

Figure 1. Number of studies by participant sample size, across all 23 studies. The vertical axis reports the number of studies.

1.1.2 Geographically Concentrated

10 of the 23 studies come from two countries. Malaysia contributes seven and Indonesia contributes three. Four that are all are from overlapping author groups centered on one researcher. Korea contributes one study to this corpus despite a national prominence in the sport. This has been described as unbroken since archery entered Korean schools in the 1960s (37). The substantial Korean language literature aggregated is not individually accessible in English (23). Japan likewise contributes 1, the earliest study in the corpus (27). India contributes 3 studies to the corpus (19, 35, 47).

What remains untested is the transferability of the findings that are generated in Southeast Asian university and sports school settings. This question has practical implications because the training hours, sports science support that is embedded and coaching density in such settings differ from decentralized pathways. In Table 2, the evidence type column identifies how each source is used. Core and boundary sources are the 23 studies on which this review draws directly and which appear individually in Table 1. Contextual sources are studies of archers that did not administer an anxiety or confidence measure. Related sport sources are studies of shooting. Synthesis sources are meta-analyses rather than primary studies. Framing sources establish the properties of an instrument or the theory behind a construct. Only core and boundary sources are counted among the 23.

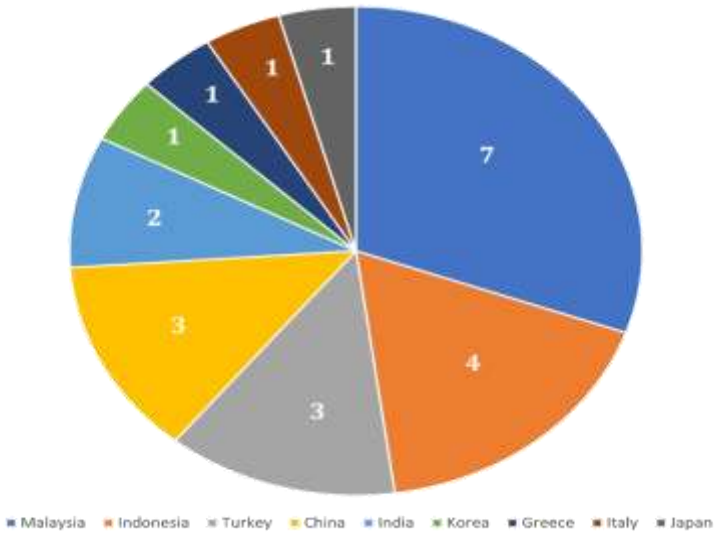

Figure 2. Number of studies by country of the participant sample, across all 23 studies. The values are counts of studies, not counts of participants, and they sum to 23.

Table 2. Sources cited on the corpus of the evidence

Source	Country	Sample	Contribution
(27)	Japan	5 kyudo archers	Earliest located study in the corpus
(37)	Korea	18 female university athletes	Small sample with repeated measurement
(39)	Malaysia	20 compound archers	Rare compound rather than recurve sample
(45)	Turkey	22 participants	Virtual against real archery
(13)	Malaysia	28 novice archers	Only randomised controlled trial in archery
(22)	Italy	115 competitive archers	Largest verifiable archery sample
(23)	Korea	17 aggregated trials	Indicates the size of the inaccessible literature

1.2 Measurement of the Constructs

Seven of the 23 studies used the Competitive State Anxiety Inventory-2 or its revision. Seventeen of the 23 measured anxiety with a named inventory, so the CSAI family accounts for seven of those seventeen. No other instrument appears more than once. Original instrument CSAI-2 was used on 30 Indian archers by Tomor & Shah (2015). Revised form of CSAI-2 has been used in the studies by Rizal et al. (2019), Wan Ahmad et al. (2023), Cahyo et al. (2025) and Baishya et al. (2025) (13, 19, 41, 42). CSAI-2 has been utilized even for shooters by Dana et al. (2022). Three studies have either made use of the Athletic Coping Skills Inventory-28(ACSI-28) (48) or a coping skills profile which is actually derived from it, namely Bebetsos (2015) and the two machine learning papers by Taha, Musa, Abdullah, et al. (2018); Taha, Musa, Abdul Majeed, et al. (2018) (20, 21).

The dominance of one instrument would matter less if that instrument were secure but it is not. The inventory was submitted to confirmatory factor analysis on 1213 competitors, testing 2 independent subsamples. Lane et al. (1999) then tested the combined set and found that the proposed three factor structure fitted poorly every time (49). They traced part of the problem to item wording. It was noted that the cognitive anxiety items ask whether the athlete is concerned rather than worried, which are not the same state. Meta-analysis of 29 studies was done using the instrument. It was found that in closed skill sports, the family archery belongs to only the self-confidence subscale which bore a relationship to performance that differed reliably from 0 (50). A further complication was added by showing that the intensity of an anxiety score and the athlete interpretation of that intensity as helpful or harmful behave as separate variables. It is a distinction almost no archery study has recorded (51).

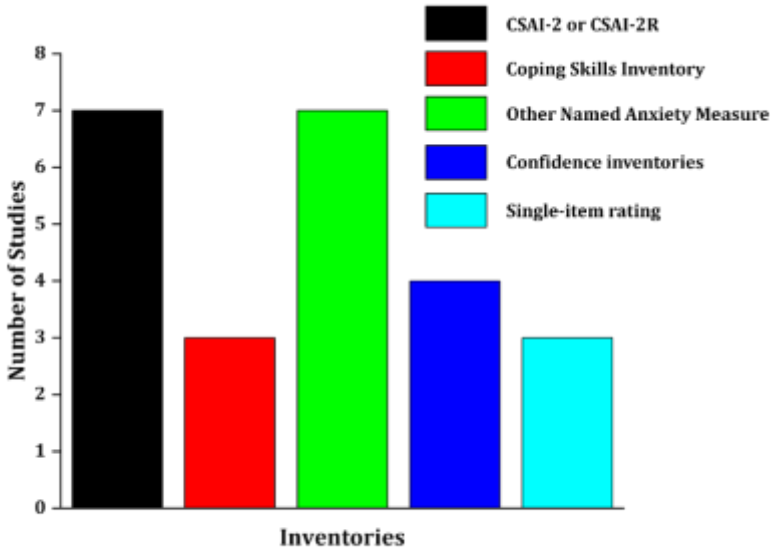

Figure 3. Instrument family across the 23 studies. Where a study administered more than one measure, the primary anxiety or confidence instrument is counted.

When the construct is measured through a single instrument, findings about the construct cannot easily be separated from properties of that instrument. This is the reasoning that was advanced when recommending that the inventory be revised or replaced by Lane et al. (1999). It was reported that lower-level archers show higher anxiety (49) and lower confidence (37) and (41). Some part of that pattern may reflect a questionnaire built on the assumption that confidence is anxiety inverted (9).

The only archery study in this corpus to use a different anxiety instrument is (40). Before a national competition, 44 Malaysian archers who were in the age bracket of 18 to 24 were given the 15 item Sport Anxiety Scale-2 (52). Their performances were then recorded across 36 arrows at 70 meters. The dominant subscale came out to be worry. It had a mean of 12.62 and a standard deviation (SD) of 3.54. The second was concentration disruption. It had a mean of 10.47 and SD 2.93. The close third subscale was somatic anxiety with a mean of 10.33 and SD 2.91r = -.45, p = .002, N = 44. The source reports this coefficient as r(44). The article states an analysed sample of 44 archers in three places, so the value in parentheses appears to be the sample size rather than the degrees of freedom. For a Pearson correlation on 44 cases, it would conventionally be 42. The sample size is therefore reported explicitly here to avoid reproducing an ambiguous notation.

There are two other significant departures that are worth recording. Bebetsos (2015) used the Greek version of the ACSI-28 with 70 elite archers at a national championship (34), which asks about dispositional tendencies rather than about state in the minutes before shooting. It produced findings about experience that the state inventories structurally cannot. Lim (2018) abandoned questionnaires almost entirely (37), asking 18 Korean athletes to rate anxiety on a single 10 point scale while collecting salivary alpha amylase and cortisol. The crudeness of that measure is obvious.

Table 3. Sources cited in the section on measurement

Source	Instrument	Sample	Key point
(9)	CSAI-2	Development	Original three subscale inventory
(10)	CSAI-2R	Revision	Seventeen item form now dominant
(49)	CSAI-2	1213 competitors	Factor structure fits poorly. Item wording implicated
(50)	CSAI-2	29 studies	In closed skill sports only confidence predicts performance
(51)	CSAI-2	Competitive athletes	Intensity and direction behave as separate variables
(48)	ACSI-28	Development	Multidimensional psychological skills measure
(52)	SAS-2	Development	The alternative used by Shaari et al.
(35)	CSAI-2	30 Indian archers	Applied the original inventory
(13)	CSAI-2R	28 novices	Applied the revision under randomisation
(41)	CSAI-2R	32 recurve archers	Applied during training isolation
(42)	CSAI-2R	63 archers	Applied across three distances
(34)	ACSI-28	70 Greek elite archers	Dispositional rather than state measurement
(37)	Single item rating	18 Korean athletes	Crude measure, three time points
(21)	Coping skills profile	Archers	Machine learning classification
(35)	Coping skills profile	Archers	Pattern recognition of coping skills

1.3 Anxiety and Performance

Where an association has been tested and reported with a coefficient, it has been negative. (40) reported r = -0.45 across 44 national level archers. Lim (2018) found that in her high performing group, competition score correlated with anxiety measured 3 minutes before the start at r = -0.86 and that group outscored the low performers by 339.5 against 323.3 across 36 arrows at fifty metres. Trait anxiety related to success was found across 407 individual sport athletes, of whom 70 were archers analysed separately (43).

Consistent direction across independent samples is worth something. It is not worth as much as it looks. These are correlations from small samples with wide intervals. They cannot establish causal direction. An archer shooting has an obvious reason to feel anxious that owes nothing to anxiety

having caused the shooting. Evidence from outside the questionnaire tradition is compatible without settling the matter. Archived competition data were modelled and performance decrements under pressure were found (3). A comparable pattern across a decade of tour results was reported by C. Li & Zhao (2024). But neither study measured anxiety in the athletes concerned (29).

The most stimulating result in this section came from the study with the crudest instrument. Anxiety 30 minutes before competition, 3 minutes before, and 30 minutes after was measured by Lim (2018). In her high performing group, the association with score peaked at the 3 minute point and had dissipated by the third measurement (37). In her low performing group, the pattern was different in a way no single measurement could have detected. Their scores correlated with anxiety recorded thirty minutes after the competition had ended, r = -0.72. The athletes who shot poorly were still anxious well after there was anything left to be anxious about. It was reported that in post competition interviews they expressed regret, self-blame, and difficulty accepting their results (37).

Every other archery study located for this review measured anxiety once. Rizal et al. (2019), Wan Ahmad et al. (2023), Shaari et al. (2023), and Cahyo et al. (2025) all administered their inventory in the period immediately preceding performance (13, 40-42). The variable separating the two performance groups was not pre competition anxiety but the failure of anxiety to resolve afterwards, which is a different phenomenon requiring a different schedule (37).

Anxiety and physiological changes

A cluster of studies has paired self-reported anxiety with physiological measurement. Together they undermine the assumption that a somatic anxiety score describes what the body is doing. Competitive anxiety alongside heart rate variability and respiration was examined in archers and it was concluded that the correspondence is conditional on personality traits rather than direct (44). It was found that heart rate and somatic anxiety moved differently across preparatory practice, formal practice, and matches in 5 kyudo archers (27). Autonomic control between novice and experienced archers was compared at the Sports Authority of India (47). It was reported that trait emotional intelligence predicted the speed of autonomic recovery after a shooting session in 87 novice archers, a construct that appears nowhere else in this literature (53).

Read together these suggest the somatic subscale should be understood as a self-report of perceived bodily state rather than as a proxy for measured arousal. The two are related but they are not the same variable. This point was made explicitly by Dal et al. (2018) (44). It was observed as implicit in the dissociation (27). The point is reinforced from the other direction, finding across one hundred and eighty-four professional matches that neither heart rate nor vagally mediated heart rate variability distinguished high scoring from low scoring performances (54).

1.4 Anxiety phenomenon in archery

The target panic, a performance block in which the archer loses volitional control of the release has been examined by Prior & Coates (2020) (55). It was done through interpretative phenomenological analysis of 7 affected archers. Their account describes a sequence in which excessive focus on shot outcome drives an attempt to seize conscious control. This produces loss of control over execution which is followed by remedial strategies to recover automaticity. The related territory was approached quantitatively across 115 archers, testing anxiety, coping style, and decentering against self-reported choking frequency. It was found that the ruminative component of worry is the factor directly implicated (22). Neither phenomenon appears in the subscales of the state inventory. This means the instrument that dominates this literature cannot detect the two forms of anxiety most specific to the sport.

Cahyo et al. (2025) compared anxiety across the 40, 50 and 70 meter distances in 63 Indonesian archers and found no significant difference (42). F = 0.478, p = .622, although the 70 meter mean was marginally higher. But this negative finding is highly useful in this context. Coaches assume that the technical difficulty of the shot drives competitive anxiety. These data do not support that. There is one caution that is attached to it. Although the paper has named the three subscales of the revised inventory separately, at the end it reports a combined anxiety score based on all three subscales. If confidence was summed into that total, the resulting number is hard to interpret, since higher confidence would inflate an apparent anxiety score.

Table 4. Sources cited in the section on anxiety, performance, physiology, target panic and distance

Source	Design	Findings

(40)	44 archers, SAS-2, 36 arrows at 70 m	Anxiety and performance correlated at r = -0.45, p = .002
(37)	18 athletes, 3 time points, saliva	High performers r = -0.86 three minutes before. Low performers r = -0.72 30min after
(43)	407 individual athletes, 70 archers	Trait anxiety related to competitive success
(44)	Archers, anxiety with HRV and respiration	Correspondence conditional on personality traits
(27)	5 kyudo archers across three conditions	Heart rate and somatic anxiety dissociate
(47)	Novice against experienced archers	Autonomic control differs with experience
(53)	87 novice archers	Trait emotional intelligence predicts autonomic recovery
(54)	8 elite archers, 184 matches	Neither heart rate nor HRV separated good from poor matches
(42)	63 archers, three distances	No difference by distance, F = 0.478, p = .622
(3)	Archived competition data	Performance decrement under pressure. Anxiety not measured
(29)	Tour results across a decade	Comparable pressure effect. Anxiety not measured
(55)	7 archers with target panic	Outcome focus leads to attempted conscious control and loss of it
(22)	115 competitive archers	Ruminative worry directly implicated in choking frequency

1.5 Self-Confidence and Performance

The survey of 61 athletes from Chinese national archery team spanning international, national, and first class grades modelled the relationships between cognitive reappraisal, sport-confidence, attention, and performance using partial least squares structural equation modelling (28). The important methodological choice was not the modelling. It was that they did not extract confidence from an anxiety scale. They used the State Sport-Confidence Inventory in its Chinese version together with the Athlete Sport-Confidence Inventory. Both are built to measure confidence as a sport construct in the tradition established by Vealey (1986) (11). Performance came from an actual competition under Olympic rules, combining the qualification ranking score across 72 arrows with the match play set score.

Sport-confidence returned a total effect of 0.574 on performance, ahead of attention at 0.344, in a model explaining 33.6 percent of variance. Cognitive reappraisal showed a negative direct effect of -0.268. The total effect of cognitive reappraisal was statistically indistinguishable from zero in the survey conducted by D. Wang et al. (2022) (28).

Within the studies reviewed here it is the largest reported effect on archery performance. It rests on the largest elite archery sample located and it was validated against competition scores rather than a laboratory task. It also concerns a construct that most of the field records as a subscale and then declines to discuss. This pattern is visible in Rizal et al. (2019) Wan Ahmad et al. (2023) and Cahyo et al. (2025) as each of these collected confidence data and reported it without analysis (13, 41, 42).

A far simpler route was used with Indonesian archers, using a purpose built 20 item confidence questionnaire and testing ability at 50 meters by Yachsie et al. (2021) (38). Like Wang and colleagues, they measured confidence directly rather than by subtraction, and like them they found a relationship with performance. The study is methodologically modest and the instrument is not validated beyond that sample. It is nonetheless a second independent instance of the same pattern.

1.6 Antecedents of self-confidence

The five factor personality traits and narcissism were tested as predictors of anxiety and self-confidence in 52 college student athletes before an archery class final examination by Dal (2018) (44). The design is unusual for this literature in treating the 2 constructs as outcomes rather than as predictors of performance. It is the only source located here that looks upstream of them. Its setting limits how far the findings travel since an examination is not a competition and the participants were students rather than competitive archers. But the question it asks is one the field has otherwise left alone.

The most useful evidence on its origins is offered by Bebetsos (2015) (34). Across 70 Greek elite archers, differences emerged by competitive experience on freedom from worry, concentration, and confidence. More experienced archers were higher on all three. Age differences appeared on freedom from worry and on peaking under pressure. Older athletes reported better emotional control with less distress. Confidence in archery therefore looks at least partly accumulated rather than dispositional. That is encouraging for coaching. It also means cross sectional comparisons between experienced and inexperienced archers cannot separate confidence from everything else experience brings.

Table 5. Sources cited in the section on self-confidence

Source	How confidence was measured	Findings
(28)	SSCI-CV and ASCI, dedicated inventories	Total effect on competition performance 0.574. Attention 0.344. Reappraisal near zero
(44)	Anxiety and confidence as outcomes	Five factor traits and narcissism tested as predictors. 52 student athletes before an archery examination
(11)	Conceptual and instrument development	Established sport-confidence as distinct from general self-confidence
(38)	Purpose built twenty item questionnaire	Confidence related to ability at fifty meters
(10)	CSAI-2R confidence subscale	The dominant approach, confidence as a subscale of an anxiety inventory

1.7 Interventions reported to improve performance

A PETTLEP imagery protocol was applied to archers preparing for a provincial competition in East Java and effects on competitive anxiety and concentration were reported Indahwati & Ristanto (2016) (14). Progressive muscle relaxation was applied at a university club in Medan and improved concentration was reported Verawati & Valianto (2020) (12). Imagery was combined with meditation and better accuracy was reported at 40 meters (17). Imagery, self-talk, and both together across 18 sessions were compared and it was found that the combination outperformed either alone on state anxiety, confidence, and performance (15). Baishya et al. (2025) built a yoga module specifically for archers, validated its 32 practices against the ratings of 40 experts, and then delivered 6 supervised sessions over 2 weeks to 14 elite archers, reporting reduced competitive anxiety and improved self-confidence alongside gains in reaction time, accuracy, and balance (19). Effects from sensorimotor rhythm neurofeedback have been reported by Paul et al. (2012) (18). A mindfulness programme was conducted with 23 archers for 4 weeks. It reported that there is an improvement in shooting performance as well as cognitive function (16). Significant gains in flow and mindfulness were reported when it delivered a mindfulness programme to not just archers but to a combined group of archers and golfers (56). Medium to high effects on mood, burnout and confidence were reported when it used a single case withdrawal design with a total of 16 archers of national team (26).

The single aggregated estimate has been provided here by Korean meta-analysis. 17 psychological skills training trials with archers were pooled by Kim et al. (2021) (23). It reported a Hedges g of 0.469 which is a small effect that is moderated significantly by the level of athlete and duration of training. Adults and longer programmes did better.

1.8 Pointing opposite ways: The two controlled trials

28 archers from the novice category of archers were randomised by Rizal et al. (2019) (13). They were gender matched. Progressive muscular relaxation or a control condition of light stretching was performed. The intervention ran nine sessions across three weeks. Anxiety was measured with the revised inventory. Heart rate was measured by pulse oximeter. Performance was measured as 20 arrows at 10 meters. The result was null. Time effects appeared for cognitive anxiety, $p = .037$, and performance, $p = .019$, but in both groups. Between group and interaction effects were absent, and nothing emerged for somatic anxiety, self-confidence or arousal.

A comparable design in shooting was run by Dana et al. (2022) (31). 45 male shooters aged 19 to 30 were randomly assigned to mindfulness training, mental skills training, or control. They were divided into 15 shooters per group, across 6 sessions of 60 minutes over 6 weeks. Both interventions reduced competitive state anxiety significantly and neither outperformed the other.

Rizal et al. (2019) worked with novices introduced to archery a week before the pre test (13), while Dana et al. (2022) worked with experienced shooters (31). The Rizal protocol ran 3 weeks against 6. The Rizal performance task was 20 arrows at 10 meters. This distance was chosen because participants could not reliably hit the target further away, which is a considerable departure from competition.

Level was found to be a significant moderator (23). If interventions work better in trained athletes, then the only randomised controlled trial in archery was run in precisely the population where it was least likely to detect anything. That is bad luck rather than bad design. It means the null should not be read as evidence that relaxation does not help archers.

It also leaves something less comfortable. The uncontrolled positive findings come from trained archers and the controlled null comes from novices. So, design and population are confounded across the whole intervention

literature. Broader syntheses in athletic populations support mindfulness efficacy under controlled conditions, as Y. Wang et al. (2023) established across randomised trials and as Noetel et al. (2019) argued from a wider review (57, 58). A randomised trial in dart throwing found effects on beginner's skill acquisition (59).

Table 6. Sources cited in the section on interventions

Source	Intervention	Control	Result
(13)	Relaxation, nine sessions, three weeks	Yes	Null. 28 novices
(31)	Mindfulness or mental skills, six weeks	Yes	Both reduced anxiety. 45 shooters
(23)	Meta-analysis of 17 trials	Varied	Pooled g = 0.469, moderated by level and duration
(14)	PETTLEP imagery	No	Effects on anxiety and concentration
(12)	Progressive muscle relaxation	No	Improved concentration
(17)	Imagery and meditation	No	Improved accuracy at forty meters
(15)	Imagery, self-talk, and both	No untreated arm	Combination outperformed either alone
(18)	Sensorimotor rhythm neurofeedback	No	Psycho-physiological and performance effects
(19)	Validated yoga module, six sessions over two weeks	No	Reduced competitive anxiety and improved self-confidence. 14 elite archers
(58)	Meta-analysis of randomised trials	Varied	Supports mindfulness efficacy in athletes.
(59)	Mindfulness in dart throwing	Yes	Effects on beginners skill acquisition
(16)	Mindfulness, four weeks	No	Improved shooting and cognitive function. 23 archers
(56)	Mindfulness programme	No	Gains in trait mindfulness and flow. Archers and golfers
(26)	Skill and spirit oriented training	No	Medium to large effects on mood, burnout, confidence. 16 national team

1.9 Competitive level and Performance

The most frequently reported finding here, though it rests entirely on cross sectional comparison, is that higher level archers report less anxiety and more confidence than lower level archers. It was found between high and low performing groups at a national trial by Lim (2018) (37). It was found among 32 recurve archers during enforced training isolation that lower level archers were around 5% higher on both anxiety subscales and top archers were substantially higher on confidence (41). Intermediate and elite compound archers were compared on psychophysiological and shooting measures (39). In the shooting analogue, 45 adolescent shooters were compared by competitive grade and significant differences were found in both cognitive and physical state anxiety (33).

The interpretive problem is the familiar one. Cross sectional designs cannot say whether low anxiety produces good performance, good performance produces low anxiety, or both follow from the years of training separating an elite archer from a developmental one. Bebetsos (2015) comes closest to disentangling it, since his experience groupings sit within a single elite sample where all participants compete nationally (34).

1.10 Sex and performance

No significant differences between men and women on any of seven factors across 70 Greek archers was found by Bebetsos (2015). Differences on all three subscales were found across 30 Indian archers (34). Women were higher on cognitive anxiety at 21.20 against 16.00, higher on somatic anxiety at 19.07 against 15.47, and markedly lower on confidence at 22.80 against 30.33 (35). The question was approached through archived competition data across a decade and it was reported that female archers showed lower last arrow scores following adversity (29). It was examined through gut microbiota composition in response to anxiety in shooting and archery athletes (46).

Table 7. Sources cited in the section on group differences and Competitive level

Source	Comparison	Finding
(37)	High against low performing groups	Anxiety lower in high performers at all three time points
(41)	Levels within 32 recurve archers	Lower level archers around five percent higher on both anxiety subscales
(39)	Intermediate against elite compound archers	Psychophysiological and shooting differences by level
(33)	Adolescent shooters by competitive grade	Cognitive and physical state anxiety differ by grade

(34)	Age, experience, and sex	Experience effects present.
(35)	Men against women	Differences on all three subscales.
(29)	Men against women, archived data	Female archers lower on last arrow scores after adversity
(46)	Men against women	Gut microbiota composition differs in response to anxiety

2. Discussion

2.1 The field measures one construct well and the more important one badly

Competitive anxiety receives the instruments, the interventions, and the attention. Self-confidence is collected nearly universally and treated as a byproduct. In the one study measuring confidence with purpose-built instruments against real competition scores, sport-confidence carried a total effect of 0.574 while every other predictor trailed behind it. Attention returned a total effect of 0.344. Cognitive reappraisal, which the authors had expected to assist performance, showed a negative direct effect of -0.268 and a total effect that was not significantly different from zero (28). A compatible conclusion was reached by a different route, finding that in closed skill sports the confidence subscale was the only one of the three with a reliable relationship to performance (50). The inventory of Martens et al. (1990) arrived before most of the archery work did and bundled confidence in as a third scale (9). The research question appears to have followed the instrument rather than the other way round.

2.2 Instrument monoculture is the central weakness

Seven of the 23 studies used the Competitive State Anxiety Inventory-2 or its revision, which is seven of the seventeen that measured anxiety with a named inventory. No other instrument appears more than once. The factor structure of that inventory was rejected on over twelve hundred athletes (49) whose subscales relate inconsistently to performance (50). It does not record the intensity and direction distinction that (51) showed to matter. The single archery study using a different instrument produced the strongest correlation in the corpus (40). One comparison cannot settle whether the instrument is the reason. It does identify the study that should be run.

A related problem concerns what the somatic subscale indexes. The physiological work indicates that self-reported bodily anxiety and measured autonomic activity relate conditionally rather than directly (44). It can dissociate across conditions (27). Autonomic measures themselves failed to separate good from poor competitive performances across 184 matches (54). A subscale named somatic anxiety invites the assumption that it indexes the body. The evidence suggests it indexes the athlete perception of the body, which is a different and arguably more interesting variable.

2.3 Four studies that would help

A randomised controlled trial of an anxiety intervention in competitive archers, at competition distance, with an active control and a dose of at least eight weeks, would resolve more than another 20 surveys. An instrument triangulation study giving one archer sample the revised state inventory, the Sport Anxiety Scale-2 and a dedicated confidence inventory together would answer directly whether the findings survive a change of measure. A repeated measures design sampling anxiety after competition as well as before, following the schedule Lim, (2018) used, a finding that has not been followed up. Any of these conducted outside Southeast Asia, particularly in a large archery nation with a decentralised development pathway, would test the transferability the field currently assumes.

2.4 Limitations

This is a narrative review and makes no claim to completeness. Screening and appraisal were carried out by one person without duplicate assessment. One substantial restriction in this field is that only full texts in English language were used. This restriction is not just a mere formality. One Persian language study related to skilled archers was identified but could not be read. Accessibility was largely limited to sources that are open access. This may bias the included set towards journals that publish openly.

The studies were weighed by one reviewer without a second reader, so the judgements about what limits each study are open to disagreement. Reporting in this literature is uneven. One included study states in its abstract that no significant differences were found while its results table reports three. A study excluded from the review reports a total sample that cannot be reconciled with its own breakdown by sex.

One source identified during screening was removed at the drafting stage. It was an extended conference abstract

reporting on a large Malaysian sample. A further limitation is the papers that were read in full text. Another limitation concerns what could be synthesized. The evidence mixes a single case observation with survey, quasi experimental and modelling designs. The evidence base is small and unevenly distributed. 23 archery studies is not a large base from which to draw conclusions about an entire field. Ten of the 23 studies come from two countries. Nine analysed fewer than 30 participants and three exceeded 100.

3. Conclusion

This review set out to ask what the evidence shows about competitive anxiety, self-confidence and archery performance, how sound the instruments and designs that produced it are and where the field claims more than it can support. Where an association between anxiety and performance has been tested and reported with a coefficient it has been negative.

Three features of the 23 studies constrain every conclusion. Fewer than 30 participants and only three exceeded 100. And all but one were published from 2015 onward, so the field is younger in substance than its earliest study suggests. This is an instrument whose proposed three factor structure was tested by confirmatory factor analysis on 1213 competitors and did not hold. Its subscales were shown by meta-analysis of 29 studies to relate to performance inconsistently. It reported that the strongest correlation of the subscales of the dominant inventory cannot detect target panic or choking, the two forms of anxiety most specific to this sport. A somatic anxiety score is better understood as a self-report of perceived bodily state than as a proxy for measured arousal.

The largest effect on archery performance reported study measuring confidence directly rather than by subtraction found a relationship in the same direction. The meta-analytic finding that in closed skill sports the confidence subscale was the only one bearing a relationship to performance reliably different from zero points the same way. Two archery studies remain a thin base for a claim of that size, which is precisely the difficulty. The intervention literature carries a comparable weakness. Positive findings are reported with regularity from designs without controls. The one aggregated estimate is a small pooled effect moderated by athlete level and programme duration. The only randomised controlled trial in archery was null and was conducted in novices over three weeks at a distance well short of competition. Design and population are therefore confounded across the whole of that literature and the null cannot be read as evidence that the intervention does not work.

Taken together, the available evidence remains limited by methodological heterogeneity, small samples and inconsistent measurement approaches. Four study designs are outlined above that would address the principal gaps identified, and none of them is expensive or technically demanding. A randomised controlled trial in competitive archers at competition distance with an active control, a study giving one archer sample the revised state inventory, the Sport Anxiety Scale-2 and a dedicated confidence inventory together, a repeated measures design that continues sampling after competition has ended, and any of these conducted outside the two countries that supply the largest share of the present literature would answer more than a further set of surveys using the existing convention. Until that work is done, the findings summarised here should be read as what the available designs can support rather than as settled properties of the sport.

Authors' Contributions

[Dr. Rina Poonia][1] conceptualisation, methodology, investigation, data curation, formal analysis, writing of the original draft, and visualisation. [Mr. Priyanshu Poonia][2] conceptualisation, methodology, supervision, validation, and writing through review and editing. [Dr. Ketul Kumar][3] investigation, screening of records, data curation, and writing through review and editing. [Mr. Mahindar Gora][4] investigation, verification of extracted data against source articles, and writing through review and editing. [Ms. Sareen Chhokar][5] formal analysis, appraisal of study quality, and writing through review and editing. [Dr. Anurag Sachan][6] validation, resources, and writing through review and editing. [Mr. Parth Chaudhary][7] supervision, project administration, and writing through review and editing. All authors have read and agreed to the submitted version of the manuscript.

Declaration

The authors declare that generative artificial intelligence (AI) tools were used solely to improve the English language, grammar, readability, and overall clarity of the manuscript. All scientific content, study design, data analysis, and conclusions were developed exclusively by the authors. The authors take full responsibility for the accuracy, originality,

and integrity of the manuscript and have carefully reviewed and approved the final version prior to submission.

Transparency Statement

No new data were generated or analysed. All studies discussed are available from the cited sources.

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Declaration of Interest

The authors report no conflict of interest.

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Ethical Considerations

This is a review of previously published literature and involved no primary collection of human subject data.

References

1. Haywood KM. Psychological Aspects Of Archery. The Sport Psychologist's Handbook: Wiley; 2005. p. 549-66. [DOI]
2. Rampp S, Spindler K, Hartwigsen G, Scheller C, Simmermacher S, Scheer M, et al. Archery Under The (Electroencephalography-)Hood: Theta-Lateralization As A Marker For Motor Learning. Neuroscience. 2022;499:23-39. [PMID: 35870564] [DOI]
3. Bucciol A, Castagnetti A. Choking Under Pressure In Archery. Journal of Behavioral and Experimental Economics. 2020;89:101581. [DOI]
4. Hatfield BD, Landers DM, Ray WJ. Cardiovascular-CNS Interactions During A Self-Paced, Intentional Attentive State: Elite Marksmanship Performance. Psychophysiology. 1987;24(5):542-9. [PMID: 3685234] [DOI]
5. Salazar W, Landers DM, Petruzzello SJ, Han M, Crews DJ, Kubitz KA. Hemispheric Asymmetry, Cardiac Response, And Performance In Elite Archers. Research Quarterly for Exercise and Sport. 1990;61(4):351-9. [PMID: 2132894] [DOI]
6. Landers DM, Petruzzello SJ, Salazar W, Crews DJ, Kubitz KA, Gannon TL, et al. The Influence Of Electrocortical Biofeedback On Performance In Pre-Elite Archers. Medicine & Science in Sports & Exercise. 1991;23(1):123-9. [DOI]
7. Carrillo AE, Christodoulou VX, Koutedakis Y, Flouris AD. Autonomic Nervous System Modulation During An Archery Competition In Novice And Experienced Adolescent Archers. Journal of Sports Sciences. 2011;29(9):913-7. [PMID: 21547837] [DOI]
8. Gonzalez CC, Causer J, Grey MJ, Humphreys GW, Miall RC, Williams AM. Exploring The Quiet Eye In Archery Using Field- And Laboratory-Based Tasks. Experimental Brain Research. 2017;235(9):2843-55. [PMID: 28660285] [PMCID: PMC5550539] [DOI]
9. Martens R, Vealey RS, Burton D. Competitive Anxiety In Sport1990.
10. Cox RH, Martens MP, Russell WD. Measuring Anxiety In Athletics: The Revised Competitive State Anxiety Inventory-2. Journal of Sport and Exercise Psychology. 2003;25(4):519-33. [DOI]
11. Vealey RS. Conceptualization Of Sport-Confidence And Competitive Orientation: Preliminary Investigation And Instrument Development. Journal of Sport Psychology. 1986;8(3):221-46. [DOI]
12. Verawati I, Valianto B, editors. The Effects Of Progressive Muscle Relaxation On Concentration In Archery Athletes At The Unimed Club. 1st Unimed International Conference on Sport Science (UnICoSS 2019); 2020. [PMID: 33612580] [PMCID: PMC7257040] [DOI]
13. Rizal H, Hajar MS, Kuan G, Savadelavar M, Kueh YC. The Effects Of Progressive Muscular Relaxation On Novice Archers' State Anxiety, Heart Rate And Performance Scores. International Journal of Public Health and Clinical Sciences. 2019;6(4):96-112. [DOI]
14. Indahwati N, Ristanto K. The Application Of Pettlep Imagery Exercise To Competitive Anxiety And Concentration In Surabaya Archery Athletes. International Journal of Educational Science and Research (IJESR). 2016;6(3).
15. Isar MAHM, Rasyid NM, Aziz SA. Effects Of Imagery Training And Self-Talk Towards State Anxiety And Archery Performance. International Journal of Human Movement and Sports Sciences. 2022;10(4A):41-5. [DOI]
16. Wu TY, Nien JT, Kuan G, Wu CH, Chang YC, Chen HC, et al. The Effects Of Mindfulness-Based Intervention On Shooting Performance And Cognitive Functions In Archers. Frontiers in Psychology. 2021;12. [PMID: 34248757] [PMCID: PMC8268485] [DOI]
17. Billy Yachsie BTPW, Suharjana S, Graha AS, Prasetyo Y, Nasrulloh A, Suhasto S. Mental Training To Improve The 40-Meter-Distance Archery Accuracy With Imagery And Meditation Methods. International Journal of Human Movement and Sports Sciences. 2023;11(2):450-6. [DOI]
18. Paul M, Ganesan S, Sandhu J, Simon J. Effect Of Sensory Motor Rhythm Neurofeedback On Psycho-Physiological, Electro-Encephalographic Measures And Performance Of Archery Players. Ibnosina Journal of Medicine and Biomedical Sciences. 2012;04(02):32-9. [DOI]
19. Baishya A, Hazarika D, Metri K. Yoga For Archers: Development, Validation, And Feasibility Testing Of A Yoga Module. International Journal of Yoga. 2025;18(2):199-208. [PMID: 41079242] [PMCID: PMC12510416] [DOI]
20. Taha Z, Musa RM, Abdul Majeed APP, Abdullah MR, Zakaria MA, Alim MM, et al., editors. The Identification Of High Potential Archers Based On Relative Psychological Coping Skills Variables: A Support Vector Machine Approach2018. [DOI]
21. Taha Z, Musa RM, Abdullah MR, Maliki A, Kosni NA, Mat-Rasid SM, et al. Supervised Pattern Recognition Of Archers' Relative Psychological Coping Skills As A Component For A Better Archery Performance. Journal of Fundamental and Applied Sciences. 2018;10(1S):467-84.
22. Diotaiuti P, Corrado S, Mancone S, Falese L, Dominski FH, Andrade A. An Exploratory Pilot Study On Choking Episodes In Archery. Frontiers in Psychology. 2021;12. [PMID: 33643124] [PMCID: PMC7907503] [DOI]
23. Kim EJ, Kang HW, Park SM. The Effects Of Psychological Skills Training For Archery Players In Korea: Research Synthesis Using Meta-Analysis. International Journal of

Environmental Research and Public Health. 2021;18(5):2272. [PMID: 33668902] [PMCID: PMC7956491] [DOI]
24. Li P, Lu Q, Wu Q, Liu X, Wu Y. What Makes An Elite Shooter And Archer? The Critical Role Of Interoceptive Attention. Frontiers in Psychology. 2021;12. [PMID: 34177723] [PMCID: PMC8219872] [DOI]
25. Lu Q, Li P, Wu Q, Liu X, Wu Y. Efficiency And Enhancement In Attention Networks Of Elite Shooting And Archery Athletes. Frontiers in Psychology. 2021;12. [PMID: 33767650] [PMCID: PMC7985157] [DOI]
26. Xu N, Yan W, Sun M, Li R, Wang Y, Chi L. Applying Skill-Oriented And Spirit-Oriented Psychological Training To Chinese National Archery Team Athletes: A Single-Case Mixed-Methods Study. International Journal of Sport and Exercise Psychology. 2024;22(4):926-52. [DOI]
27. Miyamoto M. Changes Of Heart Rate, Somatic Anxiety, And Performance Of Japanese Archers During Practices And Matches. The Japanese Journal of Experimental Social Psychology. 1994;33(3):191-200. [DOI]
28. Wang D, Hu T, Luo R, Shen Q, Wang Y, Li X, et al. Effect Of Cognitive Reappraisal On Archery Performance Of Elite Athletes: The Mediating Effects Of Sport-Confidence And Attention. Frontiers in Psychology. 2022;13. [PMID: 35529554] [PMCID: PMC9070554] [DOI]
29. Li C, Zhao Y. Gender Differences In Skilled Performance Under Failure Competitive Environments: Evidence From Elite Archers. Frontiers in Psychology. 2024;15. [PMID: 39377056] [PMCID: PMC11456463] [DOI]
30. Baethge C, Goldbeck-Wood S, Mertens S. Sanra-A Scale For The Quality Assessment Of Narrative Review Articles. Research Integrity and Peer Review. 2019;4(1):5. [PMID: 30962953] [DOI]
31. Dana A, Shahir VA, Ghorbani S. The Impact Of Mindfulness And Mental Skills Protocols On Athletes' Competitive Anxiety. Biomedical Human Kinetics. 2022;14(1):135-42. [DOI]
32. Lee G, Ryu J, Kim T. Psychological Skills Training Impacts Autonomic Nervous System Responses To Stress During Sport-Specific Imagery: An Exploratory Study In Junior Elite Shooters. Frontiers in Psychology. 2023;14. [PMID: 36818088] [PMCID: PMC9928995] [DOI]
33. Zhao C, Wang K, Li D, Li Y, Wang Z, Liu Y, et al. Relationship Between State Anxiety, Heart Rate Variability, And Shooting Performance In Adolescent Shooters. BMC Psychology. 2024;12(1):736. [PMID: 39695791] [PMCID: PMC11658281] [DOI]
34. Bebetsos E. Psychological Skills Of Elite Archery Athletes. Journal of Human Sport and Exercise. 2015;10(2). [DOI]
35. Tomor N, Shah MM. Comparison Of Competitive State Anxiety Among Senior Boys And Senior Girls Archery Players In India. International Journal of Physical Education, Sports and Health. 2015;1:43-5.
36. Dal N, Tok S, Doğan E, Balıkçı I, Zekioğlu A, Çatıkkaş F. Somatic Anxiety May Represent Archers' Actual Autonomic Nervous System Activity But How: Moderating Role Of Personality Traits. Universal Journal of Educational Research. 2018;6(8):1831-6. [DOI]
37. Lim IS. Comparative Analysis Of The Correlation Between Anxiety, Salivary Alpha Amylase, Cortisol Levels, And Athletes' Performance In Archery Competitions. Journal of Exercise Nutrition & Biochemistry. 2018;22(4):69-74. [PMID: 30661333] [PMCID: PMC6343762] [DOI]
38. Yachsie BTPWB, Prasetyo Y, Hita IPAD. The Relation Between Confidence Level Towards Archery Ability At 50 Meters Distance On Archery Athletes. MEDIKORA. 2021;20(1):1-9. [DOI]
39. Mat Salleh FN, Sut Txi MR, Wan Ahmad WN. Comparative Characteristics Of Psychophysiological And Shooting Performance Between Intermediate And Elite Compound Archers. Annals of Applied Sport Science. 2023;11(4):0-. [DOI]
40. Shaari JS, Nizam NFDM, Nor MAM, Halim NAA, Aiman S, Prasetyo Y, editors. Relationship Between Competitive Anxiety And Performance: A Study Of The Archers At The National Competition. Proceedings of the 8th ACPES (ASEAN Council of Physical Education and Sport) International Conference, ACPES 2022; 2023. [DOI]
41. Wan Ahmad WN, Mohd Adib MAH, Mat Nashir I, Sut Txi MR, Mat Salleh FN, Tang JR. Anxiety Status Of Junior Archers In COVID-19 During Training Isolation Period Towards The Shooting Performance. International Journal of Public Health Science (IJPHS). 2023;12(1):361. [DOI]
42. Cahyo FD, Prabowo TA, Anwar K, Putra ZA, Saputra AE, Sidiq KI. Analysis Of Anxiety Levels In Archery Athletes (Comparison On 40-Meter, 50-Meter, 70-Meter). Jurnal Pendidikan Jasmani (JPJ). 2025;6(2):345-52.
43. Sanioglu A, Ulker M, Sanioglu Tanis Z. The Effect Of Trait Anxiety On Success In Individual Athletes. Turkish Journal of Sport and Exercise. 2017:289-95. [DOI]
44. Dal N. The Big Five Personality Traits And Narcissism As The Predictors Of Anxiety And Confidence Before Archery Class Final Exam. Universal Journal of Educational Research. 2018;6(12):2875-9. [DOI]
45. Dal N, Tok S, Balıkçı I, Yılmaz SE, Binboğa E. Comparison Of Heart Rate Variability Psychological Responses And Performance In Virtual And Real Archery. Brain and Behavior. 2024;14(10). [PMID: 39378317] [PMCID: PMC11460634] [DOI]
46. Wei Y, Huo S, Liang R, Cui Y, Wang L, Zhao Y, et al. Gender-Based Differences In Gut Microbiota Composition In Response To Anxiety And Stress In Shooting And Archery Athletes. Brain and Behavior. 2025;15(10). [PMID: 41015779] [PMCID: PMC12476288] [DOI]
47. Aggarwala J, Dhingra M. Effects Of Autonomic Control On Performance Of Archers: A Comparative Study On Novice And Experienced Archers. International Journal of Biomedical Research. 2017;8(4):182-6.
48. Smith RE, Schutz RW, Smoll FL, Ptacek JT. Development And Validation Of A Multidimensional Measure Of Sport-Specific Psychological Skills: The Athletic Coping Skills Inventory-28. Journal of Sport and Exercise Psychology. 1995;17(4):379-98. [DOI]
49. Lane AM, Sewell DF, Terry PC, Bartram D, Nesti MS. Confirmatory Factor Analysis Of The Competitive State Anxiety Inventory-2. Journal of Sports Sciences. 1999;17(6):505-12. [PMID: 10404499] [DOI]
50. Craft LL, Magyar TM, Becker BJ, Feltz DL. The Relationship Between The Competitive State Anxiety Inventory-2 And Sport Performance: A Meta-Analysis. Journal of Sport and Exercise Psychology. 2003;25(1):44-65. [DOI]
51. Kais K, Raudsepp L. Intensity And Direction Of Competitive State Anxiety, Self-Confidence And Athletic Performance. Kinesiology. 2005;37(1):13-20.
52. Smith RE, Smoll FL, Cumming SP, Grossbard JR. Measurement Of Multidimensional Sport Performance Anxiety In Children And Adults: The Sport Anxiety Scale-2. Journal of Sport and Exercise Psychology. 2006;28(4):479-501. [DOI]
53. Dal N. The Influence Of Trait Emotional Intelligence On Archers' Autonomic Cardiac Recovery Responses Immediately After A Shooting Session. Behavioral Sciences. 2019;9(5):55. [PMID: 31137522] [PMCID: PMC6562856] [DOI]
54. Yuan SC, Chang CK. Physiological And Psychological Responses In Elite Archers: Heart Rate Variability, Salivary

Biomarkers, And Performance Outcomes. Perceptual and Motor Skills. 2025. [DOI]
55. Prior EE, Coates JK. Archers' Experiences Of Target Panic: An Interpretative Phenomenological Analysis. Qualitative Research in Sport, Exercise and Health. 2020;12(2):224-41. [DOI]
56. Kaufman KA, Glass CR, Arnkoff DB. Evaluation Of Mindful Sport Performance Enhancement (Mspe): A New Approach To Promote Flow In Athletes. Journal of Clinical Sport Psychology. 2009;3(4):334-56. [DOI]
57. Noetel M, Ciarrochi J, Van Zanden B, Lonsdale C. Mindfulness And Acceptance Approaches To Sporting Performance Enhancement: A Systematic Review. International Review of Sport and Exercise Psychology. 2019;12(1):139-75. [DOI]
58. Wang Y, Lei SM, Fan J. Effects Of Mindfulness-Based Interventions On Promoting Athletic Performance And Related Factors Among Athletes: A Systematic Review And Meta-Analysis Of Randomized Controlled Trial. International Journal of Environmental Research and Public Health. 2023;20(3):2038. [PMID: 36767403] [PMCID: PMC9915077] [DOI]
59. Zhang CQ, Si G, Duan Y, Lyu Y, Keatley DA, Chan DKC. The Effects Of Mindfulness Training On Beginners' Skill Acquisition In Dart Throwing: A Randomized Controlled Trial. Psychology of Sport and Exercise. 2016;22:279-85. [DOI]