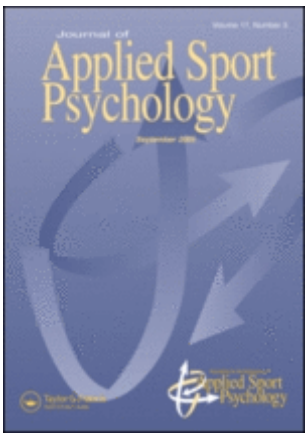

Characteristics of Polar Opposites: An Exploratory Investigation of Choking-Resistant and Choking-Susceptible Athletes

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Characteristics of Polar Opposites: An Exploratory Investigation of Choking-Resistant and Choking-Susceptible Athletes

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Abstract

The current research provides an assessment of performance under pressure by deliberately investigating responses of athletes' that are polar opposite. Forty-six female netball players were screened to sample "choking-resistant" and "choking-susceptible" athletes. The eight selected participants then completed 180 netball shots in a single-case A_1-B-A_2 design (A phases = "low-pressure" and B phase = "high-pressure"), with follow-up interviews. Under pressure, choking-resistant participants improved their performance by using task-focus and avoidance-cognitive coping, whereas choking-susceptible participants suffered from performance decrements often applying emotion-focused and approach-cognitive coping. Researchers should further explore the unique characteristics of choking-resistant athletes.

Introduction

In sport, some athletes excel under pressure (Hill, Hanton, Mattews, & Fleming, 2010) and exhibit 'clutch' performances, which is sporting vernacular for increasing performance in a high-pressure situation. Otten (2009) described a clutch performance as "any performance increment or superior performance that occurs under pressure circumstances" (p. 584). Conversely, other athletes experience debilitating anxiety and 'choking' under pressure. Mesagno and Mullane-Grant (2010) defined choking as "a critical deterioration in skill execution leading to substandard performance that is caused by an elevation in anxiety levels under perceived pressure at a time when successful outcome is normally attainable by the athlete" (p. 343). Generally, researchers agree that choking is the product of misguided attention control combined with elevated anxiety and hence, is maladaptive. There is limited research, however, focusing on aspects of clutch, or adaptive, performances under pressure.

To date, sport psychology researchers (e.g., Hill et al., 2010; Neil, Hanton, Mellalieu, & Fletcher, 2011; Otten, 2009) have paid minimal attention to exploring the polar opposites (positive and negative) of performance under pressure. In a recent quantitative study, Otten asked 201 skilled basketball players to complete anxiety and self-confidence measures and then attempt two sets of 15 free-throws under low- and high-pressure conditions. Structural equation modeling was used to predict performance under pressure. Data indicated that reinvestment (e.g., purposefully executing a skill using explicitly available knowledge; Masters, Polman, & Hammond, 1993) was positively associated with cognitive anxiety and self-focus scores, hence supporting self-focus models of choking (e.g., Baumeister, 1984; Beilock & Carr, 2001; Masters, 1992). Furthermore, self-confidence (i.e., trait and state) was positively related to perceived control, an important predictor of clutch performance under pressure (Otten, 2009). In the context of sport, however, perceived control can denote multiple meanings. For example, Otten defined perceived control as "knowledge derived from accurate prediction of subsequent stimuli"

(p. 585), whereas Cheng, Hardy, and Markland (2009) defined perceived control as "the perception of one's capacities to be able to cope and attain goals under stress" (p. 273). Hence, at this point, there is no definitive understanding of perceived control and specifically whether it most closely relates to control over the situation, attention, behavior, emotion, or all (or none) of these (Hill et al., 2010).

Otten (2009) was one of the first researchers to consider clutch performances in sport, however, only one group of researchers have investigated psychological differences between adaptive (e.g., clutch) and maladaptive (e.g., choking) performance under pressure (see Hill et al, 2010). Hill et al. conducted a qualitative exploration of elite golfers who frequently "choked" or excelled under pressure to identify common cognitive processes associated with performing under pressure. Athletes who experienced choking used maladaptive cognitions associated with anxiety and perceptions of the experience (e.g., high expectations, increased evaluation apprehension, inability to control cognitions, behaviors, emotions, and being highly self-critical of poor performance). Conversely, athletes who excelled reported more positive cognitions, than the athletes who "choked". These cognitions included reduced expectations, lower intensity of evaluation apprehension, and increased perceived control. Thus, it seems that athletes who excel, as opposed to those who "choke", experience substantively different cognitions under pressure.

The Current Study and Purpose

Researchers who have studied performance under pressure have primarily used either quantitative (e.g., Mesagno & Mullane-Grant, 2010; Otten, 2009) or qualitative (e.g., Gucciardi, Longbottom, Jackson, & Dimmock, 2010; Hill et al., 2010) approaches. To date, however, researchers have not used mixed-method approaches to investigate performance under pressure. We believe using a mixed-method approach may help researchers more fully understand the links between overt behaviors and covert cognitive processes to potentially glean a more comprehensive assessment of performance under pressure. By combining quantitative research

and exploratory qualitative inquiry, the current study was designed to extend the limited performance under pressure literature, while also confirming or challenging current choking models. To illustrate the viability of mixed methods in sport psychology research, Mesagno, Marchant, and Morris (2008, 2009) purposively sampled choking-susceptible (i.e., more likely to experience choking) participants using psychological inventories that measured self-consciousness, trait anxiety, and coping styles as predictors. Selected participants then took part in a single-case design with follow-up interviews to explore cognitions related to the planned choking intervention. To date, researchers have not yet purposively identified characteristics associated with athletes who may be choking-resistant (i.e., less likely to experience choking). Focusing more intentionally on positive responses to performance pressure, as exhibited by choking-resistant (CR) athletes, should benefit applied sport psychologists by determining behaviors and cognitions that effectively buffer performance pressure (i.e., what to do) rather than focusing on behaviors and cognitions that exacerbate performance pressure (i.e., what not to do). Furthermore, investigating adaptive performance under pressure represents a more holistic approach to the relatively narrow choking dominated research reported to date.

In the current study, we used Mesagno et al.'s (2008, 2009) choking-susceptible (CS) criteria to purposively sample both CR and CS athletes (i.e., polar opposites) using a single-case design with follow-up in-depth interviews. The primary purpose was to deliberately study behavioral responses, coping strategies, cognitions, and emotions associated with performance responses under pressure of highly resistant and highly susceptible athletes. We expected that CR athletes would increase, and CS athletes would decrease, performance under pressure.

Method

Participants

Forty-six experienced female netball players (M_{age} = 19.53, SD = 1.90), with a minimum of 5 years experience and having played in a goal shooting position for at least 3 years took part in

the study. A demographic questionnaire was administered to participants to ensure they met the declared playing experience and shooting position requirements.

Task

In keeping with typical netball game shot distances, participants attempted shots from a distance of 2.44 m (8 ft) from the inside edge of the goal post to shooting line directly in front of the goal post. The distance was determined based on pilot data, consultation with an elite netball coach, and player skill level with the objective of ensuring the task was moderately challenging.

Design

Within a mixed-methods design, researchers may "triangulate" data by employing a selection of methodological combinations to study the same factor, test for consistency in the data, and enhance validity (Patton, 2002). Two types of triangulation were used in the current study: Data triangulation (i.e., use of multiple data sources) consisted of psychological inventories, observable performance measures (i.e., successful shot attempts), and in-depth interviews; Methodological triangulation (i.e., use of multiple methods to study a problem) combined a single-case design (SCD) with qualitative interviews. The SCD was an A_1-B-A_2 design (A_1 = pre-pressure baseline, B = pressure, A_2 = post-pressure baseline) and follow-up semi-structured interviews were undertaken after the A_2 phase to explore CR and CS athletes reactions to the experimental phase. We used the ABA design, rather than another SCD method (e.g., AB design), because it is more robust for drawing conclusions about the effectiveness of the treatment. With AB designs it may be possible that performance changes are a result of other variables such as maturation, but are less likely in ABA designs. That is, SCD researchers (e.g., Barker, McCarthy, Jones, & Moran, 2011; Barlow & Hersen, 1984; Kazdin, 2011; Morgan & Morgan, 2009) suggest that, in the context of this study, when a similar mean performance occurs in the baseline (i.e., A_1 and A_2) phases with a performance change in the pressure phase, more robust interpretations can be made because the pressure manipulation was likely effective.

Equipment and Specifications

Standard netballs and goals[1] were used according to Netball Australia specifications. During the pressure phase, a video camera was used to record participants' shot attempts.

Measures

Four psychological inventories were used to measure self-consciousness, trait anxiety, coping styles, and state anxiety (see previous research by Baumeister, 1984 and Masters, 1992). The self-consciousness, trait anxiety, and coping styles questionnaires have also been used as potential predictors of choking (e.g., Masters et al., 1993; Wang, Marchant, & Morris, 2004; Wang, Marchant, Morris, & Gibbs, 2004), and in the current study, were used to purposively select CS and CR athletes (see *Participant Selection* below).

Self-consciousness. The Self-Consciousness Scale (SCS; Fenigstein, Scheier, & Buss, 1975) is a 23-item questionnaire used to measure three distinct subscales of self-consciousness (i.e., private self-consciousness, public self-consciousness, and social anxiety) on a 4-point Likert scale, ranging from 1 (*extremely uncharacteristic*) to 4 (*extremely characteristic*). High total scores equate to high self-consciousness. Fenigstein et al. reported acceptable internal consistency ($\alpha > .73$) and Carver and Scheier (1981) have provided evidence for the construct and discriminant validity of the subscales of self-consciousness.

Trait anxiety. Trait anxiety was assessed with the 21-item Sport Anxiety Scale (SAS; Smith, Smoll, & Schutz, 1990) specifically measuring worry, somatic anxiety, and concentration disruption. Total scores ranged from 21 to 84, with higher scores associated with high trait anxiety. The SAS has undergone rigorous validation procedures (e.g., Dunn, Causgrove-Dunn,

[1] For those unfamiliar readers, netball is similar to basketball because it is played on a hard court with baskets (scoring rings) at both ends, but in netball, the scoring rings do not have "backboards."

Wilson, & Syrotuik, 2000), with Dunn et al. reporting Cronbach alphas of $\alpha = .87$ (cognitive anxiety), $\alpha = .88$ (somatic anxiety), and $\alpha = .69$ (concentration disruption).

Coping style. The Coping Style Inventory for Athletes (CSIA; Anshel & Kaissidis, 1997) is a 16-item questionnaire used to measure participants' approach and avoidance coping strategies. Total scores range from 8 to 40 on each subscale, with higher scores indicating a greater propensity to use that particular coping style. Kaissidis-Rodafinos, Anshel, and Porter (1997) reported that the CSIA has acceptable internal consistency, with Cronbach's alphas of $\alpha = .79$ and $\alpha = .84$ for the approach and avoidance scales, respectively.

State anxiety. The Revised Competitive State Anxiety Inventory-2 (CSAI-2R; Cox, Martens, & Russell, 2003; Martens, Burton, Vealey, Bump, & Smith, 1990) is a 17-item self-report questionnaire measuring intensity components of somatic anxiety (seven items), cognitive anxiety (five items), and self-confidence (five items). Intensity level responses were scored on a Likert scale, ranging from 1 (*not at all*) to 4 (*very much so*). Total scores range from 10 to 40, with higher scores indicating higher anxiety levels. Cox et al. reported Cronbach alpha reliability coefficients for both cognitive and somatic anxiety to be acceptable ($\alpha > .80$). The directional component of the CSAI-2R was excluded because the valence of anxiety was not a main focus.

Performance. The total number of successful shots (i.e., attempts where the netball passed through the netball ring) out of 10 attempts signified the dependent variable for each trial block.

Participant Selection

Coaches were first contacted through a national level organization to facilitate a briefing session with potential participants. After coordinating a meeting time, the interested athletes provided informed consent (via University Ethics approval protocol), demographic information, and completed the battery of psychological tests (i.e., SCS, SAS, and CSIA). The three paper-and-pencil questionnaires were used to identify four participants who satisfied the CR, and four who satisfied the CS, criteria to take part in the SCD and subsequent interviews. The criterion for

inclusion for the CR athletes was as follows: Score in 0 – 25th percentile on at least two of the three inventories based on the initial sample of 46 netball players tested, with the remaining score in the 0 – 50th percentile. Thus, selected participants would be low in self-consciousness (SCS score), low in trait anxiety (SAS score), and have a negative differential CSIA score (e.g., approach coping [21] – avoidance coping [38] = differential score [–17]). The criterion for inclusion for the CS athletes was identical to the selection criteria used by Mesagno et al. (2008, 2009); participants were high in self-consciousness, high in trait anxiety, and had a positive differential CSIA score. Participants not selected were thanked for their involvement but were not required to participate further.

It was important that participants met experience level and stringent inclusion criteria necessary to participate. Thus, CR participants had between 7 – 9 years (M = 8.25, SD = 0.96) of competitive netball experience and were playing in a shooting position for between 4 – 6 years (M = 5, SD = 0.82), whereas CS participants had 8 – 13 years (M = 10, SD = 2.45) of netball experience and either 4 or 5 years (M = 4.24, SD = 0.5) shooting experience. The descriptive information for the CR and CS participants were as follows: SCS scores ranged from 33 to 44 (M = 38.75, SD = 4.5), SAS scores ranged from 21 to 32 (M = 25.75, SD = 4.57), and the CSIA scores ranged from 0 to – 11 (M = – 6.5, SD = 4.8), and 46 to 51 (M = 50.25, SD = 3.3), 36 to 49 (M = 40.75, SD = 5.68), and 6 to 17 (M = 9.75, SD = 4.92), respectively.

Procedure

Prior to the A_1 phase, selected participants were briefed about the study, completed the CSAI-2R, and performed a 10-shot warm-up. Testing commenced immediately after the warm-up completed. The A_1 phase consisted of six trial blocks (60 netball shots total) with a 30-second rest period following each trial block (10 netball shots).

Prior to the B phase, participants were briefed about the pressure manipulation, completed the CSAI-2R, and the 10-shot warm-up. The same procedures as the A_1 phase were used, with

the addition of the pressure. The pressure manipulation consisted of videotaping all shots, presence of a small audience (between three and five people), and performance-contingent financial incentive. In the B phase, participants were advised that a $20 bonus would be earned for equaling their score from the A_1 phase with an additional $5 for each successful shot above the A_1 phase score, to a maximum of $100. Participants were also told the number of successful shots they had made in the A_1 phase. These pressure manipulations have been used previously (e.g., Baumeister, 1984; Butler & Baumeister, 1998; Lewis & Linder, 1997; Masters, 1992). During the A_2 phase, the same procedures as the A_1 testing were completed. After the SCD, athletes participated in an interview that ranged between 30 and 75 minutes in duration, and were then debriefed, thanked, and paid as promised. The three phases were scheduled separately over three days.

Analyses

Visual analysis of the performance data was first used by visually inspecting the graphed data with the aim of reaching a judgment about the intervention effects (Kazdin, 2011). Visual inspection is a very useful beginning point for data analysis of SCD research, however, critics of SCD's argue that visual analysis is informal, subjective, and limited in detecting treatment effects (Barker et al., 2011). Unless the graphed patterns are clear, and have stable baseline data, other methods of analysis should also be employed. Consequently, the split-middle technique (White, 1974, 2005) was employed to detect changes in accuracy of shots within phases and resultant trend lines (Barlow & Hersen, 1984). White (1974) proposed that level and slope of the celeration (or trend) line should be assessed. The level enables assessment of performance change from the last trial block of one phase to the first data point of another phase. Level, however, was excluded from the results because a point on the celeration line does not necessarily explain performance level (i.e., a trial block in each phase may not represent participant's ability level). Celeration lines are used as descriptors of patterns to predict values

beyond the immediate data set (White, 2005). Constructing a celeration line enables change in slope across phases to be calculated. The slope represented the rate of performance change between consecutive trial blocks in the phases. In all slope analyses, a slope of 1.00 indicates an even slope, a multiplication sign (×) an increasing slope, and a division sign (÷) a decreasing slope.

The interviews consisted of open-ended questions based on a purpose-designed interview guide that was developed based on existing choking literature and feedback from pilot testing. In-depth interviews were recorded with participant consent and transcribed verbatim. Using content analysis techniques (Patton, 2002), raw data (i.e., significant quotes and paraphrased quotes) were organized into related groups by comparing tags (i.e., important information) with similar meanings that best captured the conversation (Côté, Salmela, Baria, & Russell, 1993). Basic units were defined as comments by the participant about feelings, cognitive processes, coping strategies, or behaviors related to the experience. Decisions regarding text classification were guided by the study's aims, knowledge of performance under pressure, and the meanings made explicit by participants (Krane, Andersen, & Strean, 1997). Member checking is the process by which each participant verifies the researcher's summary and conclusions of the interview to ensure the information gathered from the interview is authentic (Patton, 2002). After initial analysis, participants received a copy of the interview text and interpretations (i.e., member checking), and asked to comment on the accuracy (or inaccuracy). Subsequent participants' feedback and related discussion resulted in minor adjustments to the interpretations. To enhance trustworthiness and reduce potential bias, a consensus validation procedure was used, whereby an independent qualitative investigator, blind to the purpose of the study, completed each stage of the analysis. The trained researcher randomly chose four (of the eight) interviews to verify that themes were congruent with our interpretation, representing a second content analysis. After content analyses were conducted, results of the separate analyses were

then compared, investigators came to agreement on the specific themes, and differences were resolved through discussion.

Results and Discussion

To condense the findings into a manageable size for publication purposes, we have presented four (two CR and two CS) selected cases separately, which included CSAI-2R, performance, and interview results sequentially. When discussing the interviews, we provide quotes that are indicative of the identified themes.

Choking-Resistant (CR) Participants

CR Participant- Amy

Pressure analysis. Amy's intensity scores for state anxiety were 20, 30, and 18 (cognitive) and 12.9, 28.6, and 10 (somatic) prior to the A_1, B, and A_2 phases.

Performance analysis. Relative percent change is a calculation of change in a variable, which considers the original phase score in the computation and is expressed as a percent size difference between adjacent phases, whereas absolute percent change is a simpler calculation of the general differences between adjacent phases, without including the earlier phase score calculation. For example, if Participant A's success rate is 55% and 70% in the A_1 and B phases, respectively, the calculation as expressed in relative percentage change is ([55 – 70]/55) x 100 = – 27%, whereas absolute percent change calculation is 55% – 70% = – 15%. When scores from the A phases are identical, unequal percent change scores are computed between relative and absolute percent change because different initial phase scores are included in the calculation of relative percent change, even though difference scores are equivalent. Mesagno et al. (2009) suggested that absolute (rather than relative) percent change between phases is a more representative method of assessing performance changes and was, therefore, used in the current study. Mean performance for Amy, when expressed in percentage of successful shots, improved by 41% between the A_1 and B phase, whereas there was a 24% decline between the B and A_2

phase (see Figure 1). Despite Amy reporting elevated intensity of anxiety, there was a clear positive performance spike during the B phase with relatively similar performances in the A phases. Visual inspection of Figure 1 shows that the performance increase occurred in the context of low data variability within each phase, indicating similar performance consistency. Furthermore, all data points during the B phase were on or above the projected celeration line of the A_1 phase, therefore, indicating that performance improved by a sizeable amount during the B phase. Similarly, there were no overlapping data points in the B phase compared to the A phases. The timing of the effect was immediate and sustained. All of these visually observable differences provide confidence that the pressure manipulation was successful in evoking a performance change (Barker et al., 2011; Barlow & Hersen, 1984; Kazdin, 2011; Morgan & Morgan, 2009) with Amy demonstrating a classic CR pattern and the high pressure performance being her best.

Interview analysis: Pressure manipulation. Amy was apparently more anxious during the B phase,

> Session 1 (A_1 phase), it was professional… that made me a little nervous. … Compare that to Session 2 (B phase)… that made me a lot more nervous than Session 1. … I had butterflies… a bit more pressure… and having people around me, I was like what are they (the audience) going to think of me. … Session 3 (A_2 phase), I was just a lot more relaxed.

This excerpt confirms the reported CSAI-2R results, collectively indicating that Amy perceived elevated intensity of cognitive and somatic anxiety prior to the B phase.

Interview analysis: Cognitive themes. During the interview, two explanatory themes that were evident were positive self-talk and avoidance-cognitive coping. Optimistic self-talk was evident in the B phase as she coped with the pressure, “I was very focused, I was just like ‘c’mon, I can do this’ and when I missed one, I was like, ‘ok, let’s get the next one in.’” The benefits of using positive self-talk were evident in terms of recovery from errors and task-focus

when Amy stated, “I felt really positive about myself. Even if I missed one, I thought, ‘that’s alright, I’ll just get the next one or I’ll get the next one after that,’ very positive thinking toward myself.” Amy’s results support a recent self-talk review (e.g., Hardy, 2006) that indicated self-talk is helpful in maintaining concentration on the task.

Another theme that emerged was avoidance-cognitive coping. Avoidance coping is typically used to direct cognitive activity away from a threat-related stimulus, and to maintain attentional focus particularly related to the immediate next task (Anshel & Weinberg, 1999). Anshel (2001) explained that avoidance-cognitive coping involves reducing cognitive resources toward the stressor. In this context, Amy was using three primary avoidance-cognitive coping strategies: blocking out distractions, imagining team support, and bouncing the ball. Amy coped with the pressure by ignoring the camera and audience, “I was blocking out all the distractions. Half the time I didn’t even know the video camera was there. … I didn’t even know they (the audience members) were sitting around me half the time.” Another avoidance-cognitive coping strategy Amy used was imagining team support, as she stated, “In my team I have this girl that is always positive. There were times when I put it (a shot) up, because I am used to her (the teammate) saying “c’mon, get it in,” I imagined she said it and that helped.” This quote could be interpreted in numerous ways. First, imagined team support is a form of avoidance-cognitive coping by dissociation from the pressure and present moment. Second, team support and encouragement may have evoked a type of positive, conditioned response of successful shooting. Finally, team support may normalize the experimental situation into a familiar environment, allowing Amy to successfully deal with the pressure. A final coping strategy Amy used was bouncing the ball. Apparently, bouncing the ball was a strategy to help Amy relax, “I didn’t really bounce the ball a lot (in the A_1 phase). Compare that to Session 2, I did bounce it a lot… it was like a deep breath and relaxing thing before I took the shot.” Amy explained that she bounced the ball as an arousal regulation technique to control breathing and focus her attention

on the task, even though in a regulation netball game bouncing the ball is prohibited. Amy's use of avoidance-cognitive coping during the B phase is in keeping with her reported CSIA results indicating that she is predominantly an "avoidance coper."

CR Participant- Beth

Pressure analysis. Beth's intensity scores for state anxiety were 14, 30, and 12 (cognitive) and 11.4, 18.6, and 20 (somatic) immediately before the A_1, B, and A_2 phases. Our field notes indicated that Beth's reported successive somatic anxiety score increase may have been a product of her lateness to the A_2 phase and exhibiting typical reactions to rushing, which may have resulted in Beth misinterpreting her somatic anxiety on the CSAI-2R (even though she rested for five minutes before completing it).

Performance analysis. Mean performance for Beth improved by 15% from the A_1 to the B phase, whereas a 13.3% performance decrease was displayed between the B and A_2 phase. Mean performance was relatively stable across the two A phases, indicating the pressure manipulation was successful (see Figure 2). Visual inspection of the B phase in Figure 2 prompted two concerns. First, data variability increased in the B phase compared to the other phases, which indicated that Beth's performance consistency decreased. Second, the pressure negatively affected performance during the initial 20 shots (i.e., Trial Blocks 7 and 8) of the B phase and the respective data points overlapped with the A phase data points more than the final trial blocks. This data variability, overlapping of data points, and immediacy of the effects were perhaps a derivative of the pressure in Trial Blocks 7 and 8, but less so thereafter. These effects may limit interpretations of pressure effects or may indicate that the pressure manipulation, initially, negatively affected performance. Perhaps Beth needed time to select coping strategies to deal with the pressure. Whatever the explanation, there was elements of positive adaptation occurring under pressure. The quotes from the interviews help to explain the delayed positive performance spike in the B phase.

Interview analysis: Pressure manipulation. During the interview, Beth explained her nervousness through expressions of somatic anxiety, such as “heart racing a bit” and “muscles tense a bit”. It was clear that her experience in the B phase was different to the other phases, “My first reaction (in the B phase) was that I was a bit excited, my heart was racing a bit, so that probably helped a lot and helped my shots go in. I was very relaxed during the other sessions.” From the CSAI-2R results, Beth experienced an increase in intensity of cognitive anxiety prior to the B phase, with the interview data (albeit retrospectively) indicating she interpreted the anxiety as facilitative to performance.

Interview analysis: Cognitive themes. Two themes were positive interpretation of the pressure and avoidance-cognitive coping. Beth used positive interpretation as a cognitive restructuring technique to cope with the audience’s presence, “By having them there… and by them watching me, there is this silent thing that they were encouraging me to do well.” Beth perceived a positive impression from the audience (the audience was instructed to look interested but not interact with participants) that equated to motivation to perform in front of them. The positive interpretation was possibly a result of Beth’s cognitive restructuring and positive self-talk, “(I) didn’t really care about the expectations that they (the audience) had, I sort of said that I would try to do my best, so I could keep my confidence up.” This statement illustrates that Beth coped well with external pressure by using positive self-talk. Beth also downplayed the significance of the audience, “It made me relax a bit… the fact that I didn’t really need to meet anyone’s expectations helped me relax and increase confidence.” Beth’s interpretation linked with performance results provided support that an athlete’s positive interpretation of anxiety situations may influence performance under pressure (e.g., Hanton, Neil, & Mellalieu, 2008).

The second evident theme for Beth was avoidance-cognitive coping. Beth explained that she blocked the audience out, “I pretended that they weren’t there and really talked to myself. I knew they were there, I just didn’t notice them.” Beth was aware of the audience perhaps for

psychological support, but essentially disconnected from the pressure by blocking the audience out to maintain task focus. When asked how she increased concentration, she explained, “I just went into my own little world, my own zone, I wasn’t thinking about the audience.” When prompted about what “my own zone” meant, Beth explained, “I was using (positive) self-talk, and no real distracters were there and didn’t really notice the audience after that.” As is illustrated from this series of quotes, during the interview, Beth struggled to explain her concentration, which is not surprising given that experienced performers typically perform automatically and use controlled procedural knowledge that is closed to introspection (Beilock & Carr, 2001). From these quotes, it appears that Beth can consciously adapt and buffer potential distractions when necessary and seemed to use self-talk and avoidance-cognitive coping as a cocooning technique to isolate herself from the pressure.

Choking-Susceptible (CS) Participants

CS Participant- Emma

Pressure analysis. Emma’s intensity scores for state anxiety were 22, 36, and 18 (cognitive) and 14.3, 21.4, and 14.3 (somatic) prior to the respective A_1, B, and A_2 phases.

Performance analysis. Emma’s mean performance decreased by 11.7% between the A_1 and B phase and she improved performance by 13.4% between the B and A_2 phase. Performance was relatively stable with an increase of 1.7% across the two baseline (i.e., A_1 & A_2) phases, whereas performance changed considerably in the B phase, indicating the pressure manipulation was successful (see Figure 3). Visual inspection of Figure 3 indicates a declining slope direction of the B phase in comparison to the rising slope directions of the A phases, which may indicate the pressure influenced performance negatively throughout the B phase; Emma did not acclimatize to the pressure manipulation. Although there are overlapping points between the phases, Emma’s decrease in performance was relatively immediate and all data points were equal to or below the mean of the A phases, hence indicating possible choking.

Interview analysis: Pressure manipulation. During the interview, Emma explained that she experienced increased pressure in the B phase and corresponding low pressure during the A_1 and A_2 phases,

> In the first (A_1 phase) and third (A_2 phase), there was no pressure and in the second (B phase) there was heaps of pressure… they were so opposite, having the people there was really horrible. … Having that dropped on you, that everyone was going to watch, that we were going to be videotaped, going from one person to 20, that was a big thing.

Emma clearly perceived the audience as a major source of threat during the B phase. Threat is experienced when insufficient resources to meet the demands of the situation are perceived (Jones, Meijen, McCarthy, & Sheffield, 2009). The threat of the audience contributed to the altered intensity of state anxiety and, consequently, Emma appears to have exaggerated her subjective interpretation. Buss (1980) suggested that individuals high in private self-consciousness might exaggerate the intensity of an emotional experience because of their inherent self-focus. Alternatively, Weiten (2001) explained that defence mechanisms tend to distort reality to reconstruct a situation as less threatening. Emma's perceived exaggeration may indicate her inability to use, or lack of, defence mechanisms or coping strategies to effectively decrease anxiety during the B phase.

Interview analysis: Cognitive themes. A persistent theme, related to Emma's cognitions in the B phase, was public self-awareness. During the interview, public self-awareness was evident when Emma discussed being observed by the audience, as she "hated the feeling of being watched",

> In Session 2 (B phase), I just wanted it to be over because I didn't want everyone (the audience) to concentrate on me anymore. They weren't doing anything except watching me and even if they weren't looking at me, they could hear the ball miss the ring or smack into the back wall.

Buss (1980) defined social anxiety as "being upset or disturbed by others' scrutiny or remarks, or merely because others are present" (p. 204). Social anxiety is a typical characteristic associated with individuals high in public self-consciousness. Fenigstein et al. (1975) found a modest correlation (r = .21) between social anxiety and public self-consciousness. The relationship between public self-awareness and social anxiety was expressed when Emma stated,

> People not having anything else to do but watch and make judgments on me… (I was) thinking about the people and what they were thinking. I was just worrying, "I missed that shot, they are thinking I'm a loser." I was thinking negatively, "I better get this in because otherwise, I'll look like a fool."

The comment "thinking about the people and what they were thinking" is classic quote of how highly self-conscious people become absorbed and attentionally invested in the interplay between what they and others are thinking. Woody (1996) suggested excessive self-focusing directs attentional resources to the tasks of monitoring arousal, assessing ongoing performance, appraising others' perceptions, and anticipating evaluation consequences, none of which were helpful in promoting Emma's best performance.

Emma's constant self-focused attention would likely negatively affect her ability to process task-related information. For example, Emma explained that her attention was constantly diverted to the audience, "I could not concentrate, they (audience) were sticking out way too much in my head. … I tried to focus on the ring, but then as soon as I dropped my eyes (from watching the ring), I could see everyone." Masters et al. (1993) have suggested that a predisposition to be self-conscious promotes the likelihood of being self-aware during pressure situations. Emma's results substantiate aspects of distraction models of choking, namely Attention Control Theory (ACT; Eysenck, Derekshan, Santos, & Calvo, 2007), whereby anxiety decreases attention control because it causes a shift in attention to threat-related stimuli that, in Emma's case, was the threat of the audience and their judgments.

CS Participant- Felicity

Pressure analysis. Felicity's intensity scores for state anxiety were 18, 22, and 14 (cognitive) and 18.6, 21.4, and 12.9 (somatic) before the A_1, B, and A_2 phases, respectively.

Performance analysis. For Felicity, a mean performance decrease of 11.7% from the A_1 to B phase and a 16.7% performance increase between the B and A_2 phases occurred. Mean performance increased slightly by 5% when comparing the A_1 and A_2 phases, whereas the B phase performance decreased substantially, indicating the pressure manipulation was effective (see Figure 4). Figure 4 shows that performance was somewhat unstable during the A_1 phase, which may limit the interpretability of the findings. Nevertheless, we believe the pressure manipulation was successful for a number of reasons. First, Felicity's mean performance was essentially equal during the A_1 and A_2 phases, but decreased in the B phase. The pressure particularly affected Felicity, an experienced netball shooter, in Trial Block 10 (Figure 4), where she was unsuccessful in all 10 shooting attempts. Second, Felicity was less consistent (as demonstrated by high variability) during the B phase compared to the A phases. Finally, the slope of the celeration line changed from an upward trend in the A phases to a downward trend in the B phase. These performance effects provide further support for the claim that the pressure manipulation negatively affected performance with Felicity exhibiting the expected high-low-high scoring pattern for a CS participant.

Interview analysis: Pressure manipulation. Felicity explained that she perceived more pressure during the B phase, "I was more nervous during Session 2 (B phase) than Session 1 (A_1 phase). Just that extra bit of pressure (with people) watching, I felt a bit more jittery. … I was not nervous at all during Session 3 (A_2 phase)." This quote accords with her reported CSAI-2R, where Felicity perceived an increase in both cognitive and somatic anxiety during the B phase.

Interview analysis: Cognitive themes. During the interview, an approach-avoidance conflict was evident for Felicity. One explanation for this conflict was that Felicity increased

perceived pressure when she was missing shots, “I could keep going and tell myself, ‘I’m going to keep missing, who cares.’ But I tried to turn it around and say ‘ok, I didn’t even take any (shots) and let’s start from scratch.’” The psychological conflict was between the motivation to perform successfully and the pressure effect to deter her from achieving success in the B phase and may have been a product of an imbalance between perceived ability and expected outcomes.

Another possible explanation was an increase in public self-awareness, with Felicity expressing many comments related to the audience’s judgments and motives for attending, “I sat there and worried too much about what they were thinking, what are they looking at, it puts you off (i.e., is distracting).” Apparently, ruminations about the audience’s judgments occupied attention and Felicity became concerned with public evaluation, ultimately affecting her ability to maintain a task-relevant focus. This comment exemplifies the tendency for individuals high in self-consciousness to use attentional processing capacity to attend to possible audience reactions and aspects of ACT (Eysenck et al., 2007) because anxiety led Felicity to focus attention on the threat being experienced. Felicity attempted to deal with the audience by saying, “I was trying to relax myself, I was sort of saying to myself it’s not a big deal, who cares.” Felicity’s elevated state anxiety and public self-awareness also influenced her shooting technique during the B phase, as she explained, “I felt a bit more jittery, and I didn’t push the ball as well as I wanted to.” Felicity’s increase in somatic anxiety possibly caused a physical reaction that disrupted her ability to perform successfully. When asked how she recovered from unsuccessful shots, Felicity stated,

> I took a breath and tried to feel the ball a bit better and position my hand slightly different because when I missed I always had my hands wrong. Just took my time and (felt) how heavy the ball was and tried to watch the ring and know exactly how to get it in.

Felicity’s adjustment of the ball position and her reaction to the ball’s heaviness may be indicative of conscious processing under pressure. This quote provides qualitative support for the

self-focus model of choking (e.g., Baumeister, 1984; Beilock & Carr, 2001; Masters, 1992), whereby an increase in pressure may promote self-awareness and leads individuals' to explicitly monitor information related to the mechanics of the skill, which is paradoxical to performance. Thus, considering our explanations through ACT (a distraction model) and self-focusing model of choking, perhaps a combination of the distraction and self-focus model may have led to Felicity's choking experience.

The approach-avoidance conflict Felicity was experiencing may also be typical of a psychoanalytical defense mechanism such as a reaction formation. Hall (1955) stated that reaction formation as instincts and their derivatives may be arranged as pairs of opposites such as life versus death, construction versus destruction, action versus passivity, dominance versus submission. When one of the instincts produces anxiety by exerting pressure on the ego either directly or by way of the superego, the ego may try to sidetrack the offending impulse by concentrating upon its opposite. For example, if feelings of hate towards another person make one anxious, the ego can facilitate the flow of love to conceal the hostility. By consciously recognizing the need to reconstruct her overriding negative emotion into a more positive interpretation ("it's not a big deal, who cares"), Felicity is possibly responding to her unconscious negative interpretations of fear and anxiety. To illustrate, Felicity explained her fear by stating,

> I just thought with this many people, I didn't want to look like a d*%@head (Felicity laughs). … It's like anything, I'm standing there, I'm the subject and everyone is staring at me, you worry about what they are looking at, what criticisms do they have.

For Felicity, her fear was related to potential audience criticism and performing in front of others is partly about avoiding unpleasant feelings and embarrassment.

Conclusions

The purpose of the current study was to investigate cognitive process issues associated with CR and CS athletes in a pressure situation. It is readily apparent that, even in this experimental situation where the manipulated pressure was arguably well below what might be experienced in actual competition, performance responses ranged considerably. Furthermore, although choking is somewhat difficult to consistently and predictably evoke, athletes identified as CS and CR generally performed according to expectation. Cognitions associated with CR participants were task-focused attention and avoidance-cognitive coping strategies, whereas CS participants included emotion-focused attention and approach-cognitive coping strategies.

Performance and Pressure

Visual inspection of the performance data indicates that the pressure manipulation influenced the performance of the CS athletes more noticeably than the CR athletes. For example, Emma and Felicity both experienced a decrease in performance that persisted throughout the B phase. Emma was less accurate, and Felicity more inconsistent, under pressure, which was possibly a product of modified attentional focus during the phases, as supported by the qualitative data. The CR athletes, conversely, either showed consistency in the B phase compared to the A phases (in Amy's case) or recovered quickly from an initial poor start (in Beth's case), which may indicate the ability to eventually select (albeit delayed) appropriate coping skills under pressure. These performance outcomes and the differences in qualitative dialogue (below) provide further support for the successful pressure manipulation and varying cognitive processes among CS and CR athletes.

Qualitative Investigation

Conducting the interviews was fascinating especially in drawing additional information from the participants that helped to triangulate and supplement data from their questionnaire responses and netball shooting performances. Researchers (e.g., Stake, 2006) that employ SCDs

may suggest using cross-case analysis to understand emergent group categories, however, considering space constraints we focused on individual cases. Nevertheless, we offer additional general conclusions about reoccurring themes for the CR and CS participant collectively. For example, CR participants used a broader range of coping strategies to manage the pressure of the B phase, whereas the CS participants were almost devoid of effective coping strategies. CR participants discussed examples of cognitive avoidance coping strategies they employed to successfully manage the pressure of the B phase. CS participants reported having fewer coping strategies in their repertoire than the CR participants. For example, instead of using active coping strategies to deal with the pressure, Emma and Felicity attempted to use psychodynamic defense mechanisms (i.e., projection and reaction formation) to reduce anxiety. They possibly had not acquired the necessary coping skills to directly manage the pressure of the B phase. For the CS participants, there were also differences in the coping strategies implemented. For example, Grace and Helen (2 CS participants we did not report on) seemed to have more developed and adaptive coping skills compared to Emma and Felicity, which allowed them to decrease anxiety.

Methodological Issues

Single-case design research is challenging to conduct because results may be attributed to many confounding variables unless adequate care is observed toward study design and eliminating, or accounting for, possible confounding variables. In the current research we experienced some difficulties in this ABA design that included: lack of a “true” baseline and dissimilar A phase performances, stable baseline, and the Hawthorne effect. In our study, many participants seemed apprehensive about participating in the A_1 phase; one difficulty (and limitation) of the current research was the lack of a “true” baseline during the A_1 phase. CS participants were perhaps more negatively influenced because of their predisposition to being highly trait anxious, which may have negatively affected shooting performance in the A_1 phase. To overcome this limitation, researchers could provide a familiarization phase in which

participants become accustomed to the research environment. Also, the difficulty in presenting comparatively equal baseline conditions, as we attempted in the current study, has implications for larger sampling studies where counterbalancing is commonly recommended or required for scientific rigor. Some caution is necessary when counterbalancing in performance anxiety research because uncertainty and familiarity may undermine the equality of planned baseline conditions. SCD researchers (e.g., Barker et al., 2011; Barlow & Hersen, 1984; Kazdin, 2011; Morgan & Morgan, 2009) suggest that a stable baseline is needed in the initial A phase to ensure the intervention in the B phase is likely the reason for performance changes. With sport performance, however, it is sometimes difficult to provide stability in a baseline phase of the SCD because athletes may be somewhat inconsistent with their performance levels. Finally, although participants were requested to respond honestly and openly, the interviews are subject to possible outcome bias with athletes' selectively recalling cognitions, emotions and behaviors (e.g., Brewer, van Raalte, Linder, & van Raalte, 1991). Furthermore, our participants were unable to articulate clearly the strategies used during the high-pressure phase. Thus, along with the suggestions listed below, researchers should attempt to identify further what cognitive strategies that performers employ to successfully cope with pressure situations.

Future Research

During the present study, the qualitative results indicated that choking was largely due to higher levels of public self-consciousness, whereas Wang, Marchant, Morris, and Gibbs (2004) suggested that choking was due to higher levels of private self-consciousness. Considering these findings, perhaps the self-focus and distraction model of choking may be expanded to separately include increases in either public or private self-consciousness. That is, individuals high in private self-consciousness may be more inclined to increase private self-awareness under pressure and focus attention on personal aspects of self, possibly leading to choking due to self-focused attention. Individuals high in public self-consciousness may be more predisposed to

increase public self-awareness under pressure and focus attention on audience judgments and perceptions. This task-irrelevant focus of attention may cause the individual to experience choking due to distraction. Researchers might consider investigating whether private or public self-consciousness may lead to different methods, or types, of choking.

In the present study, we found that CS participants who performed poorly under pressure became distracted by their feelings during the B phase and used approach coping to cognitively deal with pressure. CR participants who increased performance generally were task-focused and used avoidance coping strategies to cognitively deal with the pressure with Debbie (not included in the results) not being affected by the B phase. Thus, there may be two types of CR athletes: those who experience increases in state anxiety but implement appropriate coping strategies to deal with the pressure, and those who do not experience heightened state anxiety and are rarely required to implement coping. Future research should, thus, examine how athletes who rarely experience increased state anxiety cope with the rare occasions they experience anxiety. Findings from this type of study might help to reconcile a seemingly contradictory finding from Baumeister (1984), who found that low self-conscious participants were susceptible to choking in anxiety evoking conditions. Amy, Beth, and Carol (Carol was not presented in the results) were CR athletes who experienced pressure in the B phase, but managed to perform well because of appropriately used coping strategies, whereas Debbie performed well primarily because she did not experience pressure at all. Mesagno, Harvey, and Janelle (2012) provided further evidence that some athletes do not experience an increase in anxiety in a basketball shooting task. That is, under low- and high-pressure phases, a low fear of negative evaluation (FNE) group did not experience anxiety changes, whereas a high FNE group experienced a significant anxiety increase, with the groups being significantly different in anxiety levels throughout the study. Furthermore, the low FNE group increased, while the high FNE group decreased, performance. Thus, further research into how athletes excel under pressure should translate into

differences in cognitive processes with these types of CR athletes. Researchers could include FNE as a predictor of choking-susceptibility in similar studies. Finally, similar to Mesagno et al. (2008, 2009) we used an older version of the SAS to predict performance under pressure, however, Smith, Smoll, Cumming, and Grossbard (2006) have developed and validated a revised version (i.e., SAS-2) that researchers will likely use in future research.

Implications for Practitioners

With the recent rise to prominence of the positive psychology movement promoted by Seligman and Csikszentmihalyi (2000), many applied sport psychologists are likely considering ways to recognize and work toward adaptive (e.g., clutch) behavior. When working with CS athletes an understanding of the underlying reasons for anxiety increases will help determine why attentional shifts occur under pressure, rather than solely focusing on concentration-related solutions (Mesagno & Mullane-Grant, 2010). Applied sport psychologists can also use the results from the CR participants to promote more adaptive cognitions for those that are struggling to perform under pressure. For example, training athletes to implement avoidance-cognitive strategies to deal with the pressure situation may help to decrease anxiety under pressure and promote adaptive and clutch performance.

We believe the information derived from the current study informs applied practice by demonstrating specific case material indicative of how athletes respond to performance pressure. The comments and quotations presented here are only a small sample of the interview data, which provide links among reported anxiety, performance and explanatory narratives that practitioners might find helpful to identify athletes susceptible to choking, performance patterns representative of choking, and comparisons between explanatory styles of CR and CS athletes.

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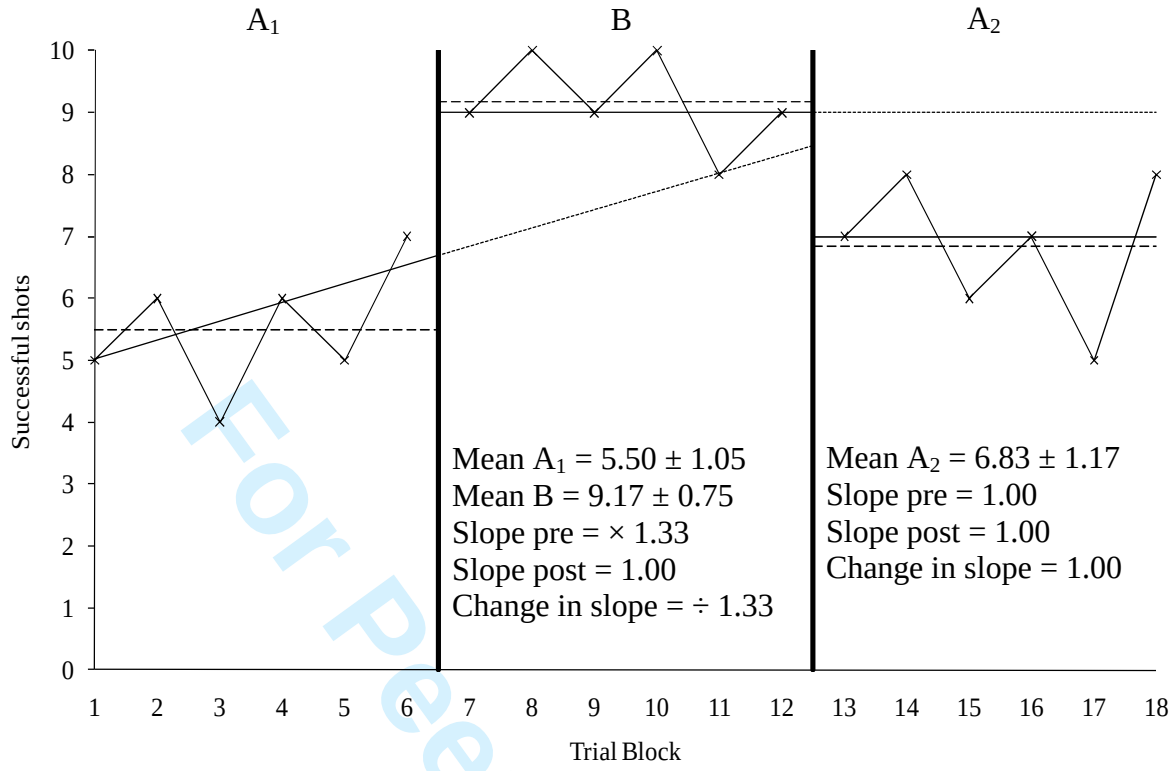

Figure 1. Split-middle analysis for Amy.

Note. In all performance figures, solid (bold) vertical lines represent the point of phase change. In each phase, solid black lines indicate celeration lines, dotted lines signify projected celeration lines, and horizontal dashed lines indicate mean performance.

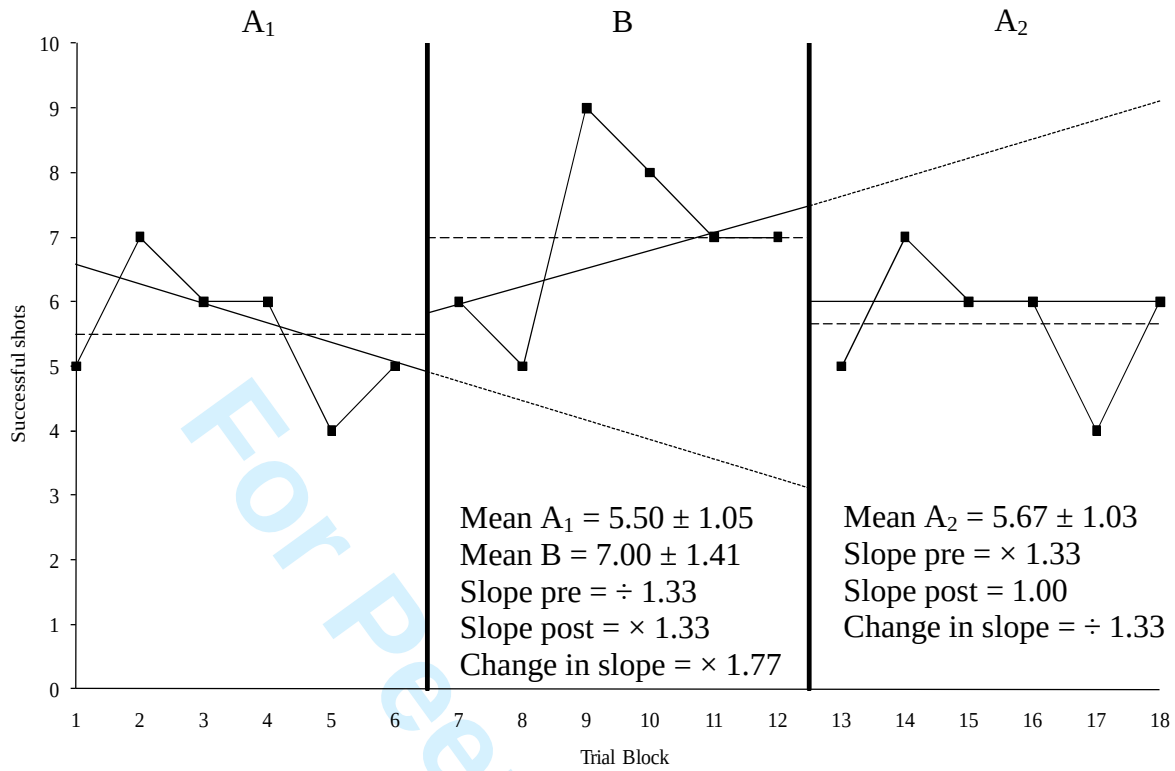

Figure 2. Split-middle analysis for Beth.

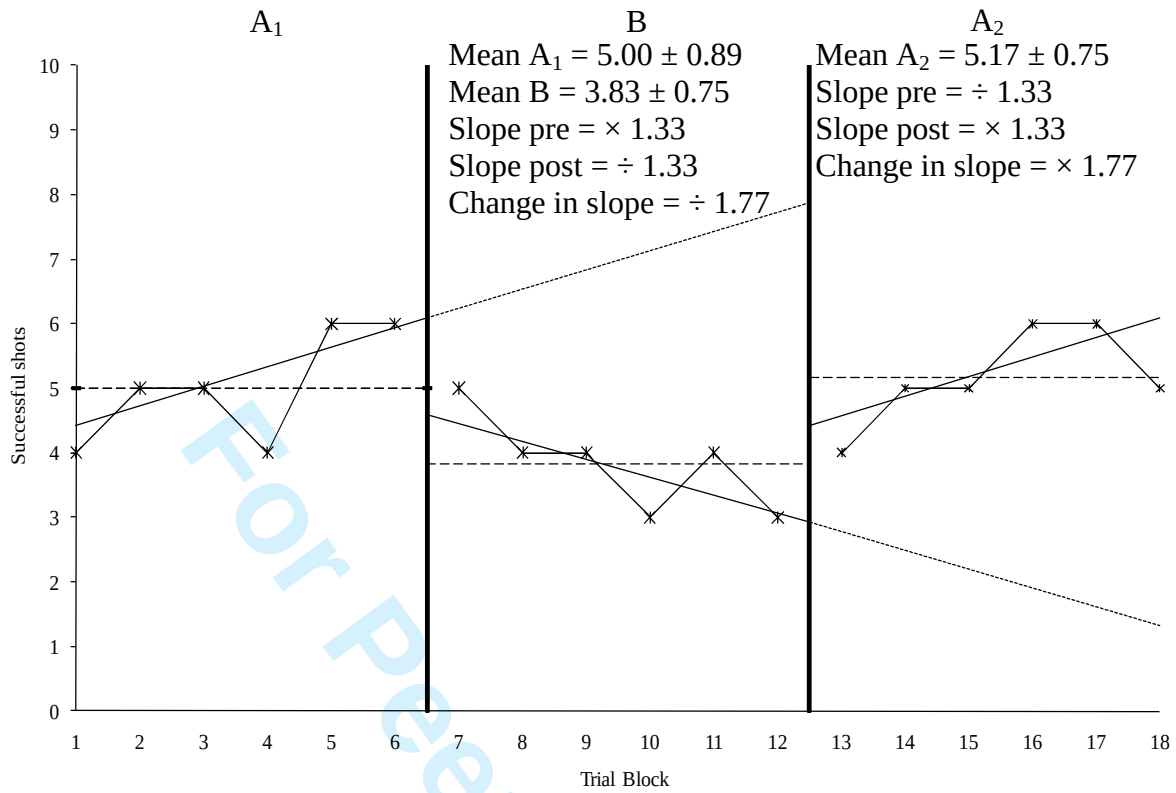

Figure 3. Split-middle analysis for Emma.

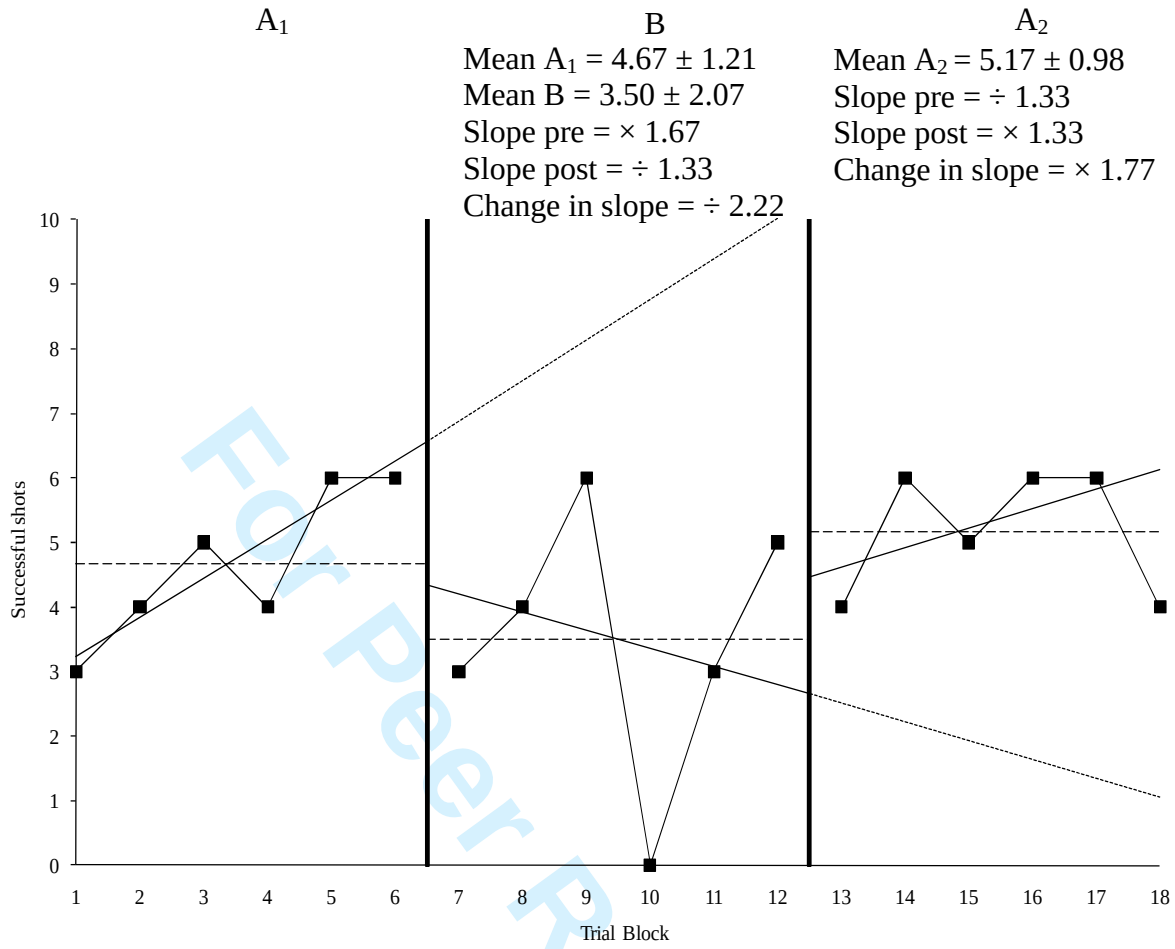

Figure 4. Split-middle analysis for Felicity.