RESEARCH NOTE

Journal of Sport & Exercise Psychology, 2008, 30, 450-457

Avoidance Motivation and Choking Under Pressure in Soccer Penalty Shootouts

Geir Jordet[1,2] and Esther Hartman[2]

[1]Norwegian School of Sport Sciences and [2]University of Groningen

The purpose of this study was to examine the relationships between shot valence, avoidance behavior, and performance in soccer penalty shootouts. Video analyses were conducted with all penalty shootouts ever held in the World Cup, the European Championships, and the UEFA Champions League ($n = 36$ shootouts, 359 kicks). Shot valence was assessed from the potential consequences of a shot outcome as follows: Shots where a goal instantly leads to victory were classified as positive valence shots and shots where a miss instantly leads to loss as negative valence shots. Avoidance behavior was defined as looking away from the goalkeeper or preparing the shot quickly (thus speeding up the wait). The results showed that avoidance behavior occurred more with negative valence shots than with positive shots and that players with negative valence shots performed worse than those with positive shots. Thus, avoidance motivation may help explain why professional athletes occasionally choke under pressure.

Keywords: achievement motivation, dread, football

Choking under pressure can be defined as performing worse than expected in situations with a high degree of perceived importance (Baumeister, 1984; Beilock & Gray, 2007). Although not directly tested, researchers (e.g., Wallace, Baumeister, & Vohs, 2005) have argued that motivation to avoid failure may predict choking under pressure. In achievement motivation theories, avoidance motivation typically refers to behavior directed by negatively valenced events, whereas approach motivation refers to behavior directed by positively valenced events (Elliot, 1999). Sport researchers (see review by Roberts, Treasure, & Conroy, 2007) have associated approach motivation with low anxiety and high performance, and avoidance motivation with high anxiety and low performance. Extending this to high-pressure tasks, in the present study, we hypothesized that elite performers who are in negative valence situations engage in avoidance behaviors and these behaviors may contribute to low performance.

Given the complexity of achievement motivation, the majority of previous research is rightly based on self-report methods. However, positively construed

Jordet is with the Department of Coaching and Psychology, Norwegian School of Sport Sciences, Oslo, Norway, and the Center for Human Movement Sciences, University of Groningen, Groningen, the Netherlands. Hartman is with the Center for Human Movement Sciences, University of Groningen, Groningen, the Netherlands.

possibilities may also be linked with behavioral tendencies to approach a stimulus, and negatively construed possibilities may be linked with moving away from the stimulus (see review in Elliot & Covington, 2001). A well-documented example is the startle reflex, in which eyes involuntary shut in response to unpleasant visual stimuli (e.g., Bradley, Moulder, & Lang, 2005). Another way to avoid a negatively valenced situation is to reduce the time that one is exposed to it. For example, when given the choice of waiting for an unpleasant event or "getting it over with" quickly, people consistently choose the latter (Berns, Chappelow, Cekic, Zink, Pagnoni, et al., 2006). In the current study, we addressed a gap in the knowledge about real-world choking (Beilock & Gray, 2007) by examining valence, avoidance behaviors, and performance in a high-distress sport task.

The penalty shootout is used to declare a winner when two teams are tied after extra time in a soccer tournament. Recently, it is shown that this event generates high levels of distress (Jordet, Elferink-Gemser, Lemmink, & Visscher, 2006), and that shooters perform worse with higher kick importance (Jordet, Hartman, Visscher, & Lemmink, 2007). In the present study, we hypothesized that players in negatively valenced situations would attempt evading the situation, by turning their backs to the goalkeeper and increase their preparation speed to get the shot "over with" as soon as possible. We expected this behavior to be associated with low performance (i.e., choking under pressure). On the contrary, for positively valenced shots, we expected players to maintain facing the goalkeeper, spend longer time preparing the shot, and perform better.

Methods

Data

Video images were obtained from the television broadcasts of all penalty shootouts ever held in the World Cup (n = 20, between 1974 and 2006), European Championships (n = 11, between 1972 and 2004), and UEFA Champions League (n = 5, between 1992 and 2006). This gave a total of 36 penalty shootouts and 359 kicks from 291 players. Most players (81.1%) took one shot, 15.6% took 2 shots, and 3.4% took 3 or 4 shots. None of the players took more than one shot in the same shootout.

Variables and procedures

Shot valence was assessed from the potential direct consequences of each shot for the outcome of the game. Shots (n = 25) were classified as positive shots when their only direct consequence on the game outcome could be positive—with a goal, one's team instantly wins. Similarly, shots (n = 34) were classified as negative shots when their only direct consequence on the game outcome could be negative—with a miss, one's team instantly loses. All other shots (n = 300) were classified as neutral shots.

Avoidance behavior was assessed by two variables. First, *approach and avoidance looking* were derived from the direction of the players' faces as they walked back to prepare their run-up after having placed the ball on the penalty mark. Here, players either walk backwards from the ball while facing the goalkeeper (classified

as approach looking) or turn around and direct their faces away from the goalkeeper while walking back (avoidance looking). Two observers independently coded all the shots. Inadequate television images and the ambulatory position of some of the goalkeepers prevented 30 shots from being reliably classified, and these shots were excluded from the analysis. This reduced the sample for positive and negative valence shots to $n = 21$ and $n = 34$, respectively. An absolute interobserver agreement of 92.5% was obtained. Second, *preparation speed* was set as the time from the referee signaled that the shot could take place (by whistle or hand) until the shooter began his run-up (first step towards the ball). The shooter can control the length of this time interval himself. All times were assessed from the videos by use of a stopwatch. We excluded shots ($n = 88$) where the referee signal and/or the start of the run-up were missing in the television images. This reduced the sample for positive and negative valence shots to $n = 19$ and $n = 28$, respectively. To estimate interobserver reliability, a second observer analyzed a random sample of 40 shots (Pearson correlations $r = .96$, $p < .001$).

Performance was derived from the shot outcomes: goal or miss. We also assessed whether each missed shot was saved by the keeper or shot wide of the goal and whether the keepers correctly directed their saving attempt to the same side that the ball was shot. This latter measure allowed us to control for differences in the keepers' shot anticipation across the various conditions, as well as making it possible to exclude potentially poorly placed shots that still were scored because the keeper dove in the wrong direction.

Data Analysis

To test for differences in looking behavior, a binominal test was used with 0.5 as test proportion. The nonparametric Mann–Whitney test was used to examine the relationship between looking behavior and preparation speed. To study the relationships between shot valence and avoidance behavior, we used a univariate logistic regression analysis (for avoidance looking) and ANOVA (for preparation speed). In univariate logistic regression analysis, the association between an individual predictor variable (e.g., shot valence) and a dependent variable (e.g., avoidance looking) is investigated. The outcome of a logistic regression analysis is an odds ratio, which is a way of comparing whether the probability of a certain event is the same for two or more groups. For example, if among players with positive valence shots, 100 of them show approach behavior and 25 avoidance behavior, whereas among players with negative valence shots, 105 of them show approach behavior and 75 avoidance behavior, the odds ratio is $([100 \times 75]/[105 \times 25]) = 7{,}500/2{,}625 = 2.9$. This means that players with negative shot valence showed 2.9 times more avoidance looking than players with positive shot valence (with the latter group having an odds ratio of 1, defined as the reference category).To study the links between shot valence and performance, and avoidance behavior and performance, univariate logistic regression analyses were used. Here, preparation speed times were split into three equal groups: quick (0.2–0.5 s), intermediate (0.6–1.4 s), and slow (1.5–7.3 s).

Results

Approach and Avoidance Behaviors

The binominal test showed that the players exhibited more approach looking (n = 229, 69.6%) than avoidance looking (n = 100, 30.4%) prior to their shots (binominal test; $p < .001$). The mean preparation speed was 1.27 s (SD = 1.21 s, range 0.2–7.3 s). There was a significant relationship between looking behavior and preparation speed, with more avoidance looking accompanying quick preparation: Median preparation speed was 0.60 s for those who showed avoidance looking, compared with 0.90 s for those who showed approach looking (Mann–Whitney test, U = 5,105.00, p = .012).

Shot Valence and Avoidance Behaviors

Shot valence was related to both avoidance looking and preparation speed. The players did more avoidance looking on negative valence shots (OR = 4.7, p = .029, n = 34) than on positive shots (OR = 1, reference category, n = 21) (see Figure 1, top left), and there was an association between shot valence and preparation speed (F = 4.13, df = 2: p = .017), with quicker preparation for both the negative shots (n = 28, p = .027) and the neutral shots (n = 224, p = .021) compared with the positive shots (n = 19) (see Figure 1, top right).

Shot Valence and Performance

The players scored on 73.8% (n = 265) of the shots, and missed on 26.2% (n = 94). Thus, the base OR = 73.8/26.2 = 2.82. Performance was significantly better on the positive valence shots than on the negative shots (OR = 7.1, p = .016) (see Figure 1, bottom left), and there was a trend that performance was better on positive compared with neutral shots (OR = 4.12, p = .059; neutral shots as reference category). When only players' first shots were selected, the relationship between shot valence and performance persisted (e.g., for positive shots compared with negative shots, OR = 5.82, p = .036). The results also seem to hold up when we take the actions of the keeper into account. First, proportionally more shots went wide of the goal in the negative valence condition (n = 3 shots, 8.8% of the shots in this condition) than in the neutral (n = 20 shots, 6.7% of the shots in this condition) and positive condition (n = 1 shot, 4.0% of the shots in this condition). Second, the keepers picked the correct side equally much in response to the positive (44.0% correct picks) and negative valence shots (44.1% correct picks) and slightly, but not significantly, more on the neutral shots (53.2% correct picks). When the keepers indeed picked the correct side, the shot performance was still significantly better on the positive valence shots (n = 11, 90.9% goals) than on the negative shots (n = 15, 26.7%) (OR = 27.5, p = .006), with a trend for positive compared with neutral shots (59.1%, n = 159) (OR = 6.92, p = .068).

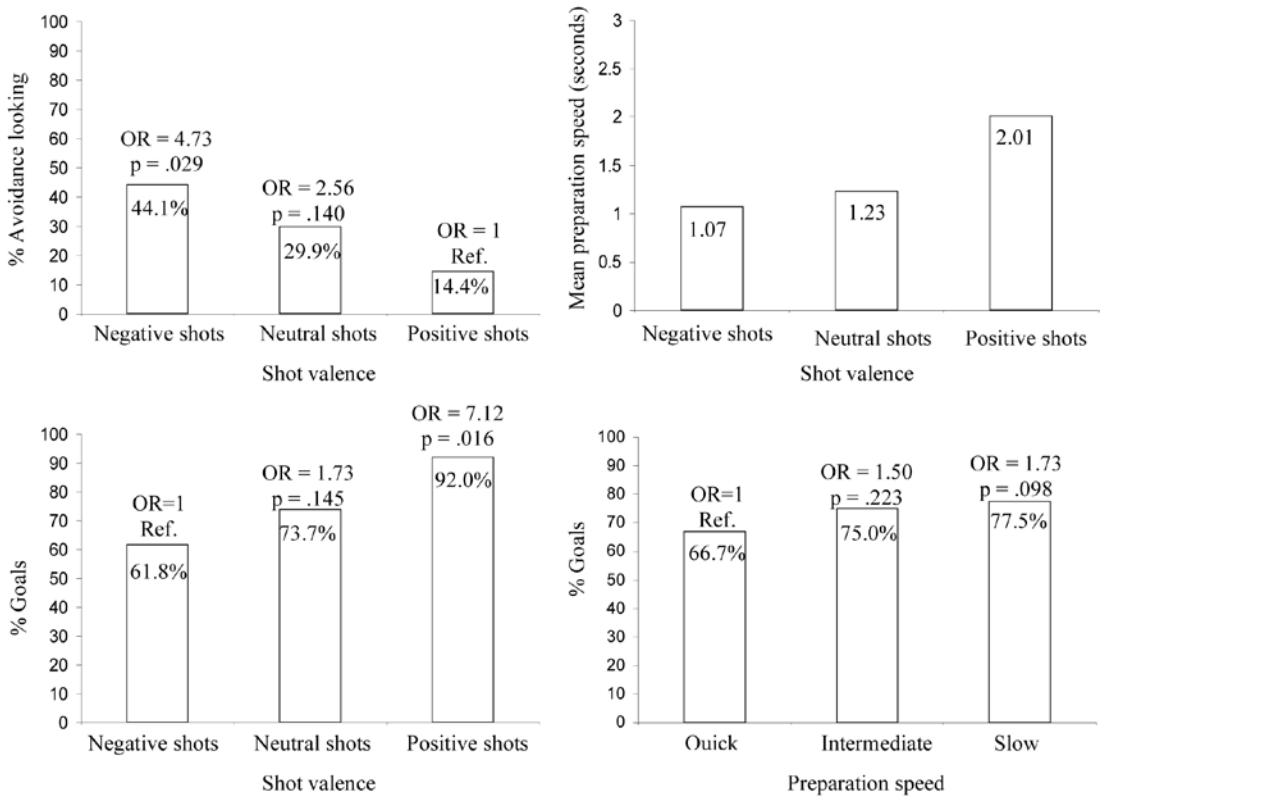

Figure 1 — The relationship between shot valence (positive, neutral, and negative) and avoidance looking, with odds ratios and corresponding *p* values (top left); the relationship between shot valence (positive, neutral, and negative) and mean preparation time (top right); the relationship between shot valence (positive, neutral, and negative) and performance, with odds ratios and corresponding *p* values (bottom left); and the relationship between preparation speed (quick: 0.2–0.5 s, intermediate: 0.6–1.3 s, and slow: 1.4–7.3 s) and performance, with odds ratios and corresponding *p* values (bottom right).

Approach/Avoidance Behaviors and Performance

There was no significant difference in performance between players who did approach (75.5%) and avoidance looking (73.0%) ($OR = 1.14$, $p = .630$), but the difference increased a bit when only selecting shots where the keepers went in the correct direction (62.7% and 53.8%, respectively, $OR = 1.44$, $p = .280$). There was a marginally significant difference in performance between quickly and slowly prepared shots ($OR = 1.73$, $p = .098$, see Figure 1, bottom right), with about the same results for shots where the keepers went correctly.

We also conducted a Sobel test to determine whether looking behavior or response time would mediate the effects of shot valence on performance. In these analyses, the neutral valence condition was excluded. Looking behavior did not significantly mediate the relationship between shot valence and performance (Sobel test $z = 0.062$, $p = .536$). Similarly, preparation speed did not significantly mediate the relationship between shot valence and performance (Sobel test $z = 0.822$, $p = .410$). This lack of direct evidence for avoidance behaviors mediating the relationship between valence and performance may have come from very low samples in the mediation analysis.

Discussion

The results of this study suggest that differences in approach and avoidance motivation can help explain why professional athletes occasionally perform poorly under pressure. Specifically, soccer players exhibited more avoidance behavior in negative valence penalty shootout situations than in positive valence situations. They also scored 30% fewer goals with the negative valence shots than with the positive shots. These performance differences seem to persist or increase when some of the actions of the keepers are controlled for, suggesting that the shooters' (and not the keepers') avoidance motivation precipitate choking under pressure.

The relationships we found between valence and avoidance behavior match previous research demonstrating that positive or negative evaluation of a stimulus is linked to behavioral tendencies to move toward or away from the stimulus, respectively (Elliot & Covington, 2001). This provides direct-observation support for contemporary theories of valence based achievement motivation (Elliot, 1999), which supplements a growing base of knowledge on sport motivation, mostly coming from self-report research (Roberts et al., 2007). Additionally, if indeed the negative valence situations produced higher experienced distress than the other conditions, our results would be consistent with studies showing that after initial hypervigilance, anxious individuals tend to avoid looking at threatening information (e.g., Garner, Mogg, & Bradley, 2006). Unfortunately, direct observation leaves many mediating variables unaccounted for. More research is needed to explore whether objective valences correspond with subjective experiences (e.g., achievement goals) and whether players indeed experience higher levels of distress when faced with negative valence shots.

The findings suggesting that high preparation speed was related to low performance are interesting given that laboratory studies have shown that experts who choke take longer, not shorter time (e.g., Beilock, Bertenthal, McCoy, & Carr, 2004). One explanation for this discrepancy may be linked to the dread of waiting in this

particular real-world situation. After players initially have spent time waiting (in the mid-circle and while walking to the penalty mark) they may hurry to get the stressful situation "over with" when they ultimately can time the shot themselves. This is consistent with the results by Berns et al. (2006). Consequently, it is possible that players initiate their shots before they have completed the necessary preparatory actions (e.g., collecting and processing relevant information) and that this contributes to the poor performance. Researchers are encouraged to more directly address these links between dread, waiting, and performance.

Finally, in the neutral valence condition, the preparation times were almost as short as in the negative valence condition and the performance was also notably closer to the negative valence condition than to the positive condition. This suggests the possibility that the neutral valence shots in reality, for some players, are perceived as having negative valence and thus, that players also may choke when performing what we here have called neutral valence shots. Another possible interpretation is that the players in the positive valence condition simply perform better (i.e., excel under pressure) than the players in the other conditions and that this may be a result of relatively higher approach motivation.

Acknowledgments

We thank Einar Sigmundstad for help with data collection and Barry Assen, Arend Jan Kranenburg, Remco Nieuwenhuis, and Roy Tjan for help with data analyses. For statistical support, we thank Hallgeir Halvari. We also want to express gratitude to Sian Beilock for helpful comments on previous versions of this manuscript.

References

Baumeister, R.F. (1984). Choking under pressure: Self-consciousness and paradoxical effects of incentives on skillful performance. *Journal of Personality and Social Psychology, 46,* 610–620.

Beilock, S. L., Bertenthal, B. I., McCoy, A. M., & Carr, T. H. (2004). Haste does not always make waste: Expertise, direction of attention, and speed versus accuracy in performing sensorimotor skills. *Psychonomic Bulletin & Review, 11,* 373–379.

Beilock, S.L., & Gray, R. (2007). Why do athletes choke under pressure? In G. Tenenbaum & R.C. Eklund (Eds.), *Handbook of sport psychology* (3rd ed., pp. 425–444). Hoboken, NJ: John Wiley & Sons.

Berns, G.S., Chappelow, J., Cekic, M., Zink, C.F., Pagnoni, G., & Martin-Skurski, M.E. (2006). Neurobiological substrates of dread. *Science, 312,* 754–758.

Bradley, M.M., Moulder, B., & Lang, P.J. (2005). When good things go bad: The reflex physiology of defense. *Psychological Science, 16,* 468–473.

Elliot, A.J. (1999). Approach and avoidance motivation and achievement goals. *Educational Psychologist, 34,* 169–189.

Elliot, A.J., & Covington, M.V. (2001). Approach and avoidance motivation. *Educational Psychology Review, 13,* 73–92.

Garner, M., Mogg, K., & Bradley, B.P. (2006). Orienting and maintenance of gaze to facial expressions in social anxiety. *Journal of Abnormal Psychology, 115,* 760–770.

Jordet, G., Elferink-Gemser, M.T., Lemmink, K.A.P.M., & Visscher, C. (2006). The "Russian roulette" of soccer?: Perceived control and anxiety in a major tournament penalty shootout. *International Journal of Sport Psychology, 37,* 281–298.

Jordet, G., Hartman, E., Visscher, C., & Lemmink, K.A.P.M. (2007). Kicks from the penalty mark in soccer: The roles of stress, skill, and fatigue for kick outcomes. *Journal of Sports Sciences, 25,* 121–129.

Roberts, G.C., Treasure, D.C., & Conroy, D.E. (2007). Understanding the dynamics of motivation in sport and physical activity: An achievement goal interpretation. In G. Tenenbaum & R.C. Eklund (Eds.), *Handbook of sport psychology* (3rd ed., pp. 3–30). Hoboken, NJ: John Wiley & Sons.

Wallace, H.M., Baumeister, R.F., & Vohs, K.D. (2005). Audience support and choking under pressure: A home disadvantage? *Journal of Sports Sciences, 23,* 429–438.

Manuscript submitted: April 16, 2007
Revision acepted: March 24, 2008