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Pitching and clutch hitting in Major League Baseball: What 109 years of statistics reveal

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ABSTRACT

Objectives: Theory on performance under pressure in sport has proposed that an athlete may be disrupted psychologically when distracted, or when explicitly monitoring too much the skills involved (Beilock & Carr, 2001; Masters, 1992). Research has also suggested that the extent to which an athlete allows pressure to impact performance may be greater for skills of increased complexity, such as hitting a baseball (Kinrade, Jackson, Ashford, & Bishop, 2010; Masters, Polman, & Hammond, 1993). Accordingly, hypotheses for the current study were that baseball hitters would be more susceptible to pressure-induced performance changes than pitchers, whose skills are less based in hand-eye coordination.
Design & method: An archival design was employed, accounting for 109 years of historical baseball data at both the team and individual levels.
Results: In line with hypotheses, for players with a minimum of 10 postseason innings pitched in a single year ($n = 835$) pitching statistics were significantly correlated from regular season (less pressure) to postseason (more pressure). For those with a minimum of 20 postseason at bats in a year ($n = 1731$), hitting statistics were similarly correlated from season to postseason; overall, however, the weakest such relationship was batting average. For teams ($n = 370$), regular season pitching was expected to be the best predictor of postseason success rates; this hypothesis was supported, but only for the most recent era of baseball history (1995–2011).
Conclusions: The data imply that, while hitting should not be wholly neglected, a successful, clutch baseball team should be built primarily around pitching.

Much has been made of the effects of elevated pressure in sport, from its potential to induce an athlete to "choke" (Baumeister, 1984; Gray, 2004; Jackson, Ashford, & Norsworthy, 2006; Mesagno, Harvey, & Janelle, 2011) to its prospective positive impact if interpreted adaptively (Cheng, Hardy, & Markland, 2009; Otten, 2009). Indeed, an athlete's performance is often disrupted, one way or another, under high-stakes conditions. Much theory has been proposed to explain this disruption and its psychological foundations. Distraction theory (DeCaro, Thomas, Albert, & Beilock, 2011; Wine, 1971) proposes that pressure deflects an athlete's attention away from the task at hand, causing performance to suffer. Alternatively, explicit monitoring theory (Beilock & Carr, 2001; Masters, 1992) posits that conscious attention paid to the step-by-step processes of a motor skill may trigger a performance letdown under pressure.

Baseball's pressure-filled World Series dates back to 1903 in the United States, when the Boston Americans (now known as the Red Sox) of the American League defeated the Pittsburgh Pirates of the National League, five games to three. The event established a rivalry between the leagues, and played to overflow crowds. After a one-year hiatus, the Series was set as an annual event starting in 1905, to establish the champion of Major League Baseball. The teams with the best records in each league qualified for the event, which stood as baseball's only postseason series until 1969. From 1969 until 1993, additional League Championship Series were added, and in 1995 (after a player strike halted play in 1994) two Division Series per league were further included to serve as an additional round of playoffs.

Thus, with the championship on the line, we may collect data from such postseason play to stand for baseball's version of performance under heightened pressure conditions. Indeed, most traditional forms of pressure tend to rise in the postseason (e.g., fan interest and attendance, media attention, internal and external awards; see Baumeister & Showers, 1986). The regular season play that leads up to these playoffs, then, might be considered low-pressure (or at least, non-elevated pressure) conditions. As such, we can compare the two and derive predictions for which players

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(and teams) might be more or less successful under the bright lights of the postseason, relative to their own same-year performances during the regular season. Baumeister's (1984) definition of a choke implied a performance decrement that occurs under high anxiety, relative to one's own standards. Likewise, Otten (2009) proposed that a "clutch" performance is a similar performance increment under pressure conditions.

As Kinrade et al. (2010) note, much of the existing literature on choking has been derived from empirical studies of relatively complex motor skill tasks that require considerable technical instruction (e.g., Beilock & Carr, 2001; Jackson et al., 2006). Included among these studies is that of Gray (2004), who found that poorer performance under pressure among a sample of skilled hitters in baseball was associated with greater explicit monitoring of the position of the bat. Indeed, hitting a baseball at the highest level is often considered by experts as the most difficult, complex skill in all of sports (see Peterson, 2011). Thus, that popular theories of pressure and performance are applicable to hitting a baseball in postseason play is considered a safe assumption here.

For pitching a baseball, however, this assumption may not be quite so clear. While it is by no means a simple skill, pitching likely requires a different mental approach, involving greater calculated effort, perhaps, than the split-second hand-eye coordination required for hitting. Thus, it could be that explicit monitoring of one's pitching motion mechanics could be *less* detrimental to a pitcher's performance under pressure than such monitoring of skills by a hitter, as in Gray (2004). This is not to say that pitchers feel less pressure, or respond to it with a reduced tendency to consciously monitor their movement. Rather, given the same amount of explicit monitoring of skills, hitters' performance may be impacted more due to the complexity involved in reacting to the ball thrown at high speed. To date, no research has examined these relationships *within* a specific sport such as baseball.

However, it is conceivable that the contrast between the complexities involved in pitching versus hitting may approximate the differences observed by Kinrade et al. (2010) and Masters et al. (1993) in their comparisons of motor skill and cognitive tasks. Masters et al. (1993) found that reinvesting attention, or more actively attending to the task, was associated with performance decrements under pressure among separate samples of golf putters, tennis and squash players. The same effect was *not* found, however, among participants asked to complete a two-dimensional rod-tracing task, leading Masters et al. (1993) to conclude that explicit monitoring was not such a bad thing for those executing a simpler task. In support of these findings, results from Kinrade et al. (2010) suggest that greater reinvestment of attention to a cognitive task may speed up one's performance, but not necessarily degrade it under pressure.

Taken together, the above findings lead us to believe that *not* explicitly monitoring your skills while under pressure may be more important for hitters than for pitchers in baseball. If this is true, then other psychological variables central to explicit monitoring theory (e.g., feelings of perceived control; Cheng et al., 2009; Otten, 2009) should also be more relevant for hitters. Thus, the successful hitter would be one who is best-prepared psychologically, regardless of say, his level of success achieved during the regular season.

The current study

At the individual level, pitching skills will be consistent across the regular season, playoffs and World Series. That is, individual regular season pitching statistics will be significantly correlated with the same postseason pitching statistics, across pitchers who participated in postseason play. For hitters, however, skills will be less consistent, and thus season–postseason correlations will be significantly smaller than those for pitching (but still, significantly different than zero). One exception should be noted: the stolen bases category is also listed among hitting statistics (see below). Since base-stealing is *not* part of the act of hitting and is less reliant on hand-eye coordination, much like pitching, it is considered a less complex skill here and is thus hypothesized to hold a stronger season–postseason correlation than the other hitting stats.

The logic of the above hypotheses may be extended to the team level as well. If pitching is relatively more stable across the regular year and postseason, it follows that teams that collectively pitched well during the season will not only also pitch well under pressure, but also *win postseason games*. As a result, regular season team hitting will be significantly less predictive of postseason team success than will regular season team pitching.

We also note that there is an old adage in baseball that pitching and defense win championships (e.g., Merron & Schoenfield, 2005). The above hypotheses are consistent with the old adage, in that pitching skills are proposed as significantly stronger predictors of championship success than hitting skills.

Method

Design & materials

To test these hypotheses, an archival research paradigm was employed. The data were downloaded from the Baseball Reference website (Baseball-Reference.com, 2012), where a plethora of baseball data is available for public access and use. The data retrieved span 109 years of baseball history, from the inception of the World Series in 1903 through to the 2011 playoff series. All individual cases included in the data set were professional baseball players who collected a minimum of either 20 postseason at bats, for hitters ($n = 1731$) or 10 postseason innings pitched, for pitchers ($n = 835$) in a given year. The data were paired so as to list regular season statistics alongside postseason stats, by year, for each player included. A separate data set was comprised of team-level statistics, encompassing team hitting and pitching for every team in history that had played at least one postseason series ($n = 370$). Data were coded and screened using Microsoft Excel.

As noted earlier, prior to 1969 only the World Series was contested, while additional rounds of playoffs have been added in recent years; as a result, some players and teams in the sample played in multiple postseason series in a single year. Thus, totals were summed (e.g., for home runs) and/or averaged (e.g., for batting average) to achieve only one listing per player or team, per year. For example, Josh Hamilton appeared in three postseason series per year in 2010 and 2011, but he is only listed twice in the final data set, once for 2010 and once for 2011.

Measurement

Hitting statistics. Total *at bats* tallies a hitter's total plate appearances, minus select cases (e.g., when he walks or is hit by a pitch). The *hits* statistic counts the total number of times a batter puts the ball in play and reaches first base, not due to a fielder's choice or error. A *home run* occurs when a player scores based on his own hit, and not due to a fielding error. While running the bases, a player may achieve a *stolen base* when he advances while the pitcher is delivering the ball. *Batting average* is the percentage of successful hits accumulated per at bat; *on base percentage* is the percent of time a player reaches base successfully per at bat, as it is possible to reach base without a hit (e.g., by a walk). The *slugging percentage* for a player is the total number of bases reached divided by at bats; for example, a single counts as one base, while a home run counts as four. Finally, the *on base plus slugging percentage (OPS)*