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The contract year syndrome in the NBA and MLB: A classic undermining pattern

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Abstract We assembled National Basketball Association and Major League Baseball player performance data from recent years, tracking 3 year periods in players' careers: pre-contract year (baseline), contract year (CY; salient external incentive present), and post-contract year (salient external incentive removed). In both sports, we examined both individual scoring statistics (points scored, batting average) and non-scoring statistics (e.g. blocked shots, fielding percentage) over the 3 years. Using extrinsic motivation theories, we predicted and found a boost in some scoring statistics during the CY (relative to the pre-CY), but no change in non-scoring statistics. Using intrinsic motivation theories, we predicted and found an undermining of many statistics in the post-CY, relative to both the CY and the pre-CY baseline. Boosted CY scoring performance predicted post-CY salary raises in both sports, but salary raises were largely unrelated to post-CY performance. The CY performance boost is real, but team managers should know that it might be followed by a performance crash—the CY "syndrome."

Keywords Motivation · Intrinsic motivation · Extrinsic motivation · Self-determination theory · Sport

Introduction

Professional athletes perform under intense scrutiny and pressure, but with the possibility of obtaining very large material rewards. How do these "extrinsic" contextual factors affect their motivation and performance over time? Although it is seldom possible to measure elite athletes' changing motivations directly, it is possible to *infer* their motivations, by examining periods in the athlete's career when particular motivational factors are especially salient. One period in which extrinsic factors are highly salient is the "contract year" (CY). The CY refers to the last season of an athlete's current contract, meaning that after the season is over the player will become a free agent who is trying to negotiate a new contract. The CY *phenomenon* (Berri and Krautmann 2006; Helin 2012) refers to a player (purportedly) performing significantly better in his CY, presumably to earn a better contract that pays more, and is guaranteed for more years, than the last contract (Coon 2013). Of course there are many other "extrinsic" forces acting upon professional athletes besides salary dynamics (i.e. fan expectations, media expectations/interviews, Hall of Fame prospects, All Star team memberships), which might also be studied. However in this research we chose to focus on players' contract year status, both because money is the most prototypical extrinsic motivator, and because archival salary data are readily available.

The CY phenomenon is often discussed in sports media in reference to both the National Basketball Association (NBA; Helin 2012; Kennedy 2012; Sharp 2011) and Major League Baseball (MLB; Rymer 2013). Some economics studies also have addressed the CY phenomenon in the NBA (e.g. Berri and Krautmann 2006; Stiroh 2007) and in MLB (e.g. Krautmann and Donley 2009; Holden and Sommers 2005). However, there has been no comprehensive examination of CY effects (before, during, and after) upon multiple types of statistics in both sports, within the framework of relevant psychological theories of motivation. Thus, we examined the effects of a CY upon professional athletes tracked over 3 year periods. The year

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prior to the CY (pre-CY) represents a 'baseline' condition, the CY represents a condition where there is a 'salient incentive' present, and the year after the CY (post-CY) represents a condition where performance incentives have become less salient. Of course, players are always aware that their performance impacts their compensation, but during the CY this awareness is especially salient, whereas it likely recedes after players obtain a long-term contract.

We attempted to answer two questions: "What happens to performance in the CY, compared to the baseline (pre-CY) condition?" and "What happens to performance in the post-CY, compared to both the baseline and the CY?" Concerning the first question, expectancy-type theories of motivation (Behling and Starke 1973; Vroom 1964) predict increases in performance during the CY, because it is a period in which external contingencies are especially salient to an athlete. These theoretical perspectives go beyond classic operant behaviorism to argue that future expected reinforcements (not just past received reinforcements) might positively affect behavior. Thus an athlete, because of his own financial interests, may try and succeed in improving his performance during the CY, because he expects that his level of pay the next season is directly contingent upon his performance in the CY (Frey and Osterloh 2002). A related frame of reference is outcome expectancy theory (Bandura 1997; Heneman and Schwab 1972). Outcome expectations (the belief that "doing well will earn me rewards") are distinct from efficacy expectations (the belief that "I can do well"). Outcome expectancy theories posit that individuals will exert greater effort and performance if they expect that better performance will translate into an attractive consequence (e.g. higher pay; Jex and Britt 2008). All of these perspectives represent variants of what has been termed "extrinsic motivation," in which a person behaves in order to get some incentive or outcome in the future that is separable from behavior itself (Deci et al. 1999; Deci and Ryan 1985). Indeed, there is considerable empirical evidence suggesting that extrinsic motivators, in the form of proffered financial incentives, can positively affect performance (see Jenkins et al. 1998, for a comprehensive meta-analysis). Thus, we expected to see a CY boost in our data. This was our first hypothesis.

Our second research question asks what happens to performance post-CY. Extrinsic motivational theories largely focus on the effects while the incentive is present and would typically assume that a reversion to the baseline should occur once the incentive is removed. In the context of the present study, such theories would predict pre- and post-CY performance to be equal.

However, other theories predict a lingering negative impact of exposure to a strong external incentive. Most prominent among these is self-determination theory (SDT; Deci and Ryan 1985; Ryan and Deci 2000). SDT is based on the phenomenon of intrinsic motivation, in which a person acts because the behavior is inherently interesting and enjoyable. Early SDT research demonstrated the "intrinsic motivation undermining effect" (Deci 1971, 1975) in which a person no longer wants to perform a formerly appealing behavior after a period in which an extrinsic motivator has been made salient. According to this theory people can be "punished by rewards" (Kohn 1993), such that their spontaneous desire to do a behavior is reduced after receiving rewards (especially if the rewards are perceived by participants as controlling or coercive). Intrinsic motivation undermining is problematic because intrinsic motivation has been shown to be associated with many positive outcomes, including sustained effort and persistence in an activity, and also with the quality and creativity of performance during that activity (Deci and Ryan 1985).

The original undermining effect has now been replicated many times. Indeed, a comprehensive meta-analysis (Deci et al. 1999) examined 128 controlled studies conducted in "laboratory-like" conditions. This analysis found that verbal rewards did not undermine intrinsic motivation (in fact they enhanced it; $d = .33$). However, "tangible" rewards (involving provision of some commodity like money) undermined intrinsic motivation ($d = -.34$), but only when the tangible rewards were expected ($d = -.36$); receiving unexpected tangible rewards after completing the task was not undermining ($d = .01$, ns). Importantly for the present study, expected *performance contingent* tangible rewards (expecting to get even more, the better one does) were a strong predictor of reduced intrinsic motivation ($d = -.28$), as were expected *engagement-contingent* rewards (expecting rewards simply for starting the task; $d = -.40$) and also expected *completion-contingent* tangible rewards (expecting rewards simply for finishing the task; $d = -.44$). Again, athletes playing in a contract year know that the size of *next* year's paycheck is highly contingent upon the quality of their performance *this* year. Of course it is also contingent on their play in previous years, but the athlete's play during the CY itself likely receives the most attention from fans and general managers: what has the athlete done for them lately?

According to the SDT perspective, effort and performance should not just fall back to baseline, but should actually fall below baseline after a salient extrinsic motivator is removed, because intrinsic motivation has been undermined and because intrinsic motivation is beneficial for effort and performance (Deci and Ryan 1985). In terms of our study, because of the reduction of intrinsic motivation in the post-CY to a level below even their pre-CY baseline, professional athletes' performance quality should decline to a level of quality that is beneath both pre-CY and CY performance. If performance merely returns to the pre-

CY baseline in the post-CY year, this could be handled by solely by extrinsic motivation theories via the assumption that behavior should regress to the mean once the incentive is no longer salient. Notably, SDT's prediction that the quality of behavior in the post-CY should be *lowest* of the 3 years constitutes a fairly demanding test of the theory. This was our second hypothesis.

Thus far we have not distinguished between different types of sports performance. As fans know, there are many different types of statistics that might be examined, including defensive statistics (e.g. defensive rebounds and steals in basketball; fielding in baseball), offensive statistics (e.g. points scored, field-goal percentage in basketball, batting average and home runs in baseball), and many more complex statistics that combine various basic statistics (e.g. player efficiency ratings, win shares). In this research we made a conceptual distinction between "individual scoring" statistics and "non-scoring" statistics. The distinction is relevant because we expected our first hypothesis (performance boosts during CY only) to apply only to individual scoring statistics, which are typically most associated with salary increases (Berri et al. 2007). Extrinsic and expectancy theories suggest that players should display enhanced performance only for those statistics that directly affect obtaining the incentive (i.e. a large raise and a guaranteed contract). This was our third hypothesis.

In sum, we used theories of both extrinsic motivation and intrinsic motivation to make predictions about professional athletes' performance before, during, and after their contract year. Our first hypothesis predicted a performance increase in the CY, while our third hypothesis predicted that this would primarily occur for the "individual scoring" statistics, as opposed to the "non-scoring" statistics. Our second and primary hypothesis predicted performance decreases post-CY in all statistics, due to the presumed undermined intrinsic motivation experienced by players as a result of the high salience of extrinsic motivation during the CY.

To test these ideas we conducted two studies, one using NBA player data (Study 1) and one using MLB player data (Study 2). These two sports leagues are financially well-off and their teams commonly offer large multi-year contracts to proven starters. We reasoned that if our basic hypotheses could be supported within these very different sport contexts, then this would help to establish the generalizability of the patterns.

Study 1

Participants and procedure

We began by downloading data for the most recent ten NBA seasons (the 2002–2003 season through the 2011–2012 season). Since we needed measures of performance before and after each CY, we were left with eight possible contract years to look at. Unfortunately, the 2011–2012 season was problematic because a lockout shortened the season from 82 to 66 games, with a shortened training camp and no pre-season games. Thus we eliminated this season, which also required eliminating players with CYs in 2010–2011 from the dataset, since the 2011–2012 season served as the post-CY year for the 2010–2011 season. Thus our data consisted of seven CYs from nine seasons.

Information on contract year status was retrieved from the official NBA website's free agents page (http://www.nba.com/freeagents/), known as the "Free Agent Tracker" for seasons 2009 to present and as the "Player Movement" page for seasons before 2009. Individual player performance statistics were retrieved from Sports Reference LLC's basketball site (http://www.basketball-reference.com). Players were included in the study if they met three criteria. First, an athlete must have played at least 500 min in every season analyzed in the study (pre-CY, CY, and post-CY), 500 min being the cut-off for being listed on ESPN's Hollinger NBA Player Statistics leader board (less than 10 % of the original sample was excluded by this criterion). Second, a player must not have had back-to-back CYs. This ensures a clean pre-CY/CY/post-CY design where the salient extrinsically motivated season is both preceded and followed by a season lacking such salience. Finally, if a player had two CYs during the 8-year period, we included only the first set of data. For example, Kobe Bryant had a contract year in both 2003–2004 and 2008–2009; we included Bryant's 2003–2004 season in our sample but not his 2008–2009 season, because that data may be dependent on what happened in Bryant's earlier CY.

There are various types of free agency in the NBA, such as unrestricted free agency, restricted free agency, early termination option, team option, and player option. While all of these nuances have their own unique characteristics, we did not attempt to deal with these differences. This is because each type of free agency still represents an instance where an extrinsic motivator is salient; moreover, we wanted to consider the generalizability of effects to any type of CY.

The resulting sample contained 170 NBA players who had CYs during one of the seasons ranging from 2003–2004 to 2009–2010. Because each player was represented by three seasons in the data, there were 510 player-years in the dataset, which we intended to analyze primarily via repeated measures MANOVAs. Among the 170 CY players were 30 point guards, 36 shooting guards, 35 small forwards, 34 power forwards, and 35 centers (we had no hypotheses concerning position differences). Players' mean age during their CY was 26.73, and their pre-CY salaries ranged from approximately $350,000/year to $25,000,000/year

(mean = $4,774,000), and their post-CY salaries ranged from $932,000 to $20,000,000 (mean = $6,200,000).

Measures

After considering dozens of statistics we decided to focus primarily on basic offensive and defensive statistics, standardized to a "per 36 min" unit (this unit is employed by Basketball-Reference and is a conservative approximation of starting players' minutes in an average game). For "individual scoring" statistics, we examined points scored and field goal percentage. These are the two most important offensive statistics, most likely to be rewarded by a contract increase. For "non-scoring" statistics we examined blocked shots, steals, assists, defensive rebounds, and offensive rebounds. Finally, we also examined one more complex statistic, namely player efficiency rating (PER), which is believed to supply the single best indicator of overall performance taking both offense and defense into account (Hollinger 2011). It is currently the most popular single number metric of player performance, used by multiple websites and analysts.

Thus, our primary analyses focus on eight variables, measured three times each: steals, defensive rebounds, offensive rebounds, assists, blocked shots, PER, points scored, and field goal percentage. We expected CY boosts only upon the latter two statistics, and expected post-CY declines in all statistics. Descriptive analyses revealed that none of the 24 variables employed had skewness coefficients greater than 2.0, indicating that the variables were normally distributed.

Results

Preliminary results

We first examined player's position (i.e., power forward, shooting guard) effects on the primary variables. There were expectable differences in these figures; for example, centers scored the least points on average but had the highest field goal percentage, whereas shooting guards scored the most points but had the lowest field goal percentage. Supporting the validity of the PER measure as an overall performance measure that balances out position effects, there were no differences in PER by position. Because position did not moderate any of the within-subject findings below, we ignore position henceforth.

Hypothesis tests

We first conducted eight repeated measures MANOVAs, one for each primary variable, comparing pre-CY, CY, and post-CY performance (see Table 1). As can be seen, a significant omnibus effect of "year in cycle" emerged for six of the variables; the omnibus effect for blocked shots ($p = .059$) and assists ($p > .50$) were not significant. Figure 1 graphically portrays these means, and pairwise differences between means are represented by coefficients in Table 1. Supporting hypothesis 1, points scored and field goal percentage were both higher during the CY incentive period, compared to the pre-CY. PER was also higher during the CY, logical in retrospect since it is partially composed of individual scoring statistics. Supporting hypothesis 3, however, no CY boosting effect emerged for any of the other, non-scoring statistics (steals, blocks, defensive rebounds, offensive rebounds). Supporting hypothesis 2, offensive rebounds, defensive rebounds, and steals were all lower in the post-CY season than either the pre-CY or the CY season. In addition, PER was lower in the post-CY than in either the pre-CY or the CY. Although points and field goal percentage declined from their CY levels, they did not decline below pre-CY levels. The latter pattern better fits the predictions of extrinsic or expectancy theories, which say that performance should merely return to baseline once the incentive is removed.

We then re-conducted all of the above analyses using ANCOVAs controlling for players' salaries in the pre-CY, the CY, and the post-CY. This was done to ensure that the above effects were not due to between-player differences in ability or pay. None of the significant omnibus effects above became non-significant in these analyses; in some cases the omnibus effects were slightly increased but in others they were slightly decreased.

Salary effects

Finally, we used regression analyses to consider the role of player's salary, and changes in salary. We asked whether: (a) CY performance, controlling for pre-CY performance, predicts boosts in salary, expecting the "scoring" statistics to have the largest effect; and whether (b) post-CY salary, controlling for CY salary, affects any of the performance declines observed between the CY and the post-CY. Perhaps those who did especially well in the CY process, earning a large raise, did not experience these declines?

Regarding the first question: post-CY salary, relative to CY salary, was significantly predicted by points scored in the CY (relative to pre-CY points scored) at $\beta = .32$, $p < .01$. Enhanced field goal percentage in the CY also predicted enhanced salary post-CY, ($\beta = .19$, $p = .020$). Enhanced PER in the CY also predicted enhanced salary post-CY at $\beta = .25$, $p = < .01$. Changes in assists, blocked shots, defensive rebounding, and offensive rebounding were unrelated to changes in salary. These results support our assumption that offensive statistics are an important determinant of the size of the raises that players receive.

Table 1 Mean differences in NBA player performance by year in the contract cycle

	Pre-CY Mean (SD)	CY Mean (SD)	Post-CY Mean (SD)	$F(2,167)$	η^2
FG %	.45 $(.051)_a$	.461 $(.051)_b$	.455 $(.053)_{ab}$	5.229**	.0297
Points	14.08 $(4.02)_a$	14.6 $(4.18)_b$	13.92 $(4.27)_a$	7.796***	.0441
PER	14.78 $(4.18)_a$	15.41 $(3.88)_b$	14.24 $(4.04)_c$	17.961***	.0961
ORB	1.79 $(1.88)_a$	1.78 $(1.26)_a$	1.65 $(1.15)_b$	8.951***	.0503
DRB	4.56 $(1.7)_a$	4.55 $(1.71)_a$	4.38 $(1.69)_b$	5.554**	.0318
Assists	3.03 (2.08)	2.98 (1.96)	3.02 (2.00)	.275	.0016
Steals	1.12 $(.452)_a$	1.12 $(.423)_a$	1.05 $(.416)_b$	6.536**	.0372
Blocks	.82 (.87)	.76 (.82)	.77 (.81)	3.087	.0179

Values on the same row not sharing subscripts differ from each other at $p < .05$

FG % = field goal shooting percentage; PER = player efficiency rating; ORB = offensive rebounds per 36 min; DRB = defensive rebounds per 36 min; assists, steals, and blocked shots also normalized to 36 min

* $p < .05$; ** $p < .01$; *** $p < .001$

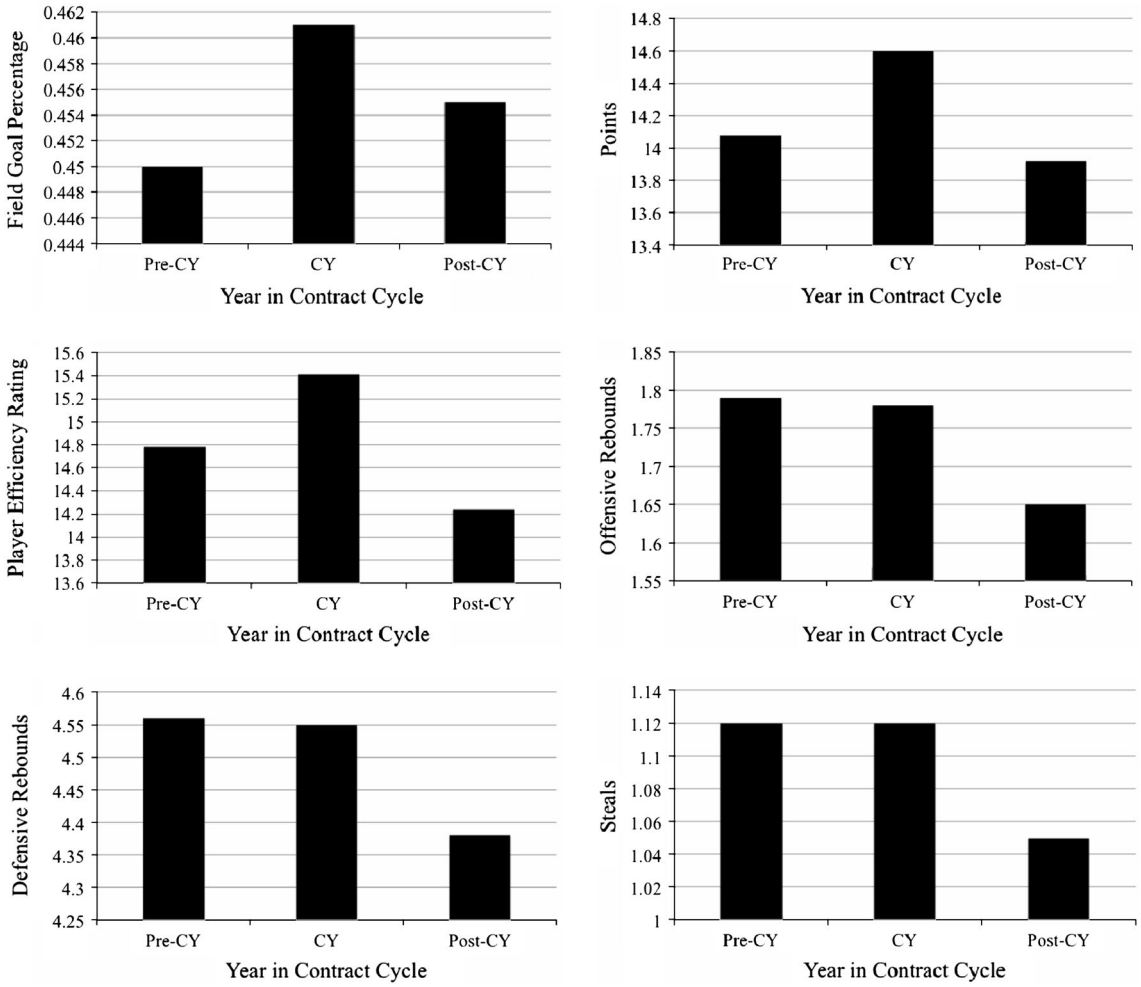

Fig. 1 Mean differences in NBA performance by year in the contract cycle. *Panel 1* (*top left*) shows field goal percentage, *Panel 2* (*top right*) shows points per 36 min, *Panel 3* (*middle left*) shows player efficiency rating, *Panel 4* (*middle right*) shows offensive rebounds per 36 min, *Panel 5* (*bottom left*) shows defensive rebounds per 36 min, and *Panel 6* (*bottom right*) shows steals per 36 min

Regarding the second question, post-CY salary (controlling for CY salary) did not predict changes in seven statistics, but it did predict a relatively greater PER rating in the post-CY than in the CY ($\beta = .22$, $p < .01$). However, in the context of the sample-wide decline in PER seen between the CY and the post-CY, larger salary raises did not actually predict increases in PER: instead, larger raises only served to somewhat mitigate the general performance reductions observed.

Study 2

In Study 2 we examined the generalizability of these effects to a second professional sport, one which also provides multi-year guaranteed contracts: Major League Baseball. Here, we examined position players and again made a distinction between offensive statistics and non-offensive statistics. Since we aimed to assemble both scoring and non-scoring metrics (thus making the NBA and MLB samples comparable in this regard), pitchers (defense only) and designated hitters (offense only) were excluded. We expected to see the same pattern of support for hypotheses 1 and 3, with hypothesis 3 referring to CY boosts in offensive versus non-offensive statistics. We again expected to see reductions in at least some statistics in the post-CY compared to the pre-CY and the CY (hypothesis 2), presumably due to the undermining of intrinsic motivation.

Participants and procedure

Players' CYs were established via the ESPN.com MLB Free Agent Tracker (http://espn.go.com/mlb/freeagents). This list dates back to the 2006 free agent class, so we chose to include players having CYs from the 2006 season to the 2011 season, with the recent 2012 season as the post-CY condition for the 2011 CY players. Individual player performance statistics were retrieved from Sports Reference LLC's baseball site (http://www.baseball-reference.com). Players were included if they met three criteria. First, an athlete must have played at least 300 innings in every season analyzed in the study (pre-CY, CY, and post-CY), which excluded less than 10 % of the original sample (similar to Study 1). Second, a player must not have had back-to-back CYs (for the same reasoning as before). Third, if a player had two CYs during the time frame of our study, again we included only the first set of data.

The resulting sample included 66 MLB players who had CYs during one of the seasons ranging from 2006 to 2011. The N for Study 2 was considerably lower than for Study 1 because there were fewer 2 years contracts (necessary for inclusion in our data) and because pitchers and designated hitters were excluded, as explained above. The final database contained 207 player-years. Players' mean age during the CY was 31.3 (SD = 2.25), and their salaries ranged from \$330,000 to \$ 21,700,000 in the pre-CY (M = \$5,850, 000) and \$1,000,000 to \$28,000,000 in the post-CY (M = \$7,400,000).

Measures

As in Study 1, we again focused on basic statistics. Five assessed offensive play: batting average (BA), slugging percentage (SLG), on base percentage (OBP), runs batted in (RBI), and home runs (HRs). For those unfamiliar with these statistics, batting average is simply the percentage of official at-bats that result in officially ruled hits. On base percentage is the percentage of all plate appearances that result in the player getting on base (i.e. by walking as well as by hitting). Slugging percentage refers to the number of bases a batter achieves via his hits, on average; home run hitters have higher slugging percentages than singles hitters. The first three percentage variables already control for the *quantity* of play; we achieved this with RBI and home runs by controlling for the number of at bats in our hypothesis tests. RBI and home runs are presented in their natural metrics in Table 2.

To measure players' defensive performance, we chose to examine overall fielding percentage, which is simply the sum of a player's put outs and assists divided by the sum of his put outs, assists, and errors, a formula which has been used since 1876 (Basco and Zimmerman 2010). Examining the separate components of fielding percentage measure did not produce a distinctive pattern, and thus we omit these statistics for economy's sake. Descriptive analyses revealed that none of the 18 variables employed had skewness coefficients greater than 2.0, indicating that the variables were normally distributed.

Results

We first conducted six repeated measures MANOVAs, one for each primary variable, comparing pre-CY, CY, and post-CY performance (see Table 2). A significant omnibus effect of "year in cycle" emerged for five variables, excluding fielding percentage; Fig. 2 presents these five patterns of means. Notably, the patterns were somewhat different than in Study 1. In four of five cases, there was no change from the pre-CY to the CY; only for runs batted in (RBIs) was there evidence for a boost from the pre-CY to the CY ($p = .051$, *ns*). Thus, hypotheses 1 and 3 (increases in offensive performance in the CY relative to the pre-CY) received little support. More importantly for our purposes, SDT's undermining hypothesis was clearly supported in

Table 2 Mean differences in MLB player performance by year in the contract cycle

	Pre-CY Mean (SD)	CY Mean (SD)	Post-CY Mean (SD)	$F(2, 63)$	η^2
Batting Av.	.274 (.03)$_a$	.277 (.027)$_a$	.262 (.03)$_b$	7.321**	.0988
Slugging %	.432 (.074)$_a$	.441 (.082)$_a$	.409 (.082)$_b$	7.835**	.1028
On base %	.345 (.036)$_a$	.346 (.036)$_a$	.33 (.035)$_b$	8.529***	.1122
Home runs	15.05 (11.3)$_a$	15.77 (12.5)$_a$	12.09 (10.3)$_b$	4.266*	.0556
Runs batted in	59.3 (28.8)$_{ab}$	65.0 (32.7)$_a$	51.9 (28.6)$_b$	7.292**	.1026
Fielding %	.983 (.013)	.985 (.01)	.98 (.01)	.665	.0107

Values on the same row not sharing subscripts differ from each other at $p < .05$

Hypothesis tests for home runs and runs batted in were performed controlling for number of at-bats

* $p < .05$; ** $p < .01$, *** $p < .001$

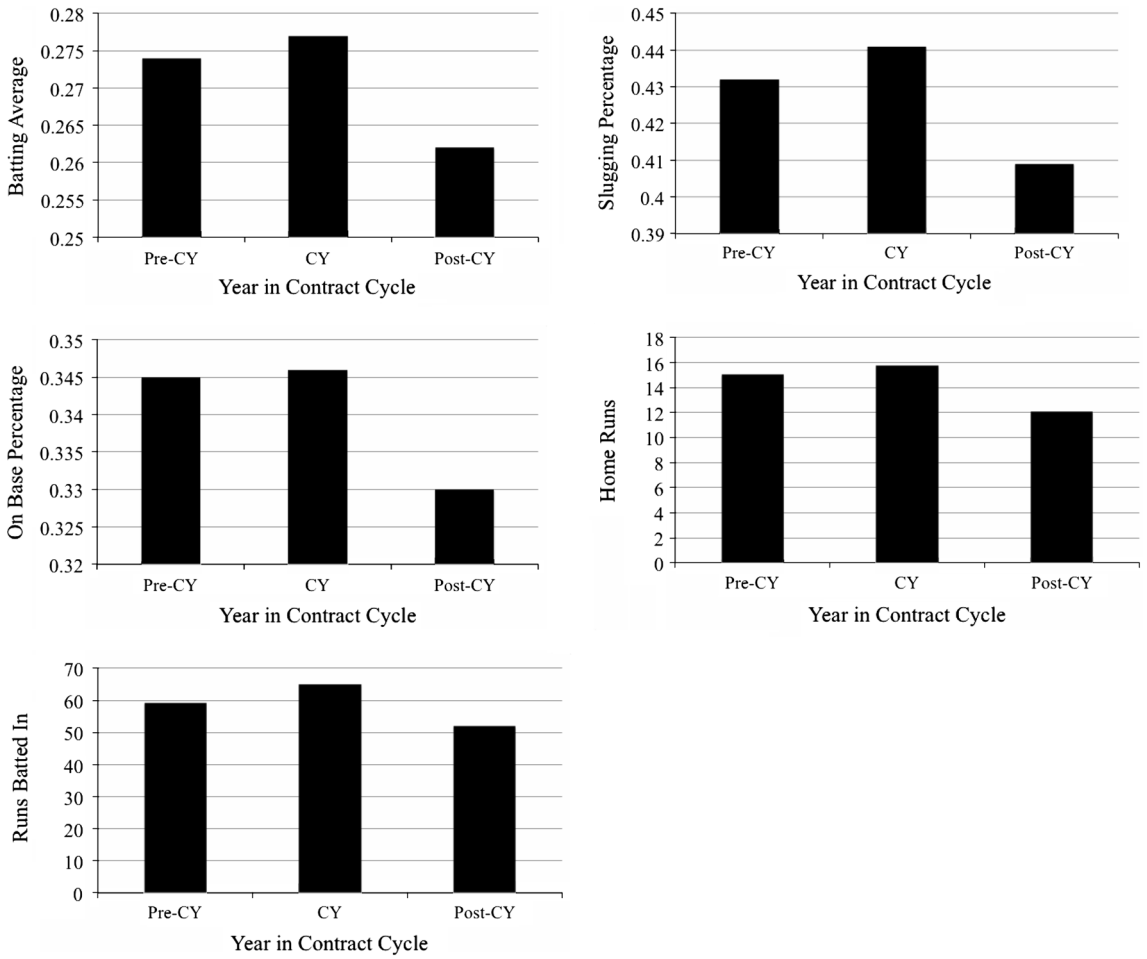

Fig. 2 Mean differences in MLB performance by year in the contract cycle. *Panel 1* (*top left*) shows batting average, *Panel 2* (*top right*) shows slugging percentage, *Panel 3* (*middle left*) shows on base percentage, *Panel 4* (*middle right*) shows home runs, and *Panel 5* (*bottom left*) shows runs batted in

four out of six cases (again excluding fielding percentage, and also RBIs): for batting average, on-base percentage, slugging percentage, and home runs, post-CY performance was significantly below both the baseline pre-CY year, and the CY year.

As in Study 1, we then re-conducted all of the above analyses using ANCOVAs controlling for players' salaries in the pre-CY, the CY, and the post-CY. None of the significant omnibus effects above became non-significant in these analyses.

Salary effects

We again used regression analyses to consider the role of player's salary, both in the pre-CY and the post-CY. These analyses revealed that post-CY salary, controlling for CY salary, was significantly predicted by changes in: CY batting average ($\beta = .26$, $p < .001$); CY slugging percentage ($\beta = .28$, $p = .001$); CY on-base percentage ($\beta = .28$, $p < .001$); and CY home runs and RBIs, controlling for at-bats ($\beta s = .23$, $p = .057$, and .46, $p < .001$, respectively). Post-CY salary was not predicted by changes in fielding percentage ($p > .30$). These results again confirm our assumption that offensive statistics are the main drivers of salary increases.

Finally, post-CY salary (controlling for CY salary) predicted changes in none of the seven performance statistics (all $ps > .10$). This is similar to what was found in Study 1, and again indicates that paying a player more does not necessarily improve his performance.

Discussion

Although sports commentators have long discussed the contract year phenomenon, the empirical evidence for it has been quite sparse. In this research we examined recent player performance data in both the NBA and in MLB, using a pre-CY/CY/post-CY design. As predicted by hypothesis 1 (based on expectancy and incentive theories; Bandura 1997; Vroom 1964), we found CY effects (i.e., a performance boost from the pre-CY baseline) in the NBA data, but as predicted by hypothesis 3, based on a more focused application of the extrinsic motivation perspective, this was found only for the offensive statistics (points scored, and field goal percentage). The evidence for a CY effect in the MLB was much weaker, with only a near-significant increase in runs batted in during the CY ($p = .051$), but no increase in batting average, home runs, slugging percentage, or on base percentage.

We also found that better CY performance pays off for players, in that offensive performance increases during the CY (compared to the pre-CY) predicted post-CY salary increases in both the NBA and in MLB. Thus, our focused application of the extrinsic motivation perspective proved correct. However, salary boosts in the post-CY did not predict relatively better performance in the post-CY, with one exception (PER, in Study 1). Thus, any theory that providing a larger raise will produce even better player performance may be incorrect.

Our second hypothesis, based on SDT, addressed these issues via the well-known intrinsic motivation undermining phenomenon (Deci et al. 1999). Undermining occurs when a formerly enjoyable activity becomes less enjoyable after a period in which activity incentives were made overly salient. The main goal of this article was to test whether such an effect might be suggested by professional sports data, due to the strong extrinsic motivation presumably induced by the CY.

In the NBA data, post-CY performance deficits were seen for four statistics: offensive rebounding, defensive rebounding, steals, and PER. The former three "hustle" statistics require effort and desire, which may be reduced after the CY experience. In a fifth case, blocked shots were actually reduced *during* the CY, and stayed at the reduced level in the post-CY. Because these statistics are all important to team-level performance (i.e. winning), these results have chilling implications for team general managers—the high scoring wonder, just inked to a 3 years deal, may now have less interest in doing the "grinding" that also produces victories.

In the MLB data, post-CY performance deficits were seen for four out of the six statistics, with performance declining not only below the CY, but also below the pre-CY. Interestingly, these were all offensive statistics and there were no effects on the aggregate fielding percentage. Thus, in the NBA, undermining occurred for non-offensive statistics but not offensive statistics, while in MLB, undermining occurred for offensive statistics but not non-offensive statistics.

These discrepancies between basketball and baseball, regarding the effects of the CY upon CY performance, may be due to the differing nature of the two games. Playing baseball well requires extremely fast reaction times, either to a pitch or to a batted ball. Perhaps it is not possible to "will" oneself into performing better at such tasks, no matter how much money is at stake. In contrast, in the NBA, it is more plausible that players can will themselves to play more aggressively, driving to the basket more often or taking more shots than usual. Working against this explanation is the fact that the CY had strong lingering effects on baseball performance, reducing nearly every category of offense in the post-CY. It may be that players reduce their training and conditioning in the post-CY, explaining the deficits observed; indeed, such an indirect effect might explain the decrements seen in both the NBA and in MLB. Unfortunately, our data cannot speak to the issue of athlete conditioning in the post-CY.

These results have clear implications for team general managers, who are largely responsible for negotiating salaries with players (via players' agents). Our results suggest that any statistical improvements by a player during his CY is unlikely to be maintained in the post-CY, even if the player does get the big payday. This knowledge could help slow the explosive and perhaps unsustainable growth of sports salaries (Aschburner 2011). Of course, general managers might still want to give large raises, in

cases where exceptional performance warrants it, or in order to satisfy fan demand, or to fill the seats. But they should be under no illusions that "the best is yet to come" from many of these players. Of course for *some* players this may be the case, especially from future stars who are only in their first or second years.

One important limitation of these studies is that we could not measure motivation directly; we could only infer it, based on which year of the contract cycle the player was in. Although we assumed that undergoing a CY induces strong extrinsic motivation, which undermines post-CY intrinsic motivation (i.e. interest, enjoyment, engagement) and negatively affects post-CY performance, other possibilities exist. One possibility is aging: players' performance naturally drops off during the latter part of their careers. However, supplementary analyses controlled for player age, finding the same pattern of effects. Another possibility is fatigue or ego depletion (Baumeister et al. 1998). During the CY players may "try too hard," expending limited self-regulatory resources to try to boost their performance. This may cause them to suffer from a negative rebound effect in the subsequent year, due to actual fatigue or perhaps just "illusory" fatigue (Clarkson et al. 2010). From this perspective, player performance might be expected to rebound back up to the pre-CY level in the *second* year post-CY. However, we did not examine this possibility in the current study, in part because few players have guaranteed contracts for this long. Yet another possibility is that players are more likely to use performance-enhancing drugs during their contract year, which might explain both their scoring increases, and their fall-off in the post-CY (assuming that they cease taking the drugs and that they pay a performance price for having taken them). Although we are unable to take this factor into account, we believe it is unlikely to explain our results. Another study limitation is that we only examined male professional athletes, not female professional athletes. It is possible that the CY syndrome might play out differently for women, although previous undermining laboratory studies have found few gender differences (Deci and Ryan 1985).

We would also like to say more about the inherent limitations of the archival studies we have conducted. Of course, experimental research, with random assignment, is better for determining causality. However, in the present research we were in the curious position that the undermining effect has already been established in the laboratory, and we were merely seeking additional evidence in archival data. Thus, our apparent next step seems *not* to be to turn (or return) to the laboratory; rather, our next step seems to be to try to replicate the effect in other sports and related archival datasets (i.e., in data concerning employees up for a raise, students up for a scholarship, and so on). We suggest that researchers studying *new* phenomena in archival data should shoulder the typical burden of replicating their effects in experimental research, the gold standard. However, archival researchers studying experimentally well-established phenomena may carry less such burden; instead, they should perhaps try to generalize their effects to other archival datasets in other fields of human endeavor.

In conclusion, ours is the first article to systematically test the CY "boosting" effect, within two different professional sports, and using relevant psychological theories of motivation. We found evidence of a CY boosting effect, but also evidence of a post-CY decline—a 3 years "syndrome" that should be sobering for team managers and fans alike. This syndrome provides a new type of support for self-determination theory, going beyond mere laboratory experiments performed with undergraduates, to apply to multi-billion dollar enterprises that capture the attention of millions of fans.

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