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All-star Fans and Home Court Advantage

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Abstract

The existence of a home court advantage is one of the most durable empirical patterns in all of sports. Yet, the sociological and psychological mechanisms explaining its strength and persistence remain a mystery in large part because of well-known challenges with statistical identification. We use crowd-size restrictions in place during the 2020-21 National Basketball Association regular season as an instrument in order to identify the effect of crowds and crowd size on home court advantage. We show that home teams win by 2.13 points, on average, when fans are present at games compared with 0.39 points when no fans are present. This is approximately the same impact as replacing a league-average player with an all star. In fixed effects instrumental variables regression models, we estimate that each additional one thousand fans generate a home court advantage of approximately 1.4 points. We conclude that the presence of home fans, on its own, explains a larger share of home court advantage than previously thought.

1 Introduction

The existence of a home court advantage is one of the most durable empirical patterns in all of sports. Yet, the sociological and psychological mechanisms explaining its strength and persistence remain a mystery in large part because of well-known challenges with statistical identification. Home court advantage is potentially driven by myriad factors, including energetic support from home fans, player familiarity with the home arena, and fatigue caused by distant travel. Making matters worse, many of the factors that potentially contribute to home court advantage could instead be the result of a higher quality home team, which complicates statistical identification.

The latter problem, in particular, afflicts explanations for home court advantage that emphasize the impact of the fans. More fans may lead to better home team performance, on average. But, better expected performance is also likely to draw more fans. What is necessary to identify the impact of the fans on home court advantage, then, is a setting with exogenous variation in the size of the crowd. In this paper, we use crowd-size restrictions in place during the 2020-21 National Basketball Association (NBA) regular season as an instrument in order to identify the effect of crowds and crowd size on home court advantage. Our empirical setting is especially well-designed to test the hypothesis, because the season schedule was determined without knowledge about when and where fans would be permitted to be in attendance, and rules for in-game play did not vary with local health conditions. These unique features of the setting permit estimation of fixed effects instrumental variables regression models in which both cross-sectional and temporal variation are used to identify the impact of fan attendance on home court advantage, which differentiates our study from prior work using COVID-19 lockdowns to answer similar questions (see, e.g., Bryson et al., 2021).

We show that home teams win by 2.13 points, on average, when any fans are present in the arena compared with just 0.39 points when no fans are present. Home teams with non-empty arenas fared approximately as home teams had in prior seasons when no health-related restrictions were in place. Further, in fixed effects instrumental variables regression models that control for the home team, away team, and time trends, each additional one thousand fans predict a home court advantage of 1.4 points. Our study thus indicates that the presence of home fans, on its own, likely explains a larger share of home court advantage than previously thought.

2 Background and Hypotheses

Home court advantage is a pervasive phenomenon across all professional sports. However, challenges with statistical identification impede clear inference about the various plausible mechanisms and diverse causal pathways that could explain why home teams tend to outperform away teams (see Jamieson, 2010, for a review). Prior studies explaining home court advantage emphasize the home team's familiarity with their arena (Loughead et al., 2003) and the physical impact of distant travel on away players (Pace and Carron, 1992). Further, in certain sports, crowd noise itself may interfere with on-the-field strategy (Nevill and Holder, 1999) or impact the referee's ability to officiate the game fairly (Dohmen and Sauermann, 2016; Garicano et al., 2005; Unkelbach and Memmert, 2010). While some studies show a correlation between fan attendance and home team performance (Moore and Brylinsky, 1993; Smith and Groetzinger, 2010), statistical identification of the impact of fan attendance on home court advantage is complicated by well-known endogeneity concerns. If better teams draw more fans, then regressions demonstrating a positive effect of fans on home court advantage could be an artifact of fans preferring to attend games when their favorite team is likely to win.

Restrictions on fan attendance caused by the COVID-19 pandemic during the 2020-21 NBA regular season thus offer an unusual opportunity to evaluate the impact of fan attendance on home court advantage. Because of local control of the timing of phased reopening, variability in fan attendance restrictions is independent of characteristics of the home team or the competitiveness of the specific contest. Furthermore, while maximum allowable fan attendance was determined by individual arenas in consultation with local health authorities, on-court competition remained centrally-regulated by the league. These features make the maximum number of fans allowed at a game a strong instrument for the actual number of fans at the game in a statistical model predicting the average home court advantage.

There are multiple psychological and sociological mechanisms that could explain why more fans produce a stronger home court advantage. The presence of fans supporting the home team could have a positive emotional impact on the home team's players to a greater extent than the away team's players. Alternatively, crowd noise could impact in-game strategy or the officiating of games. In interviews, players overwhelmingly point to the first mechanism. Portland Trail Blazers point

guard Damian Lillard emphasized how even a sparsely attended game impacted him emotionally:

When they told use it was going to be 10 percent [capacity], I was like, I don't know how much difference it's going to make in such a huge building. But man, I guess we didn't realize how bad an empty building was because that felt like a normal game. As soon as we came out to warm up and the fans, you could feel how excited they were to be there. There was chanting before the first layup in the layup line. It was a major, major difference (Holdahl, 2021).

Former Chicago Bulls and current Orlando Magic center Wendell Carter, Jr., similarly, reported that “we just kind of feed off the fans sometimes” and that empty arenas required that home teams “find ways to find energy” (Songco, 2020). Philadelphia 76ers center Dwight Howard echoed the notion that energy from the fans is contagious but also emphasized that fans make the players accountable: “When I get to the court, I gotta’ hold myself to a higher standard because all the fans, they’re looking at me to come out and play with energy and effort every night” (Grasso, 2021).

These interviews with players are consistent with existing theories of emotional contagion (Barsade et al., 2018; Hatfield et al., 1994). Emotional contagion describes how social influence can operate through an affect-based mechanism. The player interviews, for example, describe how the emotions of the fans impact their energy, motivation, and desire to perform well. Intense, short-term emotions such as anger, anxiety, joy, and love, in particular, have been shown to be especially contagious (Barsade and O’Neill, 2016). Prior empirical research in sport and non-sport settings show that positive emotional contagion improves individual affect (Barsade, 2002) and contributes to a flow state (Bakker, 2005) while reducing intra-group conflict and improving coordination.

Our empirical setting also permits us to set aside alternative fan-based mechanisms explaining home court advantage. All of the games in our study still had very low attendance by usual standards. The defending champions, the Los Angeles Lakers, for example, limited attendance to two thousand fans in a twenty thousand seat arena. Relatively empty arenas with fans kept socially distant from players constrain the potential impact of crowd noise on on-court communication by the away team. Prior research similarly indicates that the impact of fans on referee behavior is mediated by crowd noise and size (Dohmen and Sauermann, 2016; Garicano et al., 2005; Unkelbach and Memmert, 2010). Thus, the potential for referee bias to explain home court advantage is muted

in this context. In supplemental analyses, we also empirically examine the impact of fan attendance on referee bias in terms of fouls called and find a minuscule, statistically-insignificant effect.

These features of our empirical setting distinguish our study from other recent research that uses COVID-19 restrictions on fan attendance to explore similar questions in professional soccer. Bryson et al. (2021) and Wunderlich et al. (2021) examine the impact of empty stadiums on home field advantage and find evidence of reduced referee bias, but an insignificant effect of empty stadiums on goals scored or match outcomes. Sors et al. (2020), in contrast, compares soccer matches played in empty stadiums in 2020 to matches played during the 2016-19 seasons and finds evidence of a weakened home field advantage in games without fans. Further muddying the mixed evidence in the professional soccer context is the fact that these studies rely almost exclusively on comparisons of matches played prior to and subsequent to the widespread COVID-19 pandemic lockdowns, making it impossible to differentiate the impact of empty stadiums from the impact of the pandemic itself.

3 Data and Models

Our primary analyses bring together in-game data from the 2020-21 NBA regular season with news reports on limits to fan attendance in each arena. Data for each game are collected from basketball-reference.com and official NBA game summaries. A list of news sources reporting attendance limits is included in the Appendix in Table 2. Because the validity of our instrument requires that arena capacity restrictions are invariant to team or game characteristics, we rely on external reports about capacity limits, rather than inferring capacity restrictions from in-game attendance. This leads to some games for which the maximum allowable capacity is greater than zero despite having no fans reported in attendance. We also make certain changes to the publicly-reported data in order to correct obvious errors. First, we remove 25 games from our analysis in which basketball-reference.com and the official NBA game summary report zero attendance, yet there exists photographic, video, or other documentary evidence of fans at the game. Second, home games for the Indiana Pacers, Miami Heat, and Sacramento Kings are not included in the regression analyses because these teams continued to report zero attendance once their arenas reopened.

Supplemental analyses also use data from the 2014-15 through 2019-20 NBA regular seasons, also collected from basketball-reference.com. Note, in the 2019-20 season, we only include regular

season games through March 10, 2020, one day before the postponement of the season due to the COVID-19 outbreak. Subsequent games were played at a neutral venue.

We estimate fixed effects instrumental variables regression models of the following form:

$$\text{point margin}_{i,t} = \beta_1 \text{ attendance}_{i,t} + \beta_2 \text{ point margin}_{i,t-1} + u_i + v_j + m_k + \epsilon_{i,t}$$

where point margin is the difference between the home team and away team score, attendance is reported fan attendance, $t \in \{1, \dots, T\}$ indexes games at the home arena, u_i is a fixed effect for the home team, v_j is a fixed effect for the away team, and m_k is a month fixed effect. The attendance variable is considered endogenous. In the instrumental variables regression models, we use the maximum allowable capacity as an exogenous instrument. Further, we include the lagged point margin as an independent variable in our models to control for the potential for the effect of fan attendance at prior games spilling over into the focal contest. Because $T \geq 25$ for every team, our panel is sufficiently long to avoid potential concerns about Nickell bias (Baltagi, 2013).

In a supplemental analysis, we also explore the potential for fan attendance to impact referee bias by re-estimating our initial models with the difference in the number of fouls called as the dependent variable:

$$\text{foul margin}_{i,t} = \beta_1 \text{ attendance}_{i,t} + \beta_2 \text{ foul margin}_{i,t-1} + u_i + v_j + m_k + \epsilon_{i,t}$$

4 Results

We display the distributions of our key variables prior to reporting regression results. Figure 1 displays a histogram of fan attendance by game for the 2020-21 regular season. Figure 2 displays a similar histogram of maximum allowable capacity. Figure 3 plots the bivariate relationship between fan attendance and maximum allowable capacity for games where the capacity was greater than zero. They are correlated at the 0.85 level. The high correlation indicates that maximum allowable capacity is a strong instrument for fan attendance.

In Figure 4, we display the means and 95 percent confidence intervals of the point margin for the home team, our primary dependent variable, in each regular season from 2014-15 to 2020-21. During the 2020-21 regular season, home teams had an average point advantage of 0.94 points.

Figure 1: Histogram of Attendance - 2020-21 NBA Regular Season

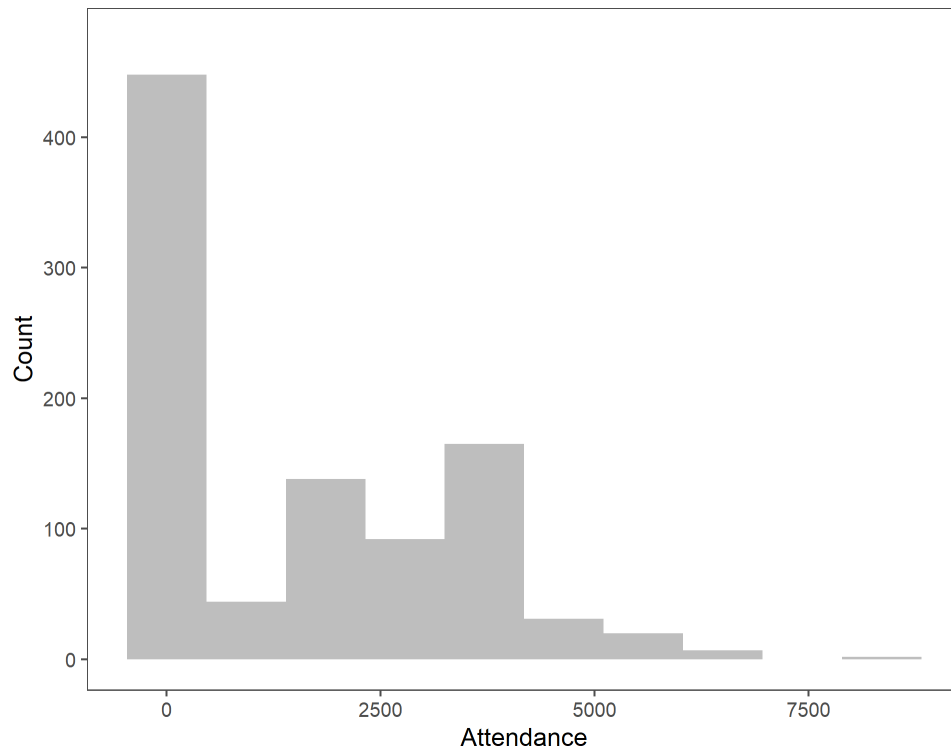


Figure 2: Histogram of Maximum Allowable Capacity - 2020-21 NBA Regular Season

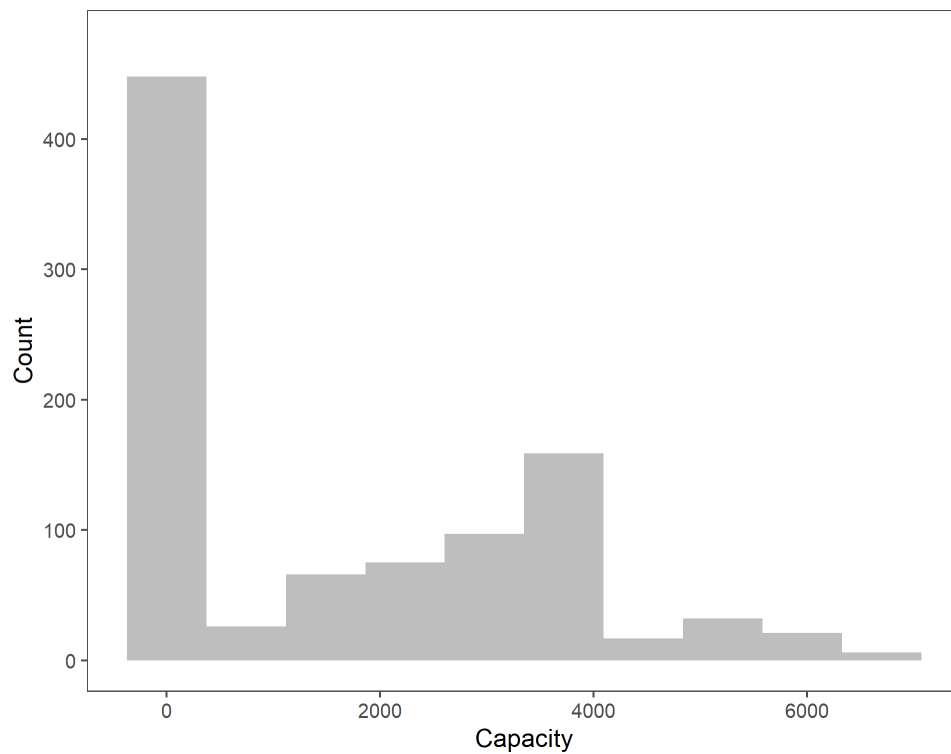


Figure 3: Correlation of Attendance and Maximum Allowable Capacity - 2020-21 NBA Regular Season

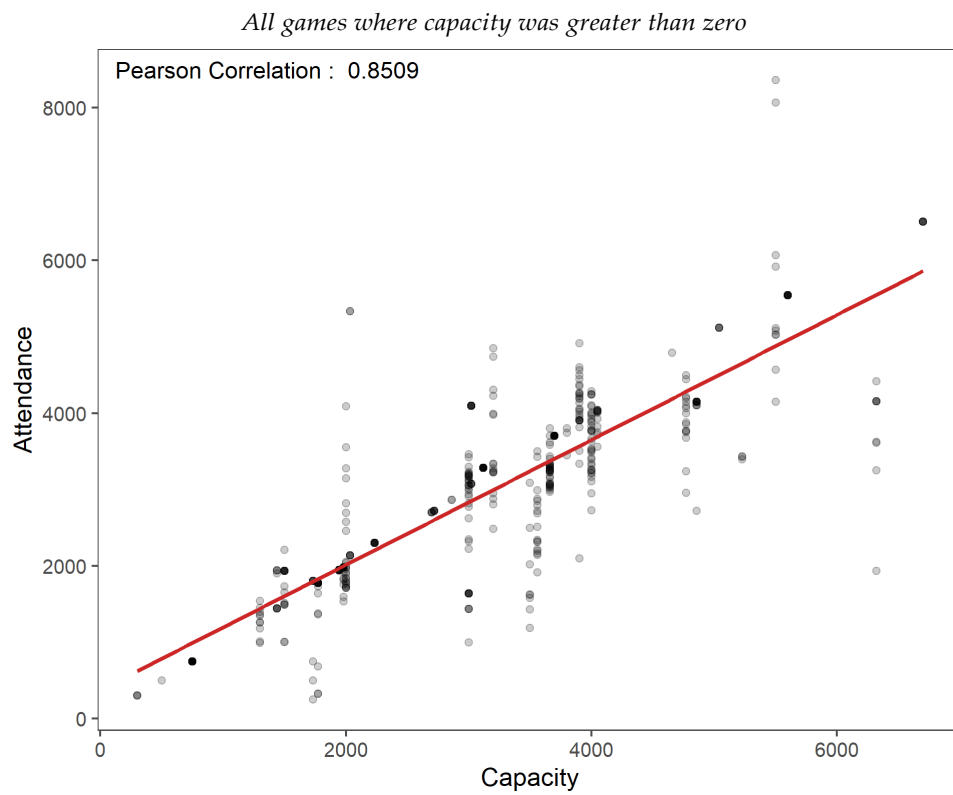
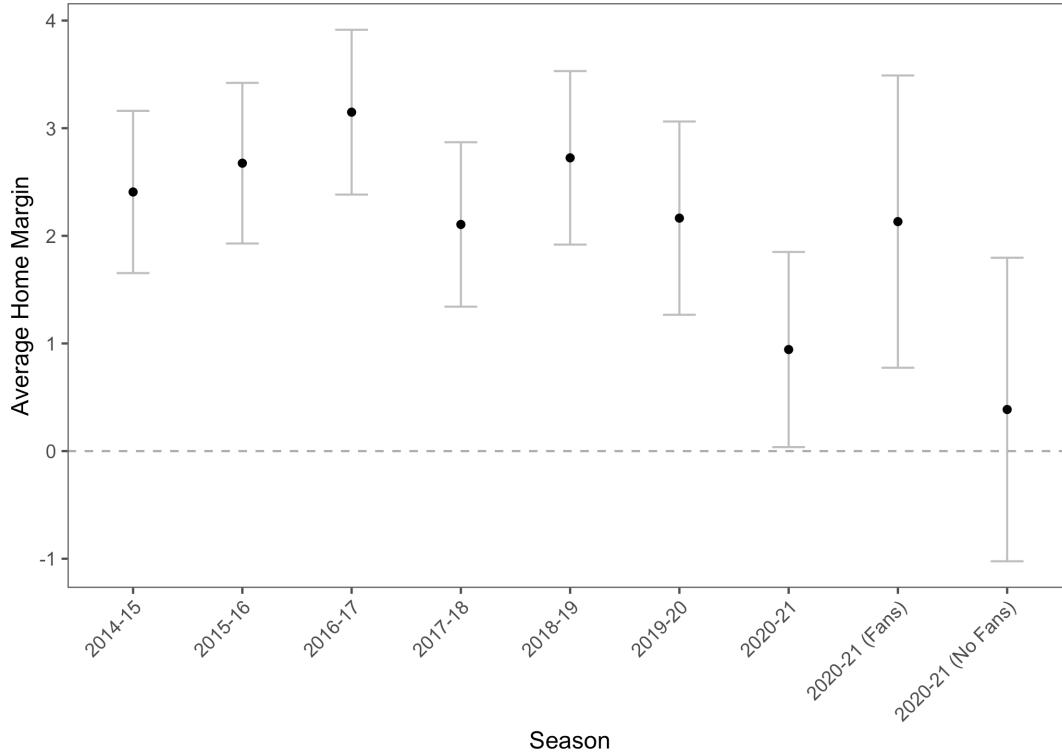


Figure 4: Average Home Point Margin - 2014-15 to 2020-21 NBA Regular Seasons



This was substantially lower than the 2.55-point home court advantage over the prior six seasons. The final two columns on the graph divide the 2020-21 season into games with and without fans in attendance. Without fans in attendance, the home court advantage was 0.39 points and insignificant from zero. With fans in attendance, in contrast, the home court advantage increased to 2.13 points, which is very much in line with the home court advantage observed in prior seasons. This graph, thus, provides clear visual evidence of the impact of fans on home court advantage.

We next present the results of the regression analyses in Table 1. Model 1 reports results from an un-instrumented fixed effects model. The marginal effect of an additional one thousand fans on home court advantage is approximately 1.2 points and the effect is significant at the 0.05-level. Model 2 reports results from the instrumental variables fixed effects model. The results are largely similar, with an estimated effect of 1.38 points per one thousand fans. The effect remains significant at the 0.05-level. These results provide strong evidence that the presence of fans promotes home court advantage.

In the third and fourth columns of the table, we also report the results from models in which the

Table 1: Regression Results

VARIABLES	(1) Home Margin	(2) Home Margin	(3) Foul Margin	(4) Foul Margin
Fan Attendance / 1000	1.166** (0.480)	1.376** (0.625)	-0.135 (0.175)	-0.183 (0.194)
Home Margin Lag	-0.0495 (0.0402)	-0.0509 (0.0311)		
Foul Margin Lag			0.0258 (0.0328)	0.0253 (0.0318)
Home Team Dummy	Yes	Yes	Yes	Yes
Away Team Dummy	Yes	Yes	Yes	Yes
Month Dummy	Yes	Yes	Yes	Yes
Observations	946	946	946	946
R-squared	0.082	0.081	0.089	0.089
Number of Teams	27	27	27	27

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

dependent variable is the foul margin. The coefficient on fan attendance is insignificantly different from zero in both models. These results, thus, do not support the claim that the impact of fans on home court advantage is mediated by an impact on the referees.

5 Discussion and Conclusion

Our paper uses instrumental variables regression to examine whether fan attendance causes home court advantage. By taking advantage of exogenous variation in capacity limits during the 2020-21 NBA regular season, we avoid the problems of endogeneity that plague other empirical studies. We find a strong effect of fan attendance on home team performance. Games with fans are associated with a 1.74 point increase in home court advantage relative to games with no fans. Further, in fixed effects instrumental variables regression models, each additional one thousand fans predict a 1.4 point increase in the home point margin.

It is worthwhile to place in context the size of this effect in terms of team performance. According to ESPN.com's "Real Plus-Minus" statistic, the difference between playing a home game without and with fans is approximately the same as the impact of replacing a league-average player with Milwaukee Bucks point guard Jrue Holiday or Utah Jazz shooting guard Donovan Mitchell. Holiday

and Mitchell, according to this measure, are the 35th and 48th best players in the NBA, respectively. The effect of fans in the arena is thus approximately equal to replacing a league-average player with a recent all star.

However, there are important scope conditions to this result. First, the effect of fans on home court advantage is only identified over the support of the data. The maximum attendance for any game during the 2020-21 regular season was 8,359, which remains far below maximum capacity of any arena. We strongly caution against using these coefficient estimates to inform, for example, the impact of adding an additional one thousand fans when arenas are near full capacity. Second, our ability to estimate the effect is a result of this study being conducted during a pandemic. If fans make it easier for players to ignore off-the-court distractions, for example, the effect size could be overstated in our context. In contrast, if external stress makes players less sensitive to their external environment, the effect size could be understated. Of note, the absence of fans at a professional sports arena is always going to be a result of some type of external shock. Any empirical estimate of the impact of fans on home court advantage will face similar concerns about external validity.

With those caveats in mind, we cannot help but reemphasize just how strong of an effect we observe in this setting. With no fans in the stands, there is no evidence of a home court advantage. With fans in the stands, the home court advantage rebounds to its usual magnitude. The outsized effect of fan attendance on home court advantage implies that this mechanism has likely been under-emphasized in the literature to date, especially relative to alternative mechanisms with smaller effects on game outcomes that have been easier to identify empirically. This conclusion is further supported by the voluminous anecdotes and interviews from players noting the positive impact of energetic fans on the quality of their on-court performance. The obvious explanation for home court advantage also appears to be the right one.

Finally, our study has broader implications for research on emotional contagion. Observational studies of positive emotional contagion frequently encounter similar identification challenges to the ones faced here. It is hard to differentiate between positive affect in one group causing positive affect in another *vs.* an unobserved variable causing positive affect in both. Our study points to the benefits of using an instrumental variables approach, when possible, in order to differentiate between these two potential causal pathways. We suspect that there are many other settings where strong positive emotional contagion exists and would be sites for fruitful research if only these challenges

of statistical identification could be overcome!

Table 2: Stadium Capacity Limits - 2020-21 NBA Regular Season

Team	Date	Capacity Limit	Source
Atlanta Hawks	1/26/2021	1300	NBA.com. "Hawks to Increase Capacity." May 3, 2021.
	3/13/2021	3000	NBA.com. "Hawks to Increase Capacity." May 3, 2021.
	5/22/2021	45% (7625)	NBA.com. "Hawks to Increase Capacity." May 3, 2021.
Boston Celtics	3/22/2021	12% (2235)	TD Garden. "TD Garden Welcomes Return of Fans." February 25, 2021.
	5/10/2021	25% (4656)	TD Garden. "TD Garden Re-Opening Updates." April 27, 2021.
Brooklyn Nets	2/23/2021	10% (1773)	Income, Net. "New York to Permit Some Fans." NetsDaily. February 10, 2021.
Charlotte Hornets	3/11/2021	500	NBA.com. "Hornets to Welcome Fans Back." March 2, 2021.
	3/13/2021	15% (2862)	NBA.com. "Hornets to Welcome Fans Back." March 2, 2021.
	3/26/2021	25% (4769)	NBA.com. "Hornets to Increase Spectrum Center Capacity." March 23, 2021.
Chicago Bulls	5/8/2021	25% (5229)	Seligman, Andrew. "Boston Celtics vs Chicago Bulls." NBA.com. May 8, 2021.
Cleveland Cavaliers	12/22/2020	300	Rabinowitz, Amanda and Fitzgerald, Sean. "After Nine Months Off." WKSU. December 23, 2020.
	1/11/2021	10% (1944)	Axelrod, Ben. "Cleveland Cavaliers Tickets on Sale." WKYC. January 6, 2021.
	2/4/2021	14% (2720)	Fedor, Chris. "Cleveland Cavaliers Approved for Attendance." cleveland.com. February 4, 2021.
	2/25/2021	25% (4858)	Fedor, Chris. "Cleveland Cavaliers Approved for Attendance." cleveland.com. February 4, 2021.
Dallas Mavericks	2/8/2021	1500	Trigg, Dalton. "Mavs Welcome Back." Sports Illustrated. February 5, 2021.
	2/22/2021	3900	Caplan, Callie. "Mavs to Admit 3,900." The Dallas Morning News, February 15, 2021.
Denver Nuggets	4/2/2021	4050	NBA.com. "Ball Arena to Host 4,050 Fans." March 18, 2021.
Detroit Pistons	3/17/2021	750	Ainsworth, Amber. "Detroit Pistons to Welcome Fans." FOX 2 Detroit. March 3, 2021.
Golden State Warriors	4/23/2021	35% (6322)	NBA.com. "Warriors to Welcome Fans." April 8, 2021.
Houston Rockets	12/22/2020	3660	Tulp, Chris. "Rockets to have 16-20 Percent." TalkBasket.net. December 17, 2020.
Indiana Pacers	1/24/2021	1000	Roberts, Mary. "Pacers to Allow Fans." Inside Indiana Business. January 8, 2021.
	3/4/2021	25% (4481)	NBA.com. "Pacers Announce Public Ticket Sales." January 8, 2021.
Los Angeles Clippers	4/18/2021	2000	Woike, Dan. "Here's when Lakers, Clippers, Kings Fans." Los Angeles Times. April 2, 2021.
Los Angeles Lakers	4/15/2021	2000	NBC Los Angeles. "Lakers to Play in Front of Staples Center." April 15, 2021.
Memphis Grizzlies	2/4/2021	2000	Barnes, Evan. "Memphis Grizzlies to Allow." Memphis Commercial Appeal. January 28, 2021.
	3/5/2021	20% (3559)	Davis, Corey. "Grizzlies to Sell Limited Single-Game Tickets." Memphis Business Journal. March 2, 2021.
Miami Heat	1/28/2021	1500	Fernandez, Gabriel. "Heat to Use Coronavirus-Detecting Dogs." CBS Sports. January 24, 2021.
	2/24/2021	3000	Winderman, Ira. "Heat to Expand Capacity." South Florida Sun Sentinel. February 11, 2021.
Milwaukee Bucks	2/16/2021	10% (1734)	NBA.com. "Milwaukee Bucks to Increase Fan Capacity." March 11, 2021.
	3/20/2021	18% (3121)	NBA.com. "Milwaukee Bucks to Increase Fan Capacity." March 11, 2021.
Minnesota Timberwolves	4/5/2021	3000	Theige, Kyle. "Timberwolves to Welcome Back." Canis Hoopus. March 13, 2021.
New Orleans Pelicans	12/22/2020	750	NBA.com. "New Orleans Pelicans Announce Plans." December 17, 2020.
	1/29/2021	1440	Elchenhofer, Jim. "Pelicans Shootaround Update." NBA.com. January 29, 2021.
	2/24/2021	2700	NBA.com. "New Orleans Pelicans Announce Increased Capacity." February 22, 2021.
	3/11/2021	3700	NBA.com. "Pelicans Announce Second Half." March 10, 2021.
New York Knicks	2/23/2021	10% (1981)	Relix.com. "Madison Square Garden to Open." February 26, 2021.
Orlando Magic	12/22/2020	4000	NBA.com. "Magic to Allow 4,000 Fans." December 15, 2021.
Philadelphia 76ers	3/14/2021	15% (3023)	Carchidi, Sam. "About 3,100 Fans are Allowed Back." The Philadelphia Inquirer. March 2, 2021.
	5/7/2021	25% (5039)	Connell, Jack. "Wells Fargo Center to Allow 25%." The Liberty Line. April 27, 2021.
Phoenix Suns	2/7/2021	1500	Olson, Kellan. "Suns to Begin Allowing Fans." Arizona Sports. February 2, 2021.
	2/16/2021	3000	Baker, David. "Phoenix Suns Will Double the Number of Fans." AZFamily.com. February 10, 2021.
	4/7/2021	5500	Olson, Kellan. "Suns to Increase Capacity." Arizona Sports. March 31, 2021.
Portland Trail Blazers	5/7/2021	10% (1944)	NBA.com. "Trail Blazers to Welcome Limited Fans." May 5, 2021.
Sacramento Kings	4/20/2021	1600	NBA.com. "Sacramento Kings Welcome Fans." April 12, 2021.
San Antonio Spurs	3/12/2021	3200	Young, Royce. "After San Antonio Spurs." ESPN.com. March 1, 2021.
Toronto Raptors	12/22/2020	3800	Burkett, Brenton. "Welcome to Tampa, NBA!" WTSP.com. December 23, 2020.
	1/9/2021	0	Rafferty, Scott. "Fans no Longer Allowed at Toronto Raptors." NBA.com Canada. January 9, 2021.
	3/19/2021	3500	Encina, Eduardo. "Raptors to Open Home Games." Tampa Bay Times. March 8, 2021.
Utah Jazz	12/22/2020	1500	Walden, Eric. "Utah Jazz Will Initially Allow 1,500 Fans." The Salt Lake Tribune. November 24, 2020.
	2/2/2021	3902	Walden, Eric. "Utah Jazz Will Increase Vivint Arena Capacity." The Salt Lake Tribune. February 1, 2021.
	3/12/2021	5600	Anderson, Ben. "Jazz Increasing Fan Capacity." KSLsports.com. March 11, 2021.
	5/1/2021	6700	Steinbrecher, Lauren. "Jazz Expand Home Game Capacity." FOX 13 Salt Lake City. April 30, 2021.
Washington Wizards	4/21/2021	10% (2036)	NBA.com. "Capital One Arena Opens to Wizards Fans." April 12, 2021.

Teams started the season (12/22/2020) with zero capacity unless stated otherwise

Oklahoma City Thunder had zero fan capacity throughout the 2020-21 NBA regular season

References

- Bakker, Arnold B., "Flow among music teachers and their students: The crossover of peak experiences," *Journal of Vocational Behavior*, February 2005, 66 (1), 26–44.
- Baltagi, Badi H., *Econometric Analysis of Panel Data*, Wiley, September 2013. Google-Books-ID: tpnXlgEACAAJ.
- Barsade, Sigal and Olivia A O'Neill, "Manage your emotional culture," *Harvard business review*, 2016, 94 (1), 58–66.
- Barsade, Sigal G., "The Ripple Effect: Emotional Contagion and Its Influence on Group Behavior," *Administrative Science Quarterly*, December 2002, 47 (4), 644.
- , Constantinos G.V. Coutifaris, and Julianna Pillemer, "Emotional contagion in organizational life," *Research in Organizational Behavior*, 2018, 38, 137–151.
- Bryson, Alex, Peter Dolton, J. James Reade, Dominik Schreyer, and Carl Singleton, "Causal effects of an absent crowd on performances and refereeing decisions during Covid-19," *Economics Letters*, January 2021, 198, 109664.
- Dohmen, Thomas and Jan Sauermann, "Referee Bias," *Journal of Economic Surveys*, September 2016, 30 (4), 679–695.
- Garicano, Luis, Ignacio Palacios-Huerta, and Canice Prendergast, "Favoritism under Social Pressure," *The Review of Economics and Statistics*, 2005, 87 (2), 208–216. Publisher: The MIT Press.
- Grasso, Justin, "Dwight Howard Loves Having Fans Back in South Philly," *Sports Illustrated*, March 2021.
- Hatfield, Elaine, John T. Cacioppo, and Richard L. Rapson, *Emotional contagion* Studies in emotion and social interaction, Cambridge [England] ; New York : Paris: Cambridge University Press ; Editions de la Maison des sciences de l'homme, 1994.
- Holdahl, Casey, "Return Of Fans Helps Blazers Best Lakers And Secure Tiebreaker," *NBA.com*, May 2021.

- Jamieson, Jeremy P., "The Home Field Advantage in Athletics: A Meta-Analysis: Home-Field Advantage," *Journal of Applied Social Psychology*, July 2010, 40 (7), 1819–1848.
- Loughead, Todd M., Albert V. Carron, Steven R. Bray, and Arvin J. Kim, "Facility familiarity and the home advantage in professional sports," *International Journal of Sport and Exercise Psychology*, January 2003, 1 (3), 264–274.
- Moore, James C. and Jody A. Brylinsky, "Spectator Effect on Team Performance in College Basketball," *Journal of Sport Behavior*, June 1993, 16 (2), 77–84. Num Pages: 8 Place: Mobile, Ala., United States Publisher: United States Sports Academy.
- Nevill, Alan and R Holder, "Home advantage in sport: an overview of studies on the advantage of playing at home," *Sports medicine (Auckland, N.Z.)*, November 1999, 28, 221–36.
- Pace, A and Albert V. Carron, "Travel and the home advantage," *Canadian Journal of Sport Sciences = Journal Canadien des Sciences du Sport*, March 1992, 17 (1), 60–64.
- Smith, Erin E. and Jon D. Groetzinger, "Do Fans Matter? The Effect of Attendance on the Outcomes of Major League Baseball Games," *Journal of Quantitative Analysis in Sports*, January 2010, 6 (1).
- Songco, Paolo, "Bulls players react to 'strange' night in blowout loss to James Harden-less Rockets," *Clutch Points*, December 2020.
- Sors, Fabrizio, Michele Grassi, Tiziano Agostini, and Mauro Murgia, "The sound of silence in association football: Home advantage and referee bias decrease in matches played without spectators," *European Journal of Sport Science*, November 2020, 0 (0), 1–9.
- Unkelbach, Christian and Daniel Memmert, "Crowd Noise as a Cue in Referee Decisions Contributes to the Home Advantage," *Journal of sport & exercise psychology*, August 2010, 32, 483–98.
- Wunderlich, Fabian, Matthias Weigelt, Robert Rein, and Daniel Memmert, "How does spectator presence affect football? Home advantage remains in European top-class football matches played without spectators during the COVID-19 pandemic," *PLOS ONE*, March 2021, 16 (3), e0248590.