

WHY BASEBALL TEAMS MOVE

Racial, Financial, and Other Predictors of Relocation,

1950 to 1970

Alan Sager, Ph.D.

Arthur Culbert, Ph.D.

Boston University Schools of Public Health and Medicine

**80 East Concord Street
Boston, Massachusetts 02118**

(617) 638-5042

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SUMMARY

By 1970, ten of the original sixteen major league baseball teams had relocated from their 1945 locations. The racial composition of the neighborhood was the most important statistical predictor of relocation, even after controlling for average annual attendance, place in the standings, and age of the stadium.

INTRODUCTION

Many baseball fans have been affected by teams' relocations from one city to another. Some are glad to welcome a franchise. Others are distressed to lose teams that matter.

Change has been a constant in American life, so we should not be surprised to see it in baseball. Still, the years from 1950 to 1970 saw unexpectedly frequent relocations of baseball teams.

In this paper, we report the results of a study of the predictors of baseball teams' relocations between and within cities. Throughout, we focus not on the attractions of other cities or other sites. These attractions-- new markets anxious for major league baseball and new (and often low-cost) stadiums-- were potentially equally available to teams that did not choose to relocate. Rather, we concentrate on the characteristics of a team, its stadium, and its surrounding residential neighborhoods. Did these characteristics impel a team to move elsewhere, or did they combine to render a team comfortable where it was?

A NATIONAL OVERVIEW

In many ways, the decades before 1945 were a time of remarkable stability for major league baseball in the United States. The most recent relocations from one city to another had taken place over four decades earlier, as the new American League was sorting itself out. The Milwaukee Brewers became the St. Louis Browns in 1902, and the Bal-

timore Orioles became the New York Yankees in 1903.¹ Indeed, 50 years elapsed between the Orioles/Yankees move of 1902/1903 and the Boston/Milwaukee Braves' move of 1952/1953.

Relocations within cities were almost as rare. In 1945, all but one of the sixteen teams were playing in stadiums built before the nation entered the First World War. (The exception: Yankee Stadium, built in 1923.) Against this stable background, the teams' movement during the 1950s and 1960s were dramatic.

In 1945, all of the sixteen major league baseball teams were located in the quadrant of the United States bounded by St. Louis on the west and Washington, D.C. on the south. The distribution of the headquarters of major U.S. corporations was probably not very different. By 1970, five had moved outside this quarter of the nation (three in the National League and two in the American.)

During these 25 years, six teams-- the Boston Braves, the Brooklyn Dodgers, the New York Giants, the Philadelphia Athletics, the Washington Senators, and the St. Louis Browns-- left their original cities. All but the Browns moved from east to west.

The departure of these six baseball teams from the northeast, mid-Atlantic, and midwest states parallels somewhat the shifting of the U.S. population itself. In 1940, 69,138,000 people (52.3 percent) of the nation lived in the 17 states and the District of Columbia demarcated by St. Louis and Washington. By 1970, this area's total population had risen to 99,197,000 people but its share of the nation had fallen to 48.8 percent of the total.

Similarly, in 1940, 18,662,000 people, 14.2 percent of the entire nation, lived in the ten original major league cities themselves. By 1970, this number had fallen slightly to 18,446,000 people but its share of the nation had dropped to 9.1 percent of the total.

Thus, baseball teams did not abandon their cities or regions because of absolute population drops. Rather, they were impelled in part by the availability of new markets elsewhere. Why should only ten cities with one-seventh of the nation's population, and

seventeen states with only half of the nation's people, continue to house all of the major league teams?

Four other teams-- the Philadelphia Phillies, the Pittsburgh Pirates, the Cincinnati Reds, and the St. Louis Cardinals-- relocated within their original cities.

All together, during this period, seven of the National League teams (all but the Cubs) moved to a new stadium located in either a new neighborhood of their original city or a new city altogether, as did three of the American League teams (excepting Boston, New York, Cleveland, Detroit, and Chicago).

Two types of relocations. This raises the question of possible differences between the relocation of teams from one city and the relocation of teams within their city. We see more similarities than differences in the causes of the two types of relocations. Both moves manifest dissatisfaction with a stadium's location. Only the response is different.

Distinguishing the specific type of response to the dissatisfaction that prompted relocation is mainly beyond the scope of this inquiry. We speculate briefly that dissatisfied teams found it attractive to attempt to solve their problems by leaving their city when they perceive large new unexploited markets, like that in Los Angeles in 1957-- with its city population of 2.5 million and its metropolitan area population of 6.7 million;² when a new city offers them a lucrative stadium and parking arrangement; and when their current city is unwilling to engage in a bidding war for the team.

It could be that inter-city relocations declined and intra-city relocations increased during the period studied because current cities fought harder to retain their teams after a few relocations from other cities convinced them that special efforts would have to be made. Also, the option of relocating to another city was probably made less attractive when the major leagues allowed new franchises to be established. Cities desiring new teams were no longer obliged to meet the terms of one of the original eighteen. This meant less attractive offers to relocate and probably helped persuade teams dissatisfied with their locations to solve them in other ways.

PREDICTORS OF RELOCATION

Why would some teams remain in place while others moved?

Improved air travel opened up new markets outside the northeast and midwest (the first Boeing 707 was ordered in October of 1955 and went into service in October of 1958, at the end of the Dodgers' and Giants' first season on the west coast)³, but only some teams relocated to them. The question of interest then becomes, Which teams were motivated to take advantage of these new markets? Put another way, why did some teams relocate and others remain in place? The core of the answer should concern the factors that rendered a team happy or unhappy with its original location.

We begin most basically by suggesting that baseball is a conservative sport and that most teams are owned and run by people who tend to be socially, economically, and/or politically conservative. Few owners are willing to undertake the trouble of moving a team unless they are very unhappy where they are. If things are good, few are tempted by something better, unless it is much better indeed. Only if things are bad will change be contemplated. Such change includes moving the team oneself or selling it to someone who will do the job.

We acknowledge that owners vary in their conservatism. They also vary in their attachment to their home town. We suggest that, during the decades studied, the range of this variation was not generally very wide. Few major league owners were inclined to approve sales of other teams to radical innovators. Relocations of teams by current owners or sales to new owners contemplating a relocation were, we suggest, tolerated when this was necessary to save a franchise and to boost ticket sales for all league teams.

We have hypothesized that four characteristics of a team and its stadium-- the team's finances, its place in the standings, the age of its stadium, and the demographics of the neighborhood surrounding the stadium-- may have influenced its decision to relocate to another city or within a city.

Financial prosperity. We hypothesize that teams making money (enjoying higher returns on equity) were much less likely to consider relocation. But how to measure this variable? Early inquiries suggested that consistent financial data on the sixteen teams from 1950 to 1970 could not be obtained with the resources available. We therefore selected a proxy measure, annual attendance. Teams with higher annual attendance were expected to earn higher returns on invested equity, all else equal.

Place in the standings. We hypothesize that even if a team is not earning money or securing high attendance, it is less likely to depart its city if it is a consistent winner. We expected that place in the standings and annual attendance would be correlated fairly closely, but we were curious to learn whether a team's success on the field was independently associated with its chances of relocation.

Age of the stadium. We hypothesize that a team with an older stadium is more willing, other things equal, to contemplate relocation. First, an older stadium is likely to be heavily or entirely depreciated financially, so it contributes less to the team's balance sheet. We could learn year of construction but could not evaluate rehabilitation fairly.

Second, and perhaps more important, an aging stadium presents a team with a major decision: given the need to undertake a major capital investment, where should that investment be made? Once this question is opened, it is hard to know how far it will lead.

Third, age of stadium may correlate with availability of parking. Older stadiums are probably more likely to be located in more densely built-up neighborhoods, closer to mass transit. These older stadiums may have therefore lacked land for the parking lots that were increasingly sought by suburbanized fans desiring to drive to games.

Neighborhood demographics. We hypothesize that teams located in black neighborhoods are more likely to relocate. There are several reasons. First, earlier studies of hospital relocation found that urban hospitals located in black neighborhoods were significantly more likely to close or relocate than hospitals located in non-black areas.⁴ Although systematic evidence is lacking, there also seems to be a tendency for department

stores, banks, and other institutions to depart from black neighborhoods. Why might this happen? One possible reason is that black average income is lower. Another is that some non-blacks will be reluctant to enter black neighborhoods for hospital care, shopping, or other services. But these tend to be local services for neighborhoods or communities, not entire cities. Why might people behave in similar ways toward baseball teams?

Second, as James suggests, baseball was-- or thought itself to be-- in trouble in the 1950s. He notes a decline in attendance from 20.9 million in 1948 to 14.4 million in 1953, a drop of almost one-third. This was especially consequential since the gate then provided a much greater share of teams' revenues than it does today.

Why did attendance drop? James writes of "fear and urban decay... a panic-stricken industry scrambling for survival."⁵ He notes that commentators, at the time, attributed the drop in attendance largely to television. But he proposes other possibilities, especially "rotting neighborhoods" in conjunction with the advent of night baseball, suggesting that fans were more reluctant to enter at night areas perceived to be dangerous. James writes that people were afraid to go to ballparks located in slums: "the crime rate was smaller but the fear was the same."⁶ James does not write explicitly of race, but it appears to be in the background.

Third, a host of other factors could be involved, factors that had a only a mild link to the racial mix of the people residing near baseball stadiums. In most cities, perhaps, blacks came to reside in older neighborhoods, and these were the neighborhoods in which stadiums were disproportionately located. These older neighborhoods were usually densely built-up and lacked land for parking. As large segments of the white population moved to newly opened suburbs after the Second World War, many would have wanted to drive to ball games. But the lack of parking blocked them. Perhaps teams with newer stadiums, located in less built-up areas, had more adequate parking and found it easier to maintain attendance.

Fourth, some owners were prejudiced against blacks. They may not have wanted their teams to remain in a neighborhood or in a city in which blacks were a growing share of the population. This prejudice may even have been heightened by the racial integration of the teams themselves. Some owners may have been willing to hire talented players to win games and make money, but would not also tolerate remaining in a black neighborhood. Other owners, less viscerally prejudiced, may have calculated that they could make more money by playing in stadiums in white neighborhoods.

METHODS

We constructed a straightforward multivariate model of baseball stadium relocation to test the power of these four variables to predict whether a team would relocate to another city or to another neighborhood within the same city.

(Although our methods were principally quantitative, we employed a few qualitative elements. Examples of the latter include analyses of the teams that were predicted by the quantitative model to remain in place but that instead relocated, such as the Pittsburgh Pirates.)

For our quantitative work, we began by locating each stadium's 1945 site on a large census tract map for each city. We defined the stadium's neighborhood as the tract containing the stadium plus all contiguous tracts forming a district whose perimeter was roughly a circle around the stadium. We generally employed published U.S. census tract data from 1940 through 1980.⁷ All stadiums were located blindly and all tracts were included blindly-- that is, by an individual who was not aware of the racial mix of the tracts or of whether the team relocated.

Each team's annual attendance and place in standings was obtained from *The Sporting News Dope Book* and other resources in the files of the National Baseball Library, Cooperstown, New York.⁸

We calculated the average attendance during the five years prior to each decade (1946-50 for the decade of the 1950s, and 1956-60 for the decade of the 1960s). Each average was used as an independent variable for that decade.

We measured place in standings in the usual way, by games behind. For example, a team finishing eight games behind in its league in 1946 was assigned a value of "+8" for that year, and a team winning the pennant by five games was assigned a value of "-5" for that year. We again calculated averages for 1946-50 and 1956-60.

The age of each stadium was calculated from the detailed data compiled in Lowry's *Green Cathedrals*.⁹ We measured years since the stadium was built.

The dependent variable, relocation, was also derived from *Green Cathedrals*. If a team relocated during the 1950s, it was assigned a value of "1" and was not analyzed again. If a team remained in place throughout the 1950s, it was assigned a value of "0" for that decade. The team was then studied again as a separate case during the 1960s.

In summary, the area percent black is the black share of the population of the neighborhood surrounding each stadium. It is calculated for 1950 for the analysis of relocations during the 1950s, and for 1960 for relocations during the 1960s. We hypothesized that a greater area percent black would be associated with a greater chance of relocation.

The average annual attendance is the team's average attendance during the five years preceding the decade, 1946-50 for the analysis of relocations during the 1950s and 1956-60 for the analysis of relocations during the 1960s. We hypothesized that higher attendance would be associated with a lower chance of relocation.

The average games behind is the team's average number of games behind first place in the league during the five years preceding each decade. Again, this is measured as the average of 1946-50 for the analysis of relocations during the 1950s and as the average of 1956-60 for relocations during the 1960s. We hypothesized that a greater number of games behind would be associated with a greater chance of relocation.

The stadium age is measured simply as its age in 1950 for the analysis of relocations during the 1950s and as age in 1960 for the analysis of relocations during the 1960s. We hypothesized that, other things equal, a greater stadium age would be associated with a greater chance of relocation.

We conducted multivariate analyses of relocation during the entire period, 1950 to 1970. This was done by pooling the data on the sixteen teams for 1950 with the data for the eleven teams still in their original locations in 1960. This yielded 27 teams for the combined analysis.¹⁰ Such a technique, sometimes called "repeated measures analysis," increases the size of the group available for study. It also provides the most current values for each independent or predictive variable. A team's behavior would be studied only once in this analysis, if it was one of the five that relocated during the 1950s. But a team would be studied twice in this analysis if it did not relocate during the 1950s. Its behavior would then be examined once during the 1950s and again during the 1960s.

Data were entered, edited, and compressed in Lotus 1-2-3; analyses were performed in Statistica; and charts were generated in Quattro.

FINDINGS

Neighborhood demographics in 1980. By 1980, the average black share of the population of the neighborhoods of teams that had relocated was substantially greater than the black share of the neighborhoods of the teams that had remained in place. Overall, ten of the sixteen teams relocated between 1945 and 1990: in 1980, the neighborhoods around the 1945 stadium sites for teams relocating were 70.6 percent black. That year, the comparable figure for teams remaining in place was 24.2 percent black. (Refer to Table 1 for details by team.)

The 1980 racial comparisons, though interesting, are crude because they reflect changes that could have taken place either before or after a team relocated. If the latter, teams could have been anticipating continued demographic change or could have been blind to it. We therefore examined relocations decade-by-decade.

Relocations during two decades. Five teams relocated during the 1950s: the Boston Braves (1952), the St. Louis Browns (1953), the Philadelphia Athletics (1954), and the Brooklyn Dodgers and New York Giants (1957). The average black composition in 1950 of the neighborhoods surrounding these teams' stadiums was 30.8 percent. The average for the remaining eleven teams was 22.4 percent.

Five of the eleven original teams still at their 1945 locations in 1961 moved during the 1960s: the Washington Senators (1961), the St. Louis Cardinals (1966), and Philadelphia Phillies, the Pittsburgh Pirates, and the Cincinnati Reds (all in 1970). The average black composition in 1960 of the neighborhoods surrounding these five teams' stadiums was 62.4 percent. The average for the remaining six teams was 13.3 percent. (See Table 2.)

Note that all of the teams relocating during the 1950s moved to another city while four of the five teams relocating during the 1960s moved within their city. Put another way, every team relocating between 1952 and 1961 moved to another city, while every team relocating between 1966 and 1970 moved within the city, usually from a neighborhood stadium to a downtown site. This change in the type of relocation probably reflects a combination of the two forces mentioned earlier: the drop in the number of large cities actively demanding teams, owing to the relocation of teams during the 1950s, and the increased supply of franchises owing to league expansions.

Each variable's relation to chance of relocation. Preparing for multivariate analyses, we performed a series of t-tests on each independent variable's association with relocation between 1951 and 1970. As shown in Table 3, teams in black neighborhoods

were very likely to relocate; teams playing in older stadiums were almost as likely to relocate; teams with higher attendance were somewhat likelier to remain; and teams lower in the standings were very slightly likelier to relocate.

Correlations among the variables. We examined the relations among the variables through the correlation matrix presented in Table 4. Many of these relationships are depicted in the series of figures following the end notes.

It is interesting that area percent black is correlated positively with age of stadium and very negatively with average attendance. Average age of stadium is very negatively correlated with average attendance. As would be expected, attendance is very negatively associated with games behind in the standings.

Multi-variate analyses. To attempt to gauge the best predictors of relocation, we performed ordinary-least-squares regression and logistic regression (logit). Ordinary-least-squares regression can be performed more easily on the small number of cases available in this study, but is not theoretically preferable here because the real value of the dependent variable can be only one or zero and regression can produce calculated (or predicted) probabilities of relocation below zero and greater than one. We therefore checked the principal ordinary-least-squares regression result in two ways: by performing a logit on the same variables¹¹ and by comparing predicted probabilities of relocation with teams' actual behaviors.

The dichotomous dependent variable was relocation versus non-relocation between 1950 and 1960 or between 1960 and 1970. By making a second measurement for those eleven teams still in place in 1960, as described earlier, we achieved 27 cases for analysis. This is not a robust number of cases on which to perform multivariate analysis, especially for logistic regression, so results should be interpreted with some caution.

In the ordinary-least-squares regression, area percent black was the first predictive variable stepping into the equation; age of stadium entered next. Neither attendance or games behind met the statistical criterion for entering.¹² Area percent black was sig-

nificant at $p = 0.095$ and age of stadium was significant at $p = 0.169$. Together, the two predictive variables yielded an adjusted R^2 of 17.4 percent, meaning that they explained that share of the variance in the dependent variable, probability of relocation. The entire equation was significant at $p = 0.039$.

In the logistic regression or logit model, the same two predictive variables were entered into the equation. Area percent black was again the more significant statistically at $p = 0.151$, and age of stadium was significant at 0.244. The entire equation accounted for 25.2 percent of the mathematical variation in actual relocation.¹³

Equations' predictions versus actual behavior. How accurately did these regression and logit equations predict the 27 chances of relocation? We set the break point equal to 0.50, meaning that we counted a prediction as accurate if an individual team's predicted probability of relocation exceeded 0.50 and it actually relocated or if a team's predicted probability fell below 0.50 and it actually stayed where it was.

By this measure, the regression equation and the logit equation correctly classified 21 teams and missed six. As shown in Table 5, the equations correctly predicted half of the relocations-- the St. Louis Cardinals, New York Giants, Philadelphia Phillies, Cincinnati Reds, and Washington Senators) but missed the Philadelphia Athletics, Boston Braves, St. Louis Browns, Brooklyn Dodgers, and Pittsburgh Pirates.

Why did the equations predict half of the relocations accurately but miss the other half? One way to begin to address this question is by contrasting the teams on the two predictive variables, since teams were wrongly predicted not to relocate in light of their values on these very variables. The stadiums of teams correctly predicted to relocate averaged 47.6 years old, and their neighborhoods averaged 73.1 percent black. The stadiums of teams wrongly predicted not to relocate averaged 41 years old, and their neighborhoods averaged 14.9 percent black.

What other factors might help to explain the relocations of the mixed group of teams that were wrongly predicted not to relocate?

The Athletics' attendance was dropping in the 1950s; their stadium was in a neighborhood whose black population share was rising from 34 percent in 1950 to 62 percent in 1960.

The Browns and Braves were the second teams in relatively small cities that were beginning to experience population losses. Both suffered low attendance. The Browns averaged just over 325,000 per season during their last seven years in St. Louis, a time when they continued to play poorly. Their local competitor was sold to the Busch family with its considerable financial resources, making it harder for them to compete. Their stadium was located in an area that was 30 percent black in 1950, but which became almost two-thirds black in 1960.

The Braves' attendance had dropped steadily from 1,455,000 in 1948 to 281,000 in 1952, their last year in Boston. Like the Browns, they competed against a local team owned by a person of wealth. They were located in a heavily commercial area with a very low black population share. (Ironically, the Braves were developing an integrated group of players that might have allowed the team to displace the Red Sox as Boston's most popular team had been able to struggle on in the city for a few more years.)¹⁴

The Dodgers' attendance dropped from 1.6 million per year in the late-1940s to an average of 1.1 million a year during their last half-decade in Brooklyn even though they continued to field superb teams.¹⁵ They were located in an area with a nine percent black population share in 1950, rising to 22 percent in 1960 and to 56 percent in 1970.

The Pirates' move was anomalous. Located in a neighborhood with a very low black population share, the stadium site was apparently coveted by a nearby university.

The regression and logit equations were wrong only once in predicting that a team would relocate when it did not actually do so. This was the Washington Senators, which were predicted to relocate between 1950 and 1960; they actually moved in 1961, so the models could be said to have been one year early.

DISCUSSION

Major league teams were restricted to the northeast quadrant of the nation until the Dodgers and Giants burst out to the west coast in 1958. Clearly, jet travel opened up new cities to major league baseball. But why did some teams take advantage of new markets? Television and suburbanization may have hurt teams' attendance, but why did they hurt some teams? Why did night baseball not help attendance more than it did?

At least two idiosyncratic forces were also at play. One is a team's management's rootedness in and loyalty to their city. A second and related force is management's orientation toward bottom-line profitability versus simple pride of ownership. When a team moves from one city to another, how often is this associated with a sale of the franchise to a new owner (St. Louis Browns) and how often with a business decision by a continuing owner (Dodgers, Giants)?

Because stadiums were then privately owned and few cities or counties yet saw a team's location as a matter for public intervention, owners were able to do pretty much as they pleased.

Race was the most important correlate of major league baseball teams' relocation between 1950 and 1970, and it was the most important statistical predictor in the multivariate analyses. But what is the place of race in explaining why they relocated? To what extent was the motivation for relocation associated with the attraction of more money, the fear of remaining in a black neighborhood, the need for a new stadium, or some combination of the three.

Baseball was and is a business. Teams have done many things to try to make more money. Relocation has been one. Some, like the Boston Braves and St. Louis Browns (the first two to move), suffered very low attendance. Other teams might still have been making money but saw chances to make still more elsewhere. The place of neighborhood racial composition and demographic succession in the decisions to relocate probably

varied from team to team. But one thing that seems clear is that the racial mix of the people residing around a stadium, by itself, is useful in understanding the pattern of major league baseball teams' relocations.

Age of stadium is somewhat less useful. It probably matters both in itself (older facilities must be rebuilt or replaced at some point), and in its relation to neighborhood characteristics like housing density and parking availability. Older and more densely built-up neighborhoods are more likely to have subway and bus service and less likely to have available land for parking.

Some areas for future work. A team's average attendance during the five years prior to the start of a decade had a mild relation to chance of relocation during that decade. Possibly, a tighter look at changes in attendance and in place in the standings during the years just prior to the start of each decade would yield more precise results. Perhaps a decline in attendance just before the start of a decade would have the predictive power lacking in the attendance variable itself.

The racial mix of the people residing around a stadium was an important predictor of relocation between 1950 and 1970; does it remain so today? If not, to what extent is public or political action responsible? What is the influence of the greater availability of parking lots and expressways that provide more convenient transportation while buffering stadiums from their surrounding residential neighborhoods?

Table 1

**Racial Mix in 1980 of Neighborhoods around Teams' 1945 Locations:
Comparison of Teams Relocating and Those Remaining**

Area Percent Black in 1980

<u>team</u>	<u>movers</u>	<u>rooted</u>
Boston Braves	5.9	
Brooklyn Dodgers	81.7	
New York Giants	76.0	
Philadelphia Phillies	98.2	
Pittsburgh Pirates	8.6	
Cincinnati Reds	46.9	
Chicago Cubs		7.9
St. Louis Cardinals	96.8	
Boston Red Sox		9.5
New York Yankees		39.8
Philadelphia Athletics	98.2	
Washington Senators	96.5	
Cleveland Indians		51.2
Detroit Tigers		25.6
Chicago White Sox		11.1
St. Louis Browns	96.8	
Mean of 16	70.6	24.2

Table 2

**Racial Mix of Neighborhoods around Teams' 1945 Locations:
Comparison of Teams Relocating and Those Remaining**

Summary by Decade

Area Percent Black at Beginning of Decade

<u>decade</u>	<u>movers</u>	<u>rooted</u>
1951-1960	30.8	22.4
1961-1970	62.4	13.3
total	46.6	19.1

n = 16 original teams

Table 3

**Association between Relocation Status (1951-70)
and Four Independent Variables**

<u>Variable</u>	Value for Teams		
	<u>Relocating</u>	<u>Remaining</u>	<u>Significance*</u>
neighborhood percent black (%)	44.1	17.6	.031
stadium age (years)	44.3	38.2	.053
average annual attendance (000)	974.0	1239.2	.104
average games behind (games)	19.1	16.7	.606

* t-test

Average annual attendance and games behind were calculated for the five years preceding the beginning of each decade. Stadium age was measured at the start of each decade. We computed the years since construction, not the years the team had been playing in the stadium, which was sometimes substantially less (as in the cases of the Philadelphia Phillies or the St. Louis Cardinals).

Race was correlated somewhat with other independent variables: negatively with average annual attendance (Pearson correlation = -0.47, significant at $p=0.012$), and positively with average games behind (Pearson correlation = 0.43, significant at $p=0.024$).

Stadium age was correlated positively with race (Pearson correlation = 0.33, significant at $p = 0.094$). It was very negatively correlated with average annual attendance (Pearson correlation = -0.51, significant at $p = 0.007$).

Average annual attendance was very negatively correlated with average games behind (Pearson correlation = -0.74, significant at $p<0.000$).

$n = 27$ (16 original teams plus 11 still in place in 1961)

Table 4

Correlations among the Variables

css/3: basic stats	Correlations $r(x,y)$ N. of Cases = 27 (MD casewise deleted)				
	standard mode	REL57	APBINIT	AOSINIT	ATTINIT
REL57	1 N=27 p< 0	.4164 N=27 p<.031	.3757 N=27 p<.053	-.3201 N=27 p<.104	.1039 N=27 p<.606
APBINIT	.4164 N=27 p<.031	1 N=27 p< 0	.3290 N=27 p<.094	-.4746 N=27 p<.012	.4340 N=27 p<.024
AOSINIT	.3757 N=27 p<.053	.3290 N=27 p<.094	1 N=27 p< 0	-.5060 N=27 p<.007	.2361 N=27 p<.236
ATTINIT	-.3201 N=27 p<.104	-.4746 N=27 p<.012	-.5060 N=27 p<.007	1 N=27 p< 0	-.7373 N=27 p<.000
GBINIT	.1039 N=27 p<.606	.4340 N=27 p<.024	.2361 N=27 p<.236	-.7373 N=27 p<.000	1 N=27 p< 0

REL57 denotes whether the team relocated between 1950 and 1970.

APBINIT is the area percent black.

AOSINIT is the age of stadium.

ATTINIT is the average attendance.

GBINIT is the average games behind (place in standings).

Table 5

**Actual Relocation Status versus that Predicted by
Regression and Logit Equations**

Team	Relocate?	Regression	Logit
<u>Relocating teams</u>			
Athletics 1	1	0.41 x	0.35 x
Braves 1	1	0.14 x	0.10 x
Browns 1	1	0.39 x	0.33 x
Cardinals 2	1	0.74	0.79
Dodgers 1	1	0.22 x	0.15 x
Giants 1	1	0.62	0.57
Phillies 2	1	0.72	0.78
Pirates 2	1	0.41 x	0.43 x
Reds 2	1	0.67	0.70
Senators 2	1	0.88	0.88
average of ten relocators		0.52	0.51
<u>Teams remaining in place</u>			
Cardinals 1	0	0.39	0.33
Cubs 1	0	0.12	0.09
Cubs 2	0	0.29	0.25
Indians 1	0	-0.11	0.02
Indians 2	0	0.08	0.06
Phillies 1	0	0.41	0.35
Pirates 1	0	0.24	0.18
Red Sox 1	0	0.19	0.14
Red Sox 2	0	0.37	0.36
Reds 1	0	0.47	0.39
Senators 1	0	0.71 x	0.68 x
Tigers 1	0	0.25	0.18
Tigers 2	0	0.46	0.47
White Sox 1	0	0.42	0.43
White Sox 2	0	0.26	0.20
Yankees 1	0	0.02	0.04
Yankees 2	0	0.23	0.16
average of seventeen remaining		0.29	0.26

Notes: The letter "x" denotes an inaccurate prediction, using 0.50 as the break-point for predicted values. The numeral "1" refers to behavior between 1951 and 1960 and the "2" refers to behavior between 1961 and 1970.

Endnotes

1. *The Sporting News Dope Book*, St. Louis: The Sporting News, 1985.
2. The population figures are from the 1960 U.S. census.
3. The Boeing Company public relations office. Regular jet passenger service began in January of 1959. See Gene Gurney, *A Chronology of World Aviation*, New York: Franklin Watts, 1965, p. 198.
4. See Alan Sager, "Why Urban Voluntary Hospitals Close," *Health Services Research*, Vol. 18, No. 3 (fall 1983), pp. 451-481.
5. Bill James, "The Fifties Nobody Talks About: Baseball in Trouble," *The Bill James Baseball Abstract*, New York: Villard/Random House, 1988 (revised edition), pp. 212-213.
6. Bill James, "The Fifties Nobody Talks About: Baseball in Trouble," *The Bill James Baseball Abstract*, New York: Villard/Random House, 1988 (revised edition), pp. 212-213.
7. In New York City, to analyze a representative geographic area around each stadium, we used the larger health districts instead of census tracts because the latter are very small spatially owing to greater population density.
8. See, for example, *The Sporting News Dope Book*, St. Louis: The Sporting News, 1985.
9. Philip J. Lowry's *Green Cathedrals*, Cooperstown: Society for American Baseball Research, 1986.
10. See, for example, L. Adrienne Cupples and others, "Comparison of Baseline and Repeated Measure Covariate Techniques in the Framingham Heart Study," *Statistics in Medicine*, Vol. 7 (1988), pp. 207-218.
11. Logistic regression or logit constrains the predicted values between zero and one.
12. The F-value to enter was 1.00.
13. We used a least squares loss function and a quasi-Newton estimation method.
14. We are indebted to Robert J. Master for this insight.
15. Bill James, "The Fifties Nobody Talks About: Baseball in Trouble," *The Bill James Baseball Abstract*, New York: Villard/Random House, 1988 (revised edition), pp. 212-213.

CHARACTERISTICS OF EACH TEAM AND ITS ENVIRONMENT

	Team	Relocate?	Age of Stadium	Initial Area % Black	Initial Games Behind	Initial Attendance (000)
1950-1960						
1	Braves	1	35	0.9%	9.4	1146
2	Dodgers	1	37	8.8%	1.2	1565
3	Giants	1	39	79.7%	18.4	1301
4	Phillies	0	41	34.3%	20.0	951
5	Pirates	0	41	0.6%	27.0	1243
6	Reds	0	38	54.6%	27.6	737
7	Cubs	0	34	0.1%	26.2	1251
8	Cardinals	0	41	30.2%	4.8	1189
9	Red Sox	0	38	1.7%	1.6	1469
10	Yankees	0	27	2.1%	0.8	2236
11	Athletics	1	41	34.3%	29.8	721
12	Senators	0	39	98.2%	35.8	829
13	Indians	0	18	5.6%	13.2	1832
14	Tigers	0	38	12.0%	11.2	1727
15	White Sox	0	40	7.1%	34.8	871
16	Browns	1	41	30.2%	31.8	340
1960-1970						
17	Phillies	1	51	61.7%	24.6	935
18	Pirates	1	51	0.7%	14.0	1236
19	Reds	1	48	60.5%	14.8	890
20	Cubs	0	44	0.0%	26.8	808
21	Cardinals	1	51	64.8%	14.0	1061
22	Red Sox	0	48	2.4%	18.6	1102
23	Yankees	0	37	11.4%	-4.0	1519
24	Senators	1	49	99.0%	33.4	544
25	Indians	0	28	11.7%	14.4	940
26	Tigers	0	48	21.6%	18.8	1162
27	White Sox	0	50	5.6%	7.0	1200

Note:

Under relocation, a "1" denotes that the team moved and a "0" denotes no move.

Abbreviations Used in Charts

1950-1960

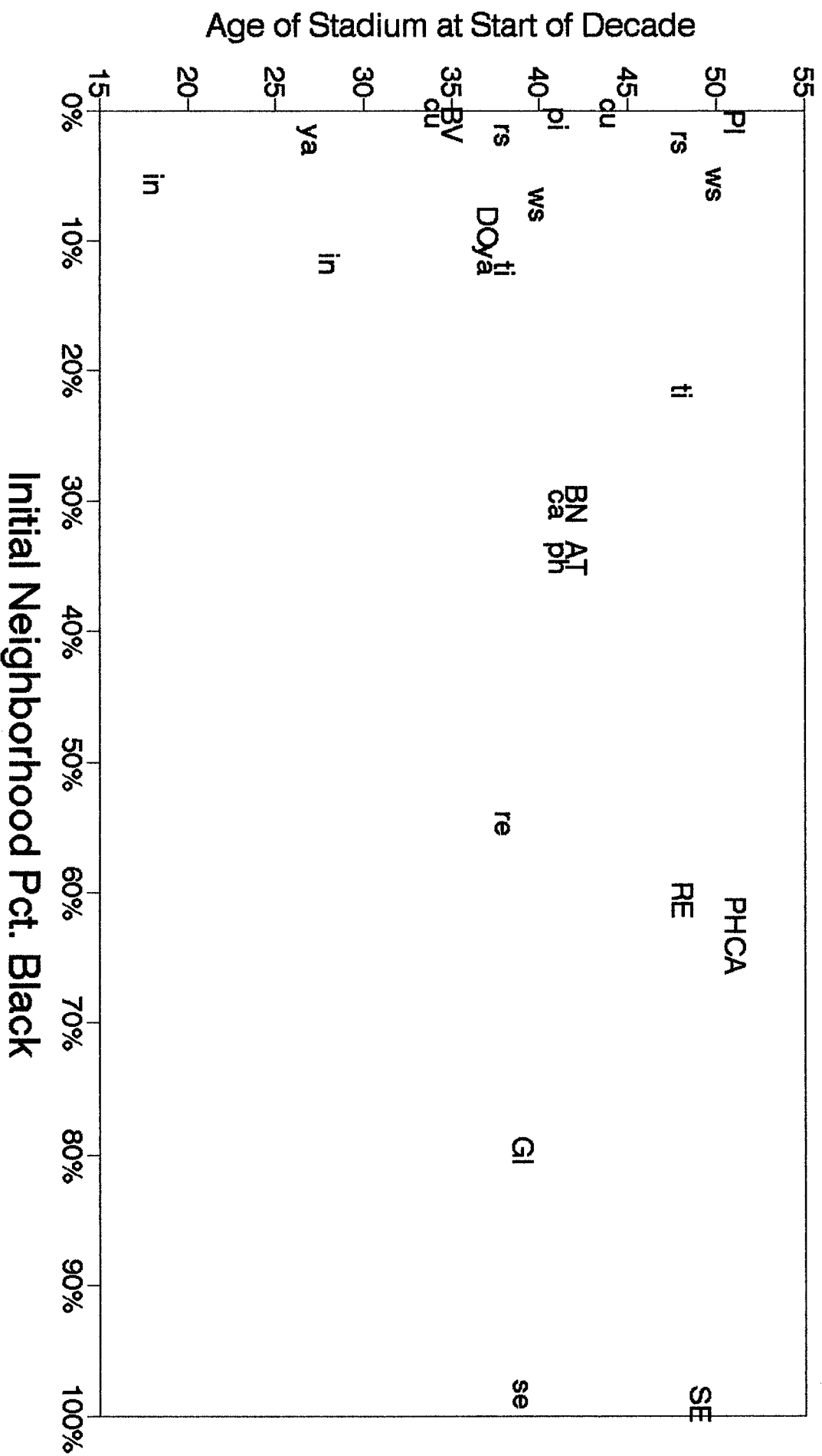
Braves	BV
Dodgers	DO
Giants	GI
Phillies	ph
Pirates	pi
Reds	re
Cubs	cu
Cardinals	ca
Red Sox	rs
Yankees	ya
Athletics	AT
Senators	se
Indians	in
Tigers	ti
White Sox	ws
Browns	BN

1960-1970

Phillies	PH
Pirates	PI
Reds	RE
Cubs	cu
Cardinals	CA
Red Sox	rs
Yankees	ya
Senators	SE
Indians	in
Tigers	ti
White Sox	ws

AGE OF STADIUM AND NEIGHBORHOOD RACE

Teams Relocating vs. Remaining, 1946-70

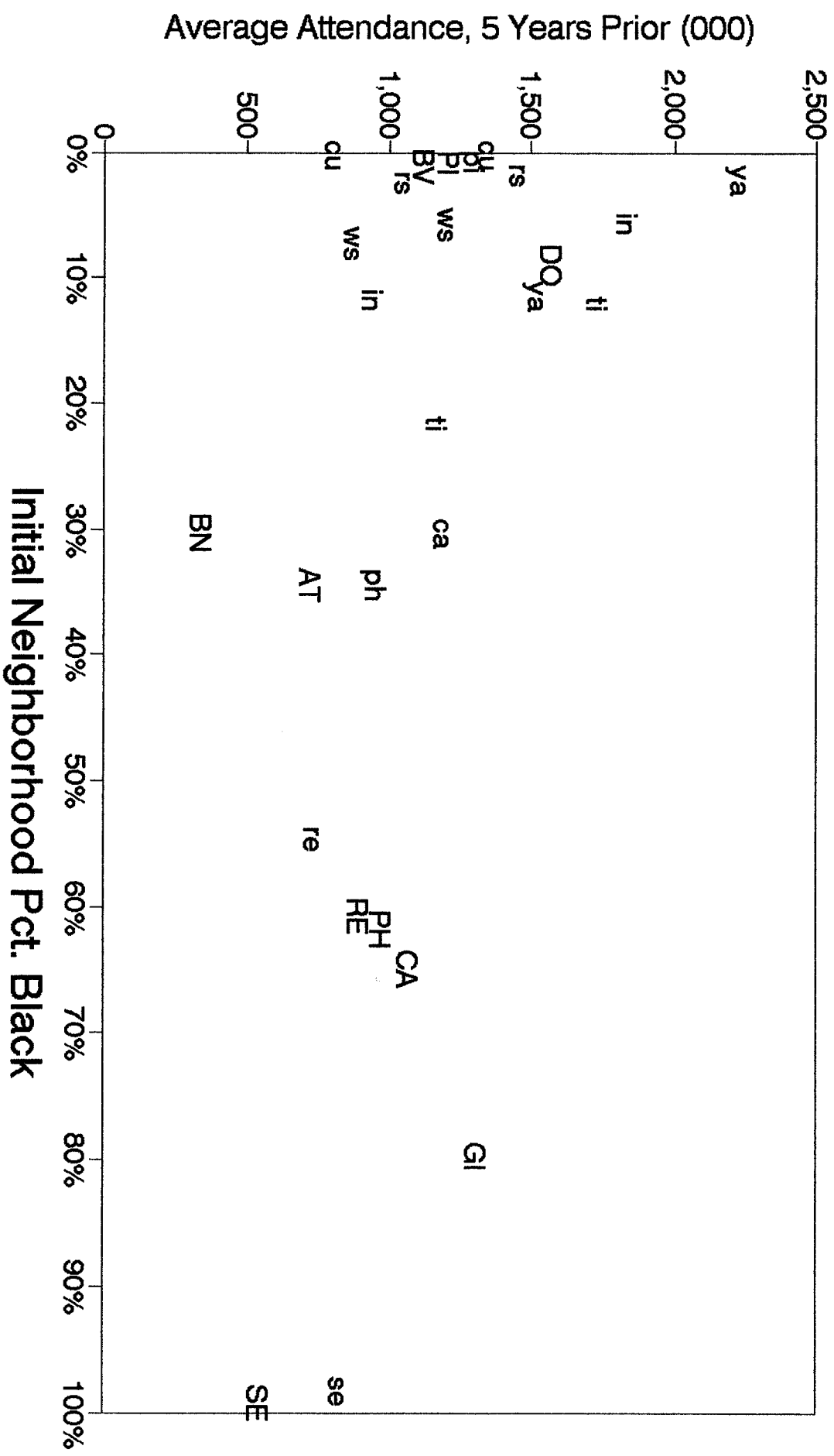


Initial Neighborhood Pct. Black

stay RELOCATE

ATTENDANCE AND NEIGHBORHOOD RACE

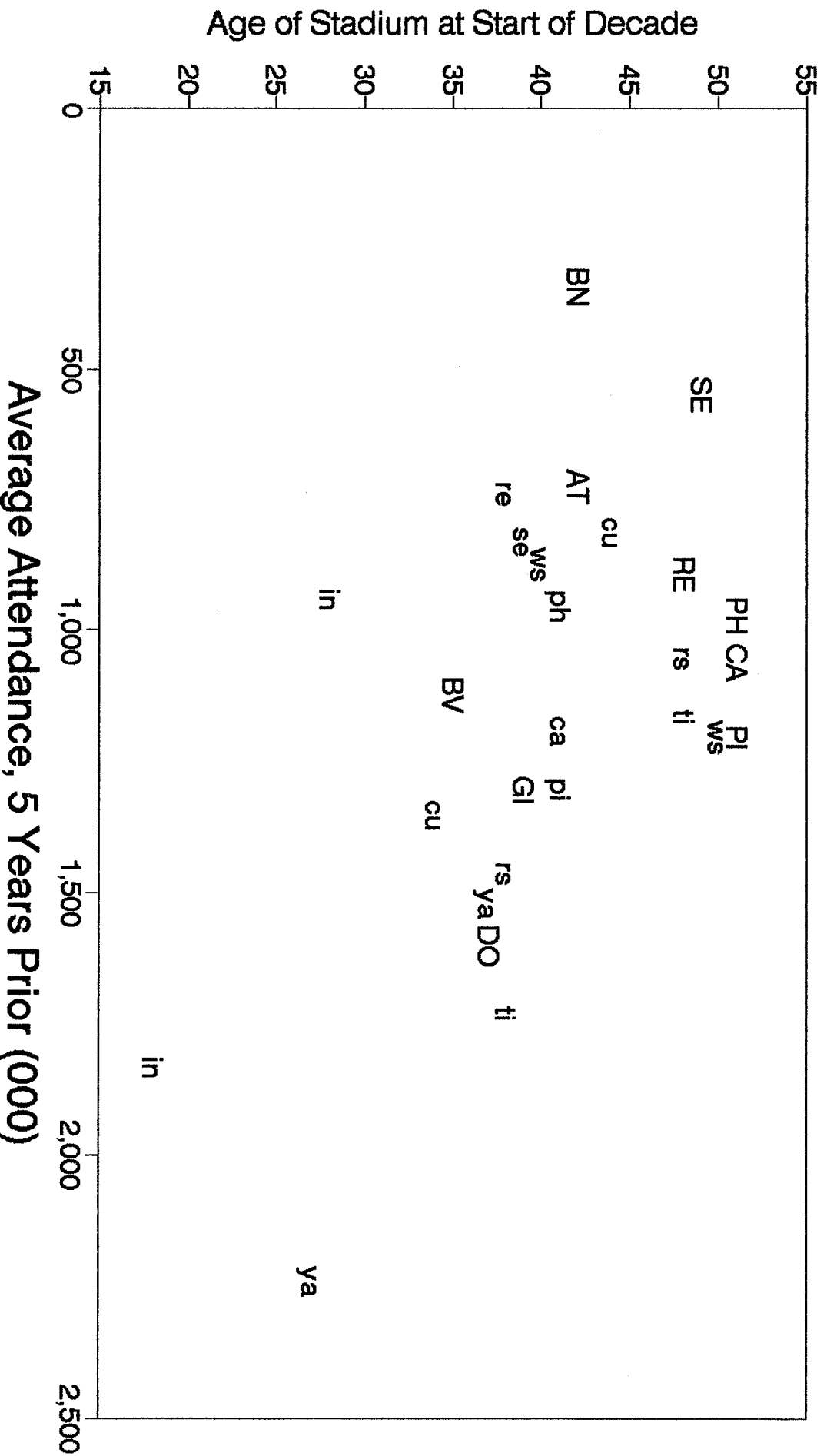
Teams Relocating vs. Remaining, 1946-70



stay RELOC

AGE OF STADIUM AND AVERAGE ATTENDANCE

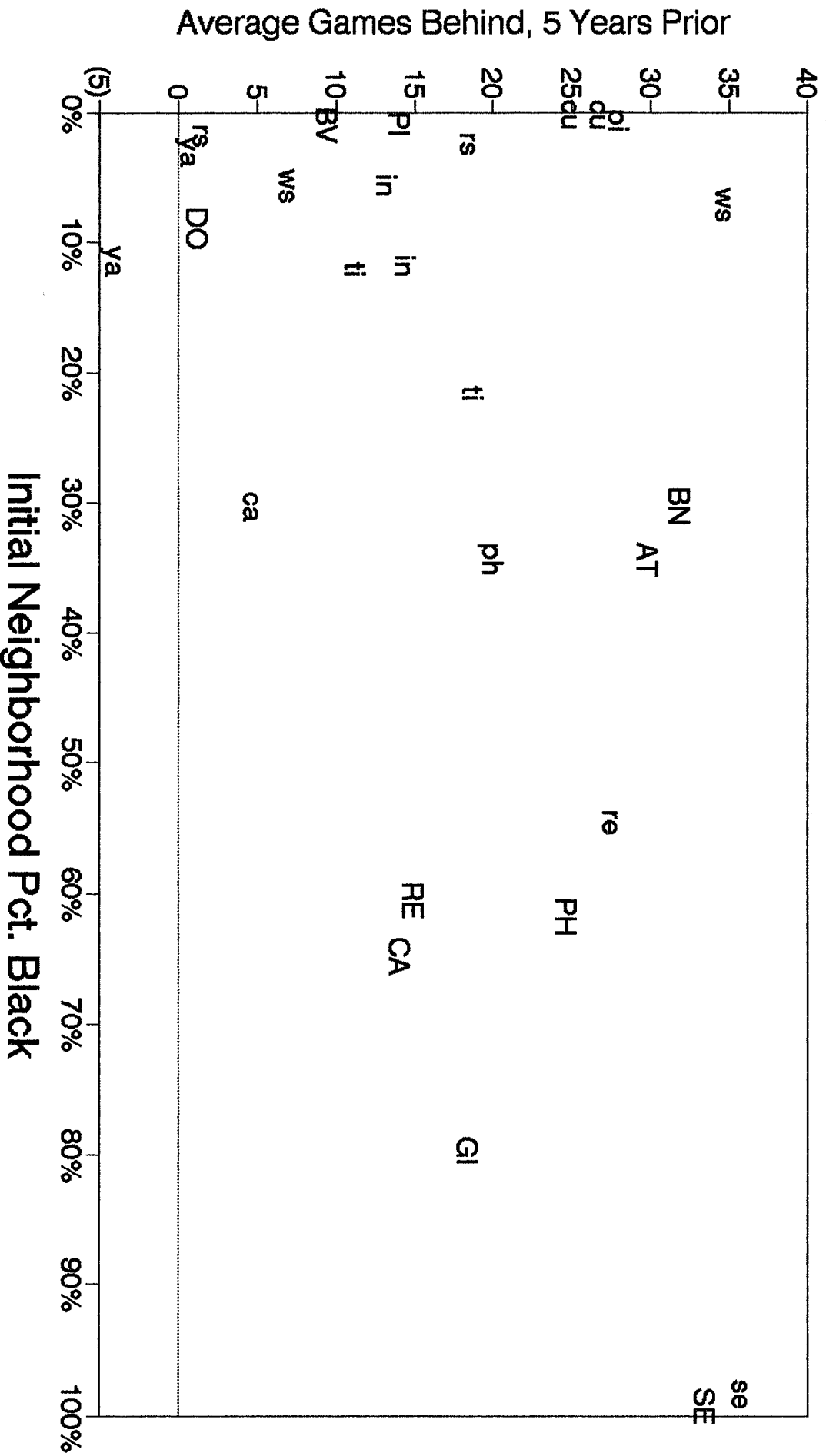
Teams Relocating vs. Remaining, 1946-70



stay RELOC

GAMES BEHIND AND NEIGHBORHOOD RACE

Teams Relocating vs. Remaining, 1946-70



stay RELOC