

DIFFUSION OF DISC GOLF COURSES IN THE UNITED STATES*

RAY OLDAKOWSKI and JOHN W. MCEWEN

ABSTRACT. This paper examines the diffusion of disc golf across the continental U.S. We provide a descriptive analysis of the spatial distribution of the sport beginning with its formal inception in 1975 through 2010. We investigate the role of common macro-level factors in determining the diffusion of sports facilities, such as population and land availability. We also consider the role of micro-level factors in influencing the diffusion of disc golf at the individual level. Our results demonstrate that disc golf has diffused rapidly and thoroughly throughout the U.S. Several disc golf regions have developed, including the upper Midwest, the mid-Atlantic I-95 corridor, and the Pacific Coast. Population has been an important determinant of diffusion patterns, with contagious diffusion evident at the local level. Disc golf facilities can be found in demographically diverse communities, however the overwhelming majority of disc golfers are white, creating an unintentional cultural barrier. *Keywords:* *Diffusion, disc golf, race, regions.*

Over the past several decades, geographers have examined the expansion of golf facilities throughout the United States (Adams and Rooney 1985, 1989; Rooney and Pillsbury 1992; Rooney 1993; Napton and Laingen 2008). These studies have described the changing spatial patterns of golf courses over time and the evolution of golf regions. In addition, they have analyzed the macro-level factors that have influenced the diffusion of golf.

More recently, geographers have broadened their focus to include the accessibility of golf for populations who have had limited or restricted access to the sport in the past (Mitchelson and Lazaro 2004; Wells and others 2008). This theme of diffusion and access to new places and people has also been investigated in the geographic analysis of other sports, such as bowling, auto racing, and hockey (Harmon 1985; Aldermen and others 2003; Hurt 2005; Coleman 2006).

The purpose of this research is to utilize the conceptual framework developed by geographers and other social scientists for the analysis of golf, and apply it to the relatively new sport of disc golf. We will begin by looking at the diffusion of disc golf courses throughout the U.S. We will then examine the emergence of disc golf regions and consider the macro-level factors that may have led to the current spatial distribution. Lastly, we will examine the results

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of two surveys. The first survey was administered to disc golf players to create a profile of individuals who participate in the sport, determine why they play, and understand how the sport diffuses at the individual level. The second survey was administered to persons who had observed disc golf being played, but had not played the sport themselves. This data should help to uncover possible barriers to diffusion among individuals. Hence, we add to the existing body of knowledge on geography and sport in two ways. First, we provide a descriptive spatial analysis of disc golf facilities. Second, we examine the relevance of traditional macro-level factors in explaining the diffusion of disc golf courses, and assess several micro-level factors to better understand the diffusion of sport among individuals.

DISC GOLF AND THE GEOGRAPHY OF SPORT

Disc golf as an organized sport began approximately thirty-five years ago (Gregory 2003). It is played by throwing a flying disc similar to a Frisbee. Players begin from a tee box and throw their disc at a metal basket. Each toss is counted toward a score, just as club strokes are counted in traditional golf. A hole is completed when the disc lands in the basket. As in traditional golf, the fewer the number of tosses, the better the score. A round of disc golf generally consists of eighteen holes. The length of the holes varies from as little as 100 feet to over 500 feet, although most holes are between 200 and 400 feet. In addition to distance, the difficulty of a hole is also influenced by obstacles such as bushes and trees or streams and ponds. The standard "par score" for a hole is three tosses, although extremely long holes may have a higher par. Most disc golf courses are comprised of eighteen holes, although "half" courses with nine holes are not uncommon, and some courses have expanded to offer more than eighteen holes.

Over 90 percent of all disc golf courses in the U.S. are public courses (Professional Disc Golf Association 2010). These public courses are almost always part of an existing park that offers other recreational opportunities. In some instances, they are integrated into a traditional golf course that is no longer in use. Most public disc golf courses can be played free of charge, although some parks charge a nominal fee for entry to the park or use of the course.

Like many other sports, disc golf fits nicely into the conceptual framework for examining the relationship between geography and sport (Bale 1982, 1989, 1996, 2003; Terrell 2004; DeChano and Shelley 2006). Several basic traditions of geographic research including space, human-environment interaction, spatial and locational analysis, and regionalism are all relevant. At the present time, disc golf is primarily a participatory sport and does not have a large number of spectators. There is a Professional Disc Golf Association (PDGA) and there are professional level tournaments with prize money. However, the tournaments are not broadcast via traditional media outlets and the players are not widely



FIGURE 1—Disc Golf Hole in Daytona Beach, Florida.

known. Hence, disc golf currently does not provide an opportunity to study research questions such as the distribution of fans, the sense of place generated by sport, the economic impact of sporting events, or the economic and environmental impact of locating and constructing large venues for sports viewing (Bale 2003; Vertinsky and Bale 2004; Shobe 2008).

Bale refers to the basic concepts of space such as distance, boundaries, and barriers as the geographic bases of sport (Bale 1989, 2003). Disc golf is played within clearly specified spatial boundaries. Play begins at a tee box and ends at a basket. Areas beyond a reasonable path between the tee box and basket are considered out of bounds. Physical geography plays a role in determining the difficulty of a hole. Terrain, elevation, vegetation, and weather (especially wind) can all serve as barriers and influence the success of a toss. Because these factors vary by region, courses in different parts of the country have different types of obstacles. For example, Figures 1 and 2 illustrate the view from a tee box on a course in Daytona Beach, Florida, and Richmond, Virginia, respectively. The Daytona Beach hole reflects the flat terrain and subtropical vegetation of central Florida. In contrast, the Richmond hole exhibits the mild rolling terrain and deciduous forest of central Virginia. Each hole presents its own unique set of challenges for the disc golfer. On the Daytona Beach hole, the player may choose a variety of paths to the basket, but must avoid a long straight throw because of the scattered pattern of trees. There are also several



FIGURE 2—Disc Golf Hole in Richmond, Virginia.

water hazards. On the Richmond hole, the player has one straight path to the basket, and must also account for the change in elevation from tee to hole.

The geographic tradition of human-environment interaction is also quite applicable to disc golf. Disc golf courses are generally designed to have a minimally disruptive and minimally invasive effect on the existing environment. The sport often promotes itself as being “green and clean.” Besides the placement of the tee box and the basket, little else is done to create a disc golf hole. Tee boxes may be concrete slabs, but on some courses they are nothing more than a carpet scrap or a worn down area of grass or dirt. Interestingly, this was originally the case with traditional golf courses as well. Courses constructed during the early eras of traditional golf in the U.S. had little impact on the existing natural environment (Adams and Rooney 1985; Napton and Laingen 2008). Preserving the natural landscape may play a role in the popularity of outdoor sports such as disc golf (Bale 1982, 1996, 2003; Terrell 2004; DeChano and Hruska 2006). For some participants, the interaction with nature provides a refreshing or rejuvenating experience (Manfredo and others 1996).

Regarding spatial analysis, the distribution of disc golf courses throughout the U.S. has not yet been mapped in academic literature. The PDGA provides a course directory that will be utilized in this research to examine the various

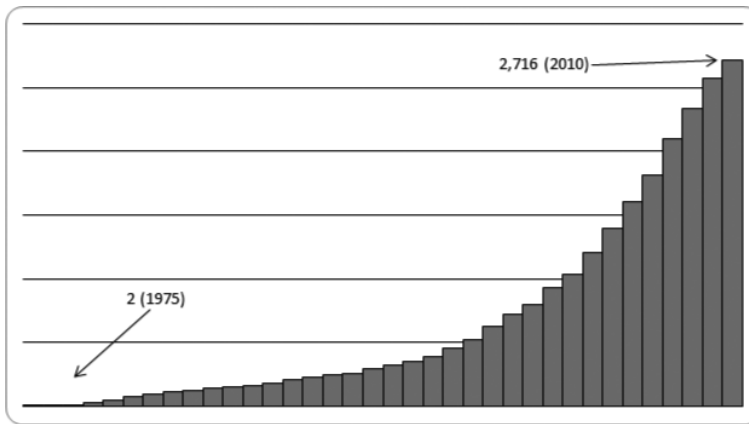


FIGURE 3—Total Courses Year-To-Year 1975-2010, Contiguous 48 States.

spatial patterns of the sport. The first “official” disc golf course was opened in Pasadena, California, in 1975. By 1990 there were approximately 250 courses and by the year 2000 there were more than 800 courses (Figure 3). At the end of 2010, there were over 2,700 courses in the contiguous U.S. (as well as twenty more in Alaska and Hawaii). There were also about 500 courses located outside the U.S., primarily in Canada and Europe (Professional Disc Golf Association 2010).

THE DIFFUSION OF TRADITIONAL GOLF

During its first forty years of existence in the U.S. (1878-1919), approximately 1,000 traditional golf courses were built (Adams and Rooney 1985; Napton and Laingen 2008). The 1920s triggered the first boom period for golf with over 4,000 courses constructed (Adams and Rooney 1989). This increase was fueled by the growing popularity of golf as a leisure activity among the upper classes. A second boom period occurred from the late 1950s to the mid-1970s. Nearly 6,000 golf facilities were built during that time. The diffusion of golf to the middle class played a crucial role in this expansion. The sport also received tremendous exposure thanks to television broadcasts, the emergence of golf superstars such as Arnold Palmer and Jack Nicholas, and even President Dwight Eisenhower’s affinity for the game. The most recent boom occurred from the late 1980s to the late 1990s as a result of the construction of golf resorts and residential golf communities (Rooney 1993; Napton and Laingen 2008).

Mapping the spatial distribution of traditional golf facilities illustrated that most of the first golf courses established in the U.S. were located near urban population centers in the Northeast, such as New York and Boston. There were also smaller concentrations in the Midwest (Rooney and Adams 1985; Napton and Laingen 2008). The golf boom of the 1920s reinforced these existing spatial patterns. It also broadened the Northeastern concentration to include

Philadelphia and Baltimore, and the Midwestern concentration to include most areas of the north-central U.S. Subsequent eras saw golf diffuse southward and westward with new golf regions developing in the south Atlantic, Pacific coast, and desert Southwest (Adams and Rooney 1989; McPherson and Haip 1989). Interestingly, Napton and Laingen (2008) mapped the mean center of golf courses with the mean center of population. In general, these two centers moved to the west and south throughout the twentieth century. However, the mean center of golf began further to the north and east because of the large concentration of courses in the New York to Boston Megalopolis. Moreover, it seems that limits on the availability of water and developable land in the West deterred the mean center of golf from moving as rapidly in that direction as the mean center of population.

Clearly, population played an important role in explaining the expansion of traditional golf through space and time. Settlement patterns and population density dictated the initial location of golf courses. Urban decentralization, suburbanization, Sunbelt migration, and the emergence of residential golf communities (especially for snowbird retirees) influenced the location of more recent golf facility construction (Adams and Rooney 1985, 1989; Bale 1989; Napton and Laingen 2008).

However, mapping golf courses per capita or location quotients for golf courses demonstrated that golf-facility construction did not necessarily keep up with population growth (Adams and Rooney 1985; Rooney and Pillsbury 1992; Napton and Laingen 2008). Heavily populated states such as California, Texas, Florida, New York, New Jersey, and Massachusetts have relatively low rates of golf courses per capita. The highest levels of golf course accessibility are actually found in the sparsely populated states of the northern plains and upper Midwest.

In addition to population, geographers have examined other macro-level factors that might help to explain the expansion of golf in the U.S. (Adams and Rooney 1985, 1989; Napton and Laingen 2008). The cost of land and availability of water can dictate the development of new facilities. The importance of tourism led to the emergence of golf resorts in the Carolinas, Florida, and the desert Southwest.

Adams and Rooney (1985) discussed the significance of racial and economic discrimination, especially in the location of private golf courses. Mitchelson and Lazaro (2004) examined the role of racial discrimination in the distribution of golf facilities in North Carolina. Their results clearly demonstrated lower levels of spatial accessibility to golf for African Americans as compared to whites. Census tracts with high percentages of black population were found to be underserved with golf in all regions of the state. Other research illustrated that even when public courses were available, tactics such as club memberships, course fees, separate facilities, or limited playing dates and times restricted African American's access to golf (Kirsch 2007; Wells and others 2008).

TABLE 1—DATA COLLECTION SITES

CITY	PARK	POPULATION	COMPLETED INTERVIEWS
Clearwater	Cliff Stevens Park	Disc golfers	77
Fort Lauderdale	Tradewinds Park	Disc golfers	64
Gainesville	Northside Park	Disc golfers	62
Jacksonville	Ed Austin Park	Disc golfers	60
Orlando	Gordan Barnett Park	Disc golfers	78
	Gordan Barnett Park	Observers	87
Tallahassee	Tom Brown Park	Disc golfers	71
	Jack McLean Park	Observers	74

This type of discrimination can also be a barrier to diffusion at the individual level. In his discussion of the soft landscape of ultimate Frisbee, Griggs (2009) notes that persons are also a component of the sports landscape. Hence, if one sees only whites playing golf, they may feel that the sport is not welcoming to others. Funk and others (2011) characterizes the behavioral engagement with a leisure activity such as golf as a progression from an awareness stage to attraction, attachment, and allegiance. Once again, discrimination might block potential new participants from becoming aware of or attracted to a sport such as disc golf.

Based on these findings from previous research, several questions emerge regarding the diffusion of disc golf. First, has the diffusion of disc golf demonstrated similar geographic patterns to those of traditional golf? For example, does it follow population growth and movement in a regional context? Have any disc golf regions emerged? Are there any concentrations or voids in per capita access to disc golf? What is the distribution between rural and metropolitan areas? Moreover, is there a demographic or socioeconomic profile of disc golfers? Why do disc golfers participate in the sport, and others who have been exposed to the sport choose not to play? Does actual or perceived discrimination exist as a barrier to the diffusion of disc golf among individuals?

METHODS

Data for mapping the spatial distribution of disc golf courses was obtained from the PDGA. Their database includes locational information such as street address, city, state, zip code, and latitude and longitude coordinates for all U.S. disc golf courses. Also available is information regarding the number of holes per course, the year the course was established, whether the course is public or private, and the types of tees, baskets, and the length of holes.

Survey data regarding disc golf players were collected in the summer of 2008. Questionnaires were administered to individuals playing disc golf at randomly selected courses within the four major metropolitan areas of Florida, as well as the two major university towns (Table 1). Disc golfers were approached by interviewers (trained in face-to-face interviewing techniques) at the first tee

area of each course and asked to complete a brief questionnaire. A total of 412 completed interviews were obtained from 568 potential respondents generating a cooperation rate of approximately 73 percent (Czaja and Blair 2005).

The survey instrument used to gather data from disc golfers focused on their disc golf activities. Respondents were asked how long they had been playing disc golf, how frequently they played, on which courses they played regularly, and how far they were willing to travel to play disc golf. In addition, we inquired about how they first became familiar with disc golf and the reasons they enjoyed playing. Standard demographic data such as gender, race, age, education, employment status, and place of residence were also obtained.

Survey data from individuals who had seen disc golf being played, but had never played disc golf themselves, were collected in the summer of 2009. Questionnaires were administered to individuals who were visiting parks with disc golf courses in racially diverse neighborhoods in Orlando and Tallahassee (Table 1). We selected these parks because our analysis of the earlier survey of disc golfers revealed that the overwhelming majority of disc golf players were white. Individuals were approached by interviewers (trained in face-to-face interviewing techniques) in areas adjacent to disc golf holes and asked to complete a brief questionnaire. A total of 161 completed interviews were obtained from 204 potential respondents resulting in a cooperation rate of approximately 79 percent.

The survey instrument for individuals who did not play disc golf gathered information about how frequently the respondents visited the park and their main reason for coming. They were also asked if they had noticed persons throwing Frisbees/discs at baskets, and if they knew what sport was being played. Interviewers then provided some basic information about disc golf and asked respondents if they would be interested in playing or not and why. Demographic data on gender, race, and age were also obtained.

SPATIAL ANALYSIS

In this section, we focus on several questions about the diffusion of disc golf over time, paying interest to uniformity of development, establishment of regional patterns, and distribution among rural and metropolitan areas. Because Figure 3 shows a consistent expansion of disc golf through time with no natural breaks or booms, we will structure our maps and discussion on the basis of the three decades since disc golf was first introduced.

Figure 4 illustrates where disc golf courses were established between 1975 and 1990. After Ed Headrick established the first disc golf course in Pasadena, California, in 1975, new courses sprouted in several regions of the country. The most obvious concentration appeared in the Great Lakes and Midwest. A cluster of courses could be found around major cities such as Chicago, Cincinnati, Detroit, and Minneapolis. In addition, there were a significant number of courses to be found scattered throughout Iowa, Indiana, and Wisconsin.

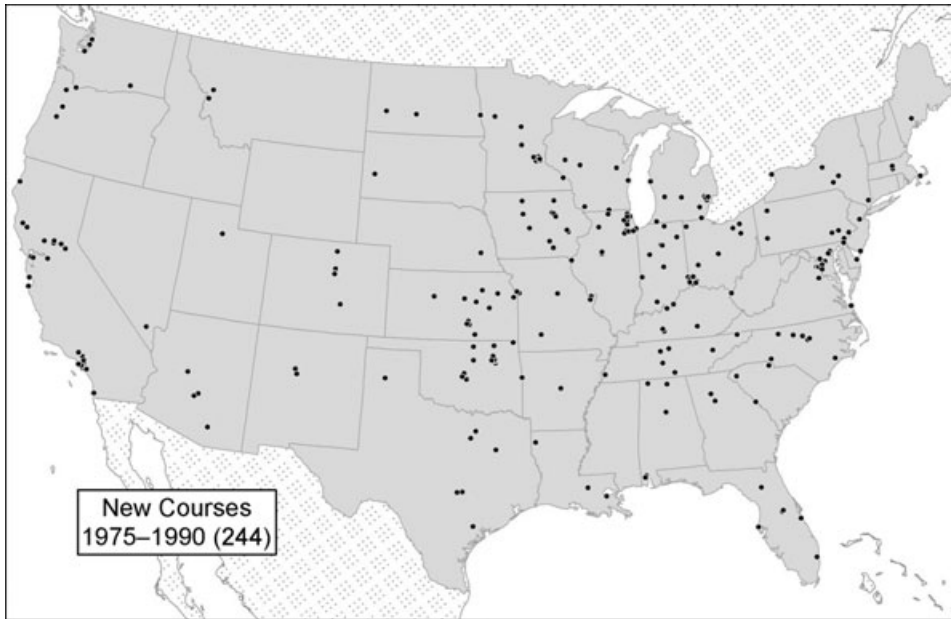


FIGURE 4—Disc Golf Courses Established from 1975-1990.

A second region of development would be the I-95 corridor between Washington, D.C. and Philadelphia. However, this concentration did not extend to New York City or Boston. The metropolitan areas of the Pacific coast also created a region. These include Los Angeles, San Francisco to Sacramento, Portland, and Seattle. Lastly there was a small concentration in central Oklahoma that extended northward into eastern Kansas. Very few courses were found in the Deep South including the Southeast Atlantic and Gulf Coast regions. Another void existed in the western plains and Mountain West.

Figure 5 maps the 557 new courses that were established from 1991 to 2000. This decade reinforced the regional patterns established during the previous fifteen years. The popularity of the sport continued in the Great Lakes and Upper Midwest. Courses now extended throughout the entire Chicago land area from northwestern Indiana to southeastern Wisconsin. New courses could be found in and around Cincinnati, Detroit, and Minneapolis. The growth even continued in areas away from big cities, such as northern Iowa and western Indiana. The I-95 corridor saw additional courses develop between Washington, D.C. and Philadelphia, and some expansion into northern New Jersey and the New York City metropolitan area. Growth occurred along the Pacific coast metropolitan areas of San Francisco, Portland, and Seattle. Even the smaller region found in the central plains saw an expansion of courses into southwestern Oklahoma and northern Kansas. Several new regions also emerged during this decade. A sizable number of courses were established throughout North

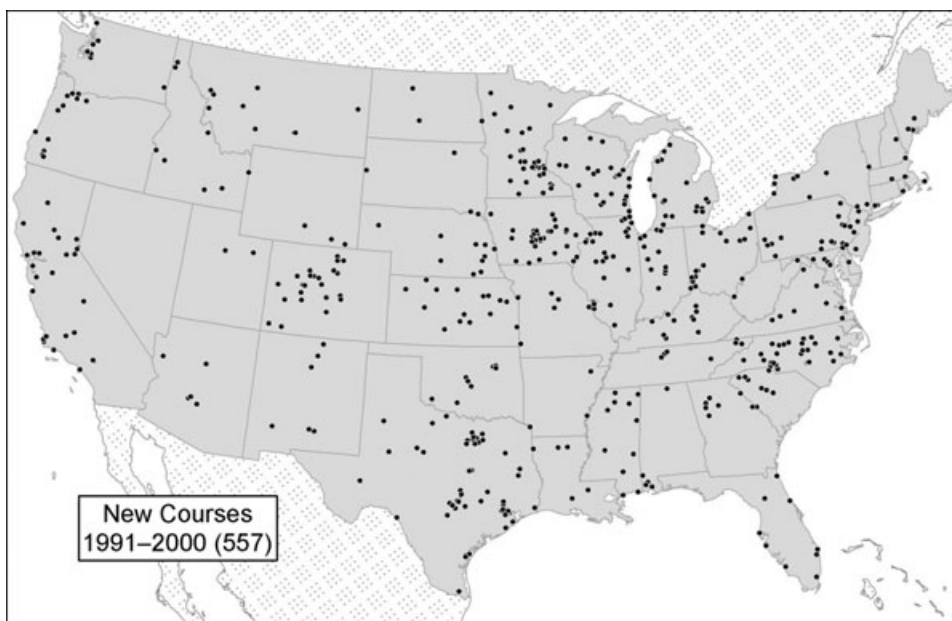


FIGURE 5—Disc Golf Courses Established from 1991-2000.

Carolina. This concentration stretched into South Carolina and the Atlanta region. Texas, which saw only a few courses established during the first fifteen years of disc golf, now had significant concentrations around Dallas, Houston, and San Antonio. Lastly a new concentration could also be found in central and northern Colorado, focusing around the Denver area.

Over 1900 new courses were established from 2001-2010, and their locations are illustrated in Figure 6. Again, the upper Midwest catches one's eye as the most prolific region for course development. There was significant expansion radiating outward from Chicago, Minneapolis, and Detroit. Growth also occurred in new areas of the Midwest, such as northern and central Ohio and central Illinois. Growth along the I-95 corridor now extended into New England. The Pacific coast region demonstrated a pattern of uniform development, filling in those areas between the metropolitan centers of Los Angeles, San Francisco, Portland, and Seattle. Moreover, courses were now being established in the California Valley. In the South, course development was again most obvious in North Carolina, and in Texas's big three metropolitan areas. There was also a modest increase in the number of courses in central Florida, especially in the Tampa Bay area.

The expansion patterns of traditional golf and disc golf appear similar. Each sport established several areas of initial popularity. For traditional golf, it was the New York to Boston megalopolis, Chicago, and other metropolitan areas of the eastern Great Lakes (Napton and Laingen 2008). For disc golf, it was Chicago, the Middle Atlantic I-95 corridor, and the Pacific Coast metropolitan

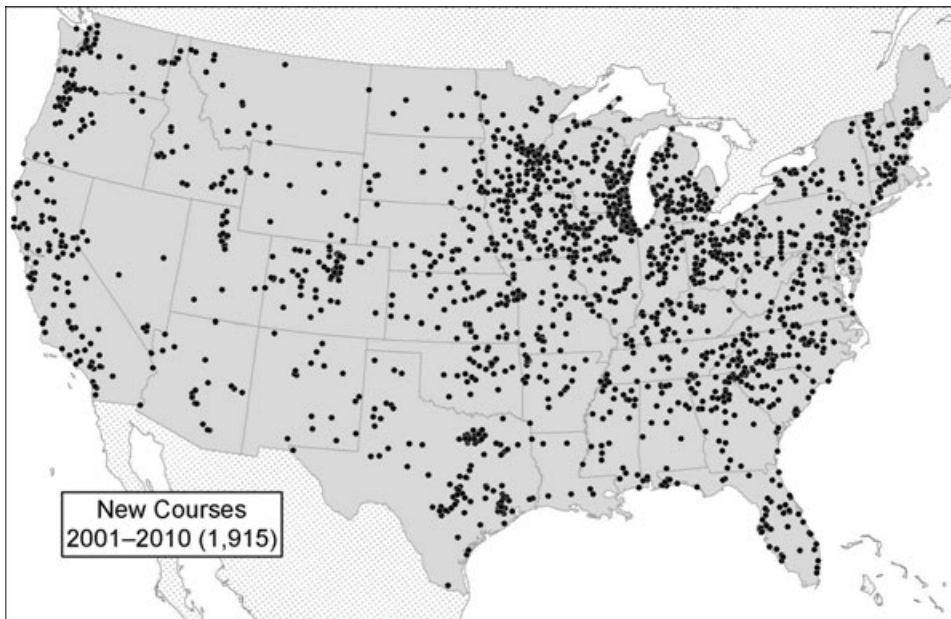


FIGURE 6—Disc Golf Courses Established 2001-2010.

areas. These original “growth nodes” remain popular locations for new courses, even as both traditional golf and disc golf expand to other areas. A simple count of the number of disc golf courses within metropolitan areas demonstrates the importance of these growth nodes and the effect of contagious diffusion at the local level. Utilizing GIS, we generated a circle with a fifty-mile radius (approximately one hour’s drive time) around the centroid of the central city of each U.S. Metropolitan Statistical Area (MSA). The MSAs with the most disc golf courses were Chicago (seventy-one), Minneapolis-Saint Paul (fifty-nine), Dallas-Fort Worth (thirty-eight), Milwaukee (thirty-seven), and Detroit, Philadelphia, and Houston (thirty-six). Each of these MSAs are found in the regions where disc golf originally become popular, except for Dallas and Houston, which became the growth nodes for disc golf expansion in Texas during the 1990s.

Disc golf appears to have expanded at a quicker pace than traditional golf. Figure 3 shows the trends in the number of new courses established during the sport’s thirty-five-year existence. Beginning around 1980, approximately twenty-five new courses were established each year. By 1990, the rate of growth had increased to nearly 100 new courses created annually. Since 2007, the total number of disc golf courses has grown by over 200 each year.

Disc golf has also eliminated almost all regions of void within its first thirty-five years of development. Figure 6 illustrates that only a few sparsely populated areas of the country do not have several disc golf courses within a fifty-mile radius. However, it was not until sixty years after its introduction to

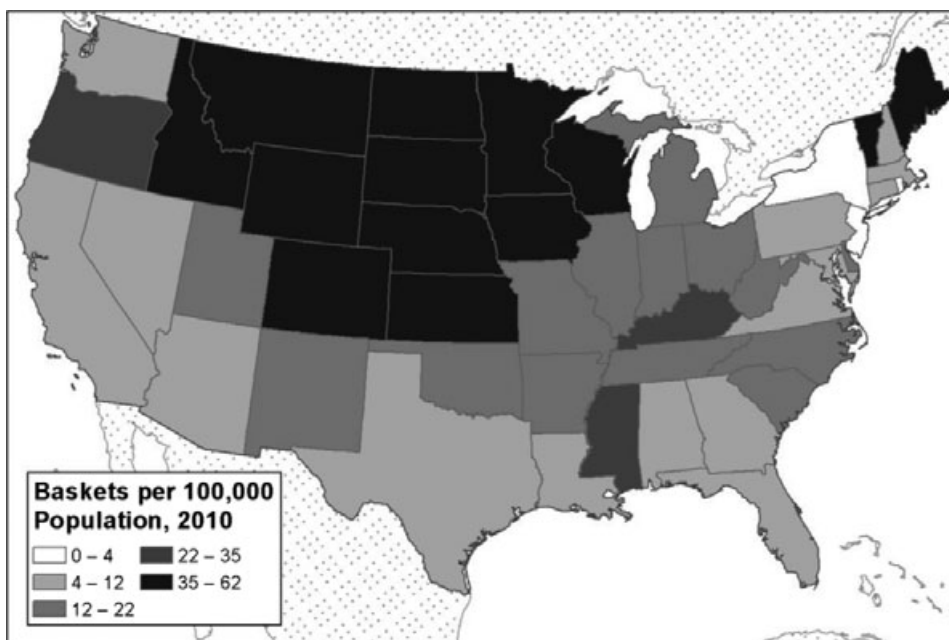


FIGURE 7—Disc Golf Holes Per 100,000 Population by State, 2010.

the U.S. that traditional golf overcame its reputation of elitism and restriction and began to gain national coverage (Napton and Laingen 2008). An important fact to consider here might be that in its first thirty-five years of existence, nearly three-fourths of all traditional golf courses were private, whereas over 90 percent of all disc golf courses were public. This may have allowed for some disc golf courses to be built before a sufficient demand had developed. In other words: build it and they will come. This process would lead to better geographic coverage more quickly.

The reasons for the expansion of both traditional and disc golf are also somewhat similar. Population clearly plays an important role. Both sports established their initial strongholds in large metropolitan areas. From 1900-2000, the mean center of traditional golf courses closely followed the mean center of population with a slight skewing to the East due to the sport's original concentration in New York and Boston (Napton and Laingen 2008). Although disc golf's short period of existence does not allow for similar mapping, the states with the largest populations also have the largest number of disc golf courses. Texas and California rank number one and two with 194 courses and 154 courses, respectively. The next four states in terms of number of courses: Iowa (151), Minnesota (149), Illinois (143) and Wisconsin (143) demonstrate the importance of contagious diffusion within the regional context. The large number of courses in these states is most likely a result of the popularity of the sport in Chicago and the upper Great Lakes region.

Land area is also influential and plays a role in tandem with population. It appears that regardless of population, there are a minimum and maximum number of disc golf courses that will exist within a certain space. Figure 7 illustrates the number of disc golf holes per 100,000 population. States with large populations and large land areas like California, Texas, Florida, and Illinois all fall below the national mean. However, states with small populations and large land areas such as Montana, Wyoming, and North and South Dakota have greater rates of disc golf holes per capita. A remarkably similar spatial pattern is found in the per capita distribution of traditional golf courses by state from Adams and Rooney (1989). This suggests that for both traditional and disc golf courses, there is a limited amount of land area (or park space) available for these facilities in heavily populated areas. Conversely, in sparsely populated areas, there are a minimum number of facilities established to achieve reasonable travelling distances.

Other factors found to be influential in the expansion of traditional golf included the cost of land, the availability of water, and other maintenance costs. The expansion of disc golf would be significantly influenced by the availability of existing parkland to accommodate a disc golf course or the creation of new parks. Disc golf courses have minimal maintenance costs, and the additional persons they bring to a park may help to justify or mitigate other maintenance costs. Both these factors make disc golf a desirable addition to many park systems.

Lastly, it is well known that spatial distribution and diffusion of traditional golf was also influenced by intentional and explicit discrimination against minority groups. Although blatant examples of this type of behavior are no longer tolerated in society, more subtle or implicit discrimination may still be at play. In order to investigate the possible influence of these types of factors in the diffusion of disc golf, we conducted surveys with disc golfers, and with persons who have observed the sport but do not play.

SURVEY RESULTS

The survey of disc golfers was conducted to develop a profile of those who play, their spatial and temporal playing patterns, and their motivations for playing. Two demographic questions, gender and race, painted a clear picture of the typical disc golfer: male and white. Over 85 percent of the 412 survey respondents were male and nearly 95 percent were white. There was some skewing towards younger persons, although nearly one-third of the respondents were forty or older. The median age of the respondents was thirty-two. Because two parks in university towns were included in the sample, there was a slightly higher percentage of college graduates (32 percent) than the general population, and approximately 15 percent of the respondents were students.

The playing habits of the respondents illustrated the popularity of the sport. Nearly half of those surveyed had been playing disc golf for two years or less,

indicating the sport is gaining many new participants. There appear to be no economic barriers to taking up the sport. Course fees are rare among public courses, and minimal among the relatively few private courses that exist. Equipment is cheap, with a typical disc costing less than ten dollars. The game can be played with one disc, although the average among our sample was four discs. The most serious players can be seen carrying over a dozen disks in shoulder bags and even baby carriages (Gregory 2003). Funk et al. (2011) noted that the accumulation of equipment for a leisure activity is indicative of an attachment to that activity.

Amazingly, over 80 percent of the respondents answered that they play at least one round of disc golf per week. In addition, more than 50 percent said they would travel twenty-five miles or more to play. Disc golfers also enjoy playing different courses. Over half of the survey respondents stated that they had played on at least two different courses in addition to the course on which they were interviewed. Contagious diffusion appears to be the primary vehicle for the expansion of disc golf, as over 80 percent of the respondents stated they had learned about the sport from a friend. The remaining respondents said they had just stumbled upon a course and took up the sport because it looked like fun. Lastly, disc golfers provided three main reasons for playing: recreation (88 percent of respondents), exercise (61 percent), and interaction with nature (57 percent).

The profile of disc golfers illustrated an underrepresentation of women and blacks. However, it should be noted that previous research has found that across the board, women spend less time on exercising and leisure activities than do men (Nomaguchi and Bianchi 2004). Given the similar historical profile of traditional golfers, we decided to determine if this was a result of discriminatory barriers. Hence, we conducted a new survey of individuals who were near disc golf holes and could see the sport being played. We then asked them if they had ever played disc golf. For those who had never played, we asked why not. The parks we chose, in Orlando and Tallahassee, were located in racially diverse areas. This made it easier for us to solicit respondents who were not white to participate in the survey. It also meant that those respondents had easy access to disc golf facilities.

Of the 161 respondents, 88 percent were black, and 36 percent were female. All of the respondents in the areas adjacent to disc golf holes stated they had noticed persons throwing Frisbees at baskets. Approximately one-third of them had heard of disc golf, but less than 5 percent had ever played the game. Of the respondents who had not played, roughly half said they would be interested in trying if they had a disc and someone showed them how to play the game. Recall from the survey of disc golfers that an overwhelming majority of respondents were introduced to the game by a friend. Hence, personal contact is once again critical in the contagious-diffusion process. The other half had no interest

in playing. The interviewers then asked why and encouraged the respondent to provide more than one response if appropriate.

Most of the reasons provided by the respondents for not playing disc golf would be typical given any demographic group. Some persons don't have the time (26 percent) or don't know the rules of the game (9 percent). Others come to the park to relax (18 percent) or play other sports (18 percent). Moreover, none of the reasons reveal a purposeful restriction of access to the game. However, the most common response, that disc golf is "not my kind of game" (42 percent) can be interpreted in several different ways. For some respondents, it may represent a genuine lack of interest in the game. For others, it may suggest a possible cultural barrier. Many of the respondents elaborated on their disinterest by stating the game was too "stupid," "girly," "whitish," and several other adjectives unfit for print. These statements indicate that those respondents did not connect themselves with the game culturally. They may have associated golf and/or Frisbees with the white community, causing them to consider disc golf an inappropriate game to play.

CONCLUSION

The purpose of this research was to examine the diffusion of disc golf in the U.S. We utilized the concepts and techniques used to study the expansion of traditional golf so we could observe and assess the similarities and differences in the geographic patterns of the two sports. We also evaluated the role of several macro- and individual-level factors in the diffusion process.

First, we found that the number of disc golf courses has increased at a relatively fast rate, especially when compared to the growth of traditional golf. In its first thirty-five years of existence, more than 2,700 disc golf courses have been established in the U.S. Comparatively, less than 1,000 traditional golf courses were built in the first forty years after that sport's introduction to the U.S. Furthermore, disc golf appears to have established a more comprehensive geographic coverage across the various regions of the U.S. than did traditional golf in its early years.

Clearly, there have been many differences in communication and transportation technology between 1878, when the first traditional golf course was built in the U.S., and 1975, when the first disc golf course was established. These technological advances would certainly lead to more rapid diffusion. A more dispersed population settlement pattern throughout the country and more time for leisure activities are two additional historical differences that would promote diffusion.

Furthermore, disc golf has several other advantages. The overwhelming majority of disc golf courses are found in public parks. Hence, the sport is not as dependent on demand from paying consumers. They require only about one-third of the land needed for a traditional golf course. Disc golf courses can also be reasonably commingled in and around other park spaces such as

jogging paths, hiking trails, or picnic areas. Each of these factors makes disc golf courses easier to create. There are also minimal maintenance costs for disc golf in terms of both watering and landscaping. Conversely, the land for traditional golf courses (both public and private) had to be purchased. The effort and cost of acquiring land in existing urban areas and developing urban fringes could hinder the establishment of new courses.

Traditional golf had periods of elitism and discrimination in its past which impeded diffusion to certain people and places. Whereas this is not the case with disc golf, our survey of disc golfers revealed that there is an underrepresentation of blacks and women among those who play. It does not appear that this profiling is purposeful. Societal conventions have changed, and there are few private courses that restrict playing to members only. Our survey of observer non-players revealed that half the respondents were interested in playing disc golf if someone showed them how, indicating a degree of attraction to the sport. However, our survey also revealed that there is a perception that the sport (and especially the disc/Frisbee) is something to be played by whites. If the sports landscape includes people, and the overwhelming majority of people playing a sport is white, then the landscape would seem uninviting to others. Therefore, a significant cultural barrier does exist despite the fact it is not intentional or explicit.

There are many avenues for further research. A key factor in the diffusion of disc golf that we were unable to examine in this study would be the willingness of park department officials to establish new courses. Perhaps it would also be interesting to compare the diffusion of disc golf courses to other nonrevenue-generating sports facilities found in public parks, such as tennis courts or basketball courts. At the individual level, further analysis of the cultural barrier regarding discs/Frisbees among blacks and women would be of great interest. Following a group of observer non-players who are interested in taking up the sport through the awareness, attraction, attachment, allegiance continuum would be productive in investigating this issue. Lastly, the role of social media in promoting the diffusion of the sport would be an additional interesting research focus.

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