Abstract

The television show “Survivor” is the subject of interest for many as one of the longest-running reality shows on television, and an ongoing, ever-evolving social experiment that forces people of different walks of life together to form a miniature society for a little over a month. There have been two trends in recent “Survivor” seasons that lend to the question of who comes into the game with an advantage because of factors beyond the contestants’ control: 1. Contestants from certain parts of the country seem more likely to be cast and to win the game; 2. Male contestants seem to have an advantage in many aspects of the game over females. This paper examines whether producers contribute to creating a disparity in the location and gender variables, as well as how location and gender impact success in the game.

"Survivor" is a television show with a seemingly simple concept: outlast all but one or two other contestants, remaining in the game long enough to reach the final tribal council. And, on top of that, the ultimate goal is to remain friendly enough or impressive enough to the contestants who have been voted out so that they vote to reward you with the million dollar prize at the end rather than the person (or persons) sitting next to you. There have been 38 seasons of "Survivor" to date, with plans for at least two more in the works.

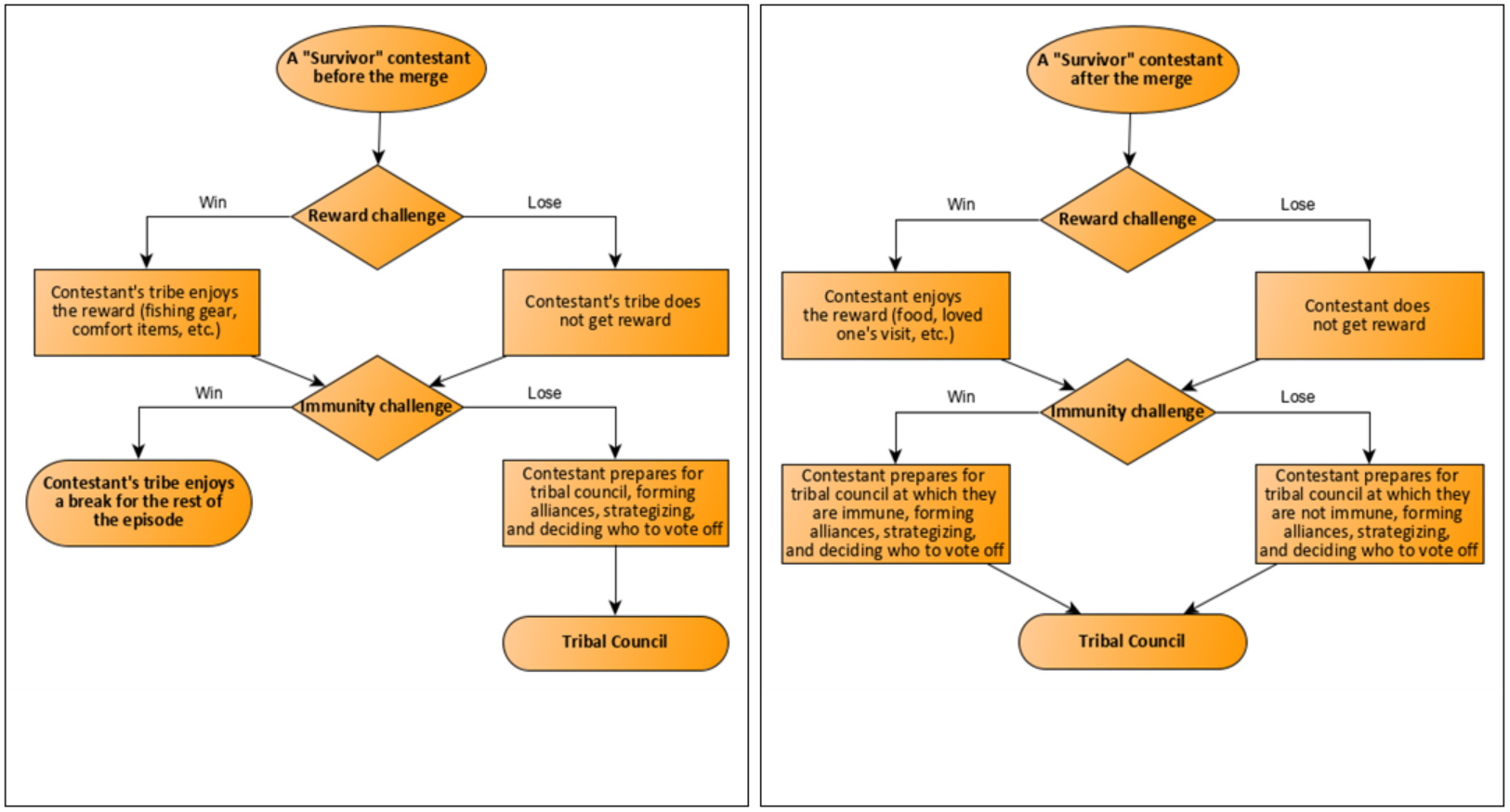
Since inception, there have been arguments surrounding whether "Survivor" is fair to all contestants who participate, and whether any unfairness observed is attributable to producers, other contestants, or other factors. Specifically, where a contestant is from and what gender they are seem to contribute to a participant's chances for success in the show. Before delving further into these discrepancies, the following section provides a little bit of background information about "Survivor" and how the game works in order to better understand the analyses that follow.

Background

"Survivor" typically consists of forcing 16 to 20 contestants together for 39 days to form a miniature society. Contestants are either cast for the show by submitting applications to participating, or by being recruited through various connections. The 16 to 20 castaways are initially divided into two, three, or four tribes which work together to attain the essentials of survival, and also work together in various challenges which can either provide survival advantages to the tribe (reward challenges) or keep the tribe from attending tribal council (immunity challenges). Every three days, a tribal council occurs in which the tribe which has not won immunity must vote to remove one of their own members. A little less than halfway into the show, the tribes merge into a single tribe. The format of reward challenges, immunity challenges, and tribal councils continues, but instead of competing as tribes for such advantages, contestants

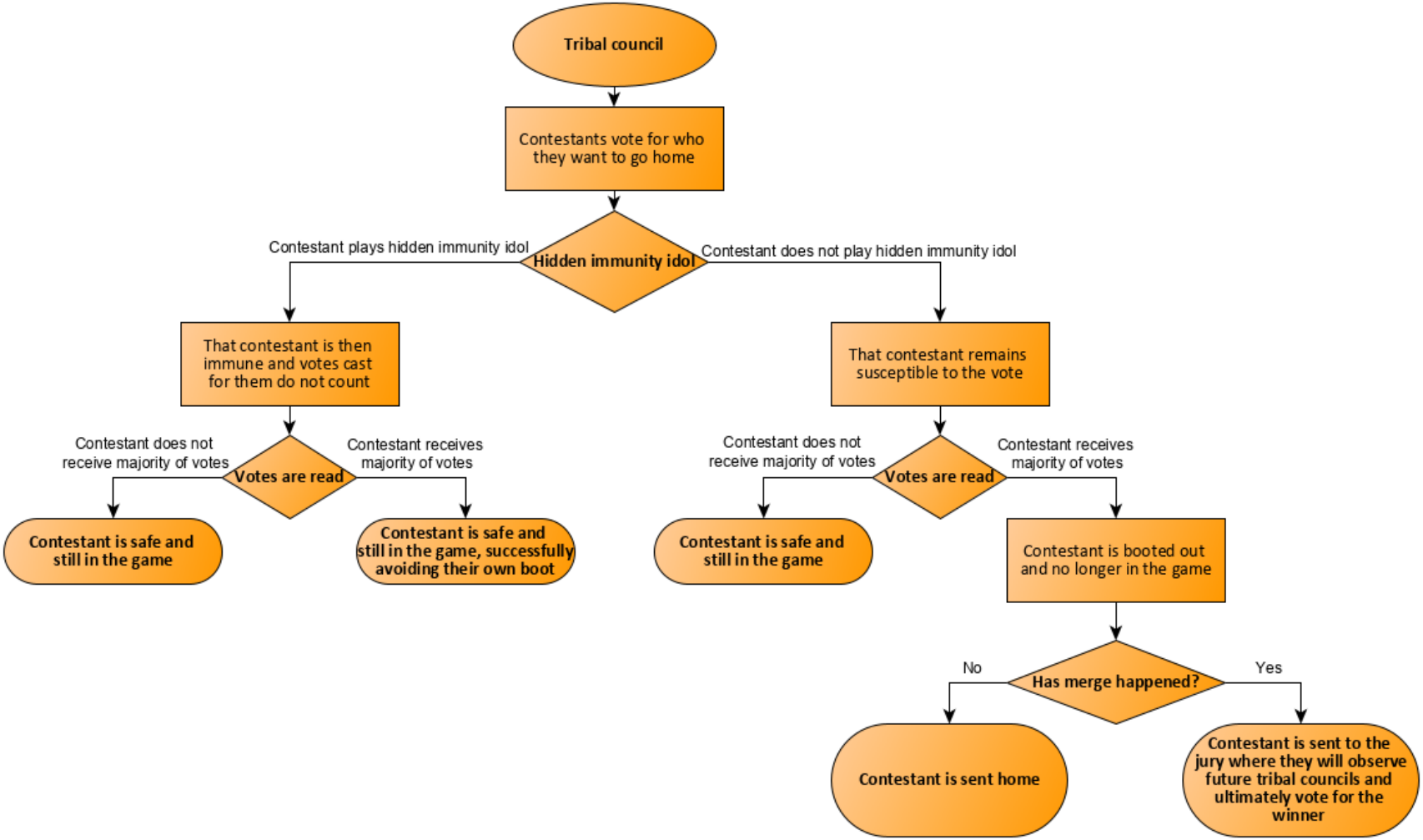
compete to enjoy them individually. Figure 1 shows flow charts for a typical episode from a contestant’s perspective both before and after the merge.

Figure 1. A Contestant’s Experience in a Single Episode Before and After the Merge



Individual immunity challenges can help a contestant attending tribal council to feel comfortable, as that contestant cannot receive votes to be removed on the night for which they are immune. Another advantage which prevents a contestant from the threat of being voted out of the game is called a “hidden immunity idol.” These idols can be found at various points, and theoretically by any contestant. They are played after votes are cast at tribal council but before the votes are read, and can be played for the person who found the idol or for someone else instead. Figure 2 shows the process of tribal council, including the potential for hidden immunity idols to affect the outcome.

Figure 2. A Typical Tribal Council Proceeding



The process of voting out members of the tribe continues until only two or three people remain (depending on the season). At that point, those final contestants attend a final tribal council along with the seven to thirteen contestants voted out previously which comprise the jury (after the merge but prior to this final tribal council, the jury also attends tribal councils but just to observe). At this final tribal council, the jury members are allowed to interact with the final contestants to gain whatever information they need to determine a winner. The jury members then each cast a vote for who they wish to win the game (one of the few times on "Survivor" where contestants want votes to be cast for them). The votes are read by the host, and the person with the most votes cast for them is deemed the winner of that season.

Method

Data sources include a web log which tracks the confessional count for each contestant; "The True Dork Times" which compiles a fair amount of "Survivor" data by season and by player; "Survivor and Big Brother By The Numbers," a dataset and audio blog interview which contains mostly demographic information about each contestant; and data pulled from various pages of the "Survivor Wiki." Additional data for state populations across years was pulled from the website of the "United States Census Bureau." Data were initially compiled and cleaned in Microsoft Excel, with further cleaning, joining, etc. occurring in R. The data was then exported to Tableau for further analysis and visualization creation.

Variables utilized included the location a "Survivor" contestant was living when cast for his or her season (FromLocation); season the contestant participated in (Season); whether the contestant was an applicant or recruit (AppStatus); whether a contestant was a winner (Winner); gender of a contestant (Gender); average confessionals for a contestant which consists of the number of one-on-one interviews with that contestant divided by the number of episodes in

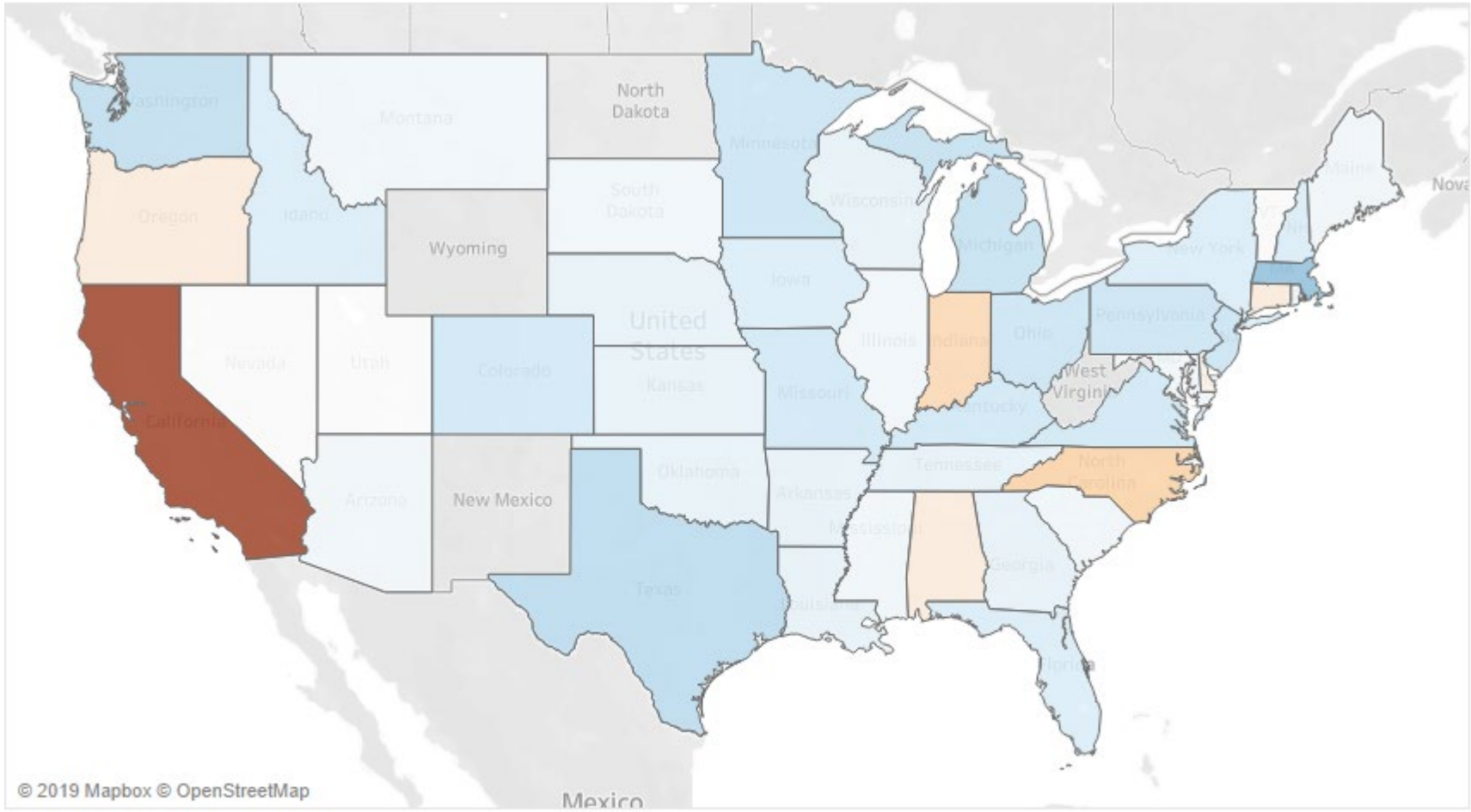
which they appeared as a contestant (Average_Confessionals); final placement of a contestant between 20, or last place, and 1, or winner (Placement); number of individual immunity challenges won by a contestant (IndImmunities); number of hidden immunity idols found by a contestant (Idols_Found); whether a contestant participated as a contestant in the final tribal council (Final_Tribal); and the number of correct tribal council votes a contestant cast (VFB_NIF3).

Results

For the first seasons of “Survivor,” almost every contestant who was a part of the show applied to be on the show. Only one contestant, Rudy, was recruited because of connections to the show’s producers. In the following earlier seasons, most “Survivor” contestants were still applicants. However, as “Survivor” grew throughout the years, producers wanted contestants guaranteed to make good television, and thus recruited known quantities more frequently.

Figure 3 shows the difference between applicants and recruits cast across all seasons of “Survivor” from the 48 contiguous states (no contestant has ever been cast from Alaska or Hawaii). The location attributed to each contestant is the state in which they were living at the time they were cast for the show. Recruits were assigned a value of -1 and applicants a value of positive 1, and then all values were summed per state to see states with more recruits (more negative and brown) versus states with more applicants (more positive and blue). Figure A in the Appendix shows a screenshot from an interactive figure created which cycles through this information by season.

Figure 3. Where Contestants Cast for “Survivor” Live



Map based on Longitude (generated) and Latitude (generated). Color shows sum of AppRecruitFix. Details are shown for Location From.

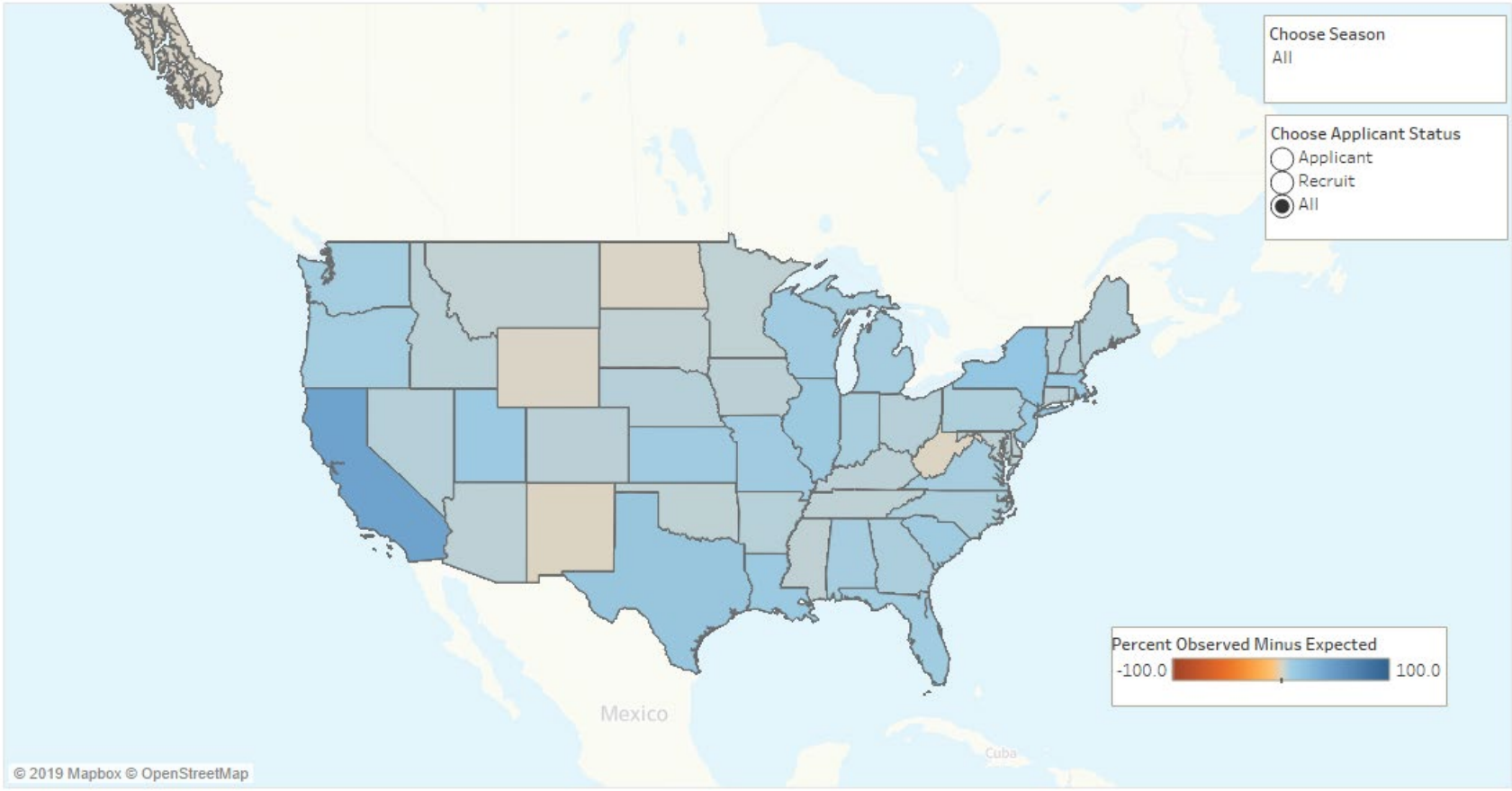
Recruits vs. Applicants

-42 15

Of note in the previous figure is that California is very heavily recruited from, and that North Carolina and Indiana also have more recruits than applicants, whereas Washington and Massachusetts tend to have more applicants. While this figure is informative in deducing this information, it does not account for the population of the state in the first place; that is, it would be expected that California has many contestants since the population of California is large (although that does not explain why it is so heavily weighted in the recruit direction). It is also difficult to see from the previous figure that the states which are most commonly recruited from are actually California, New York, Florida, Texas, and Illinois, as the latter four states actually have more applicants which balance out their overall value.

Figure 4 provides the difference between the percent of contestants cast from a state (from the full contestant pool) and the percent of the United States population that state represents (note that this figure is also from an interactive visualization). The more overrepresented a state is (that is, a greater percent cast than would be expected based upon state population), the more blue the state is; the more underrepresented a state is, the more brown it is.

Figure 4. Difference in Percent Contestants Cast for “Survivor” and Percent State Population

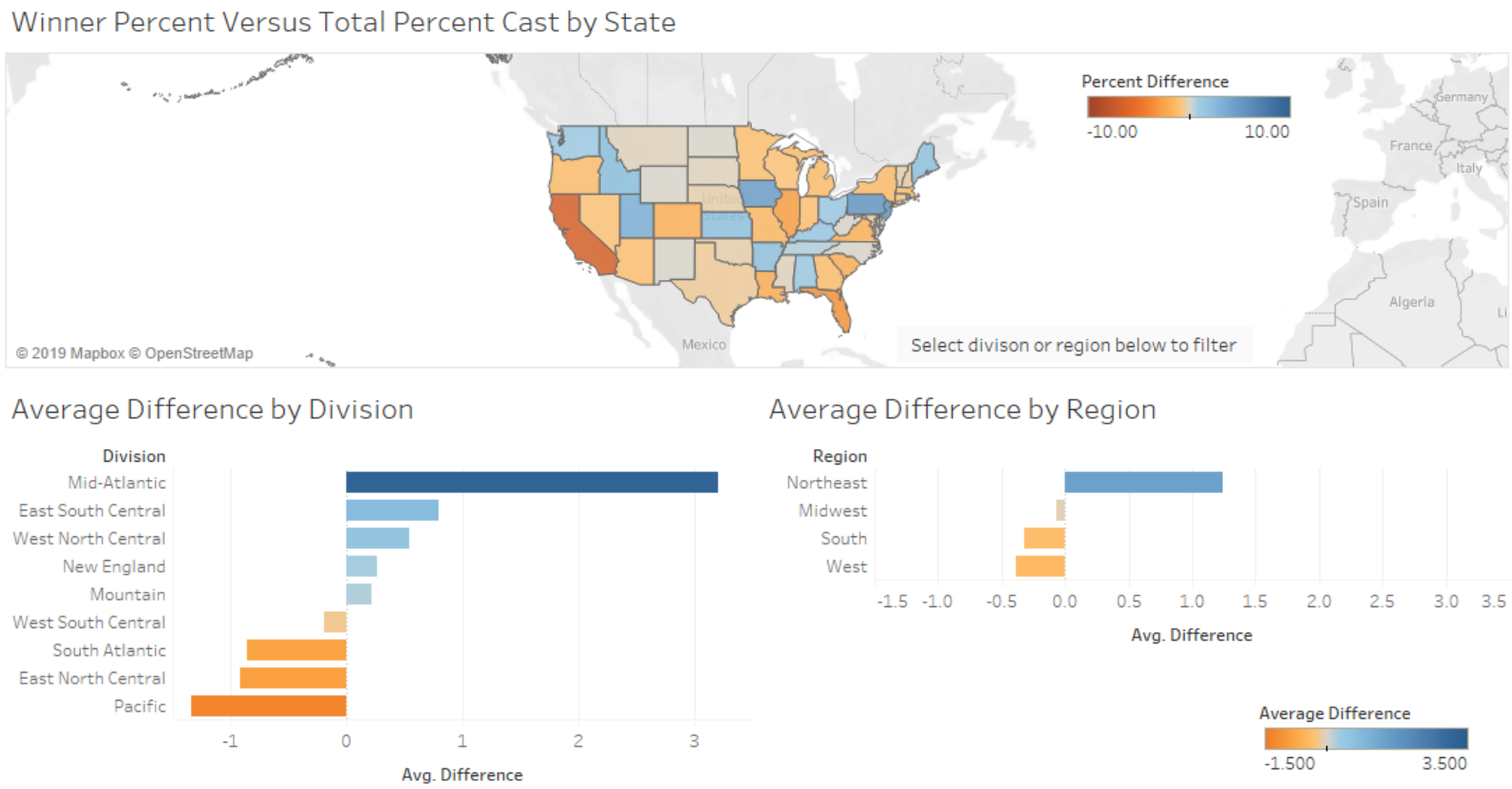


Again note that California is an extreme value, meaning not only are many recruits cast from California as learned in the previous figure, but more contestants in general are cast from California from season to season than would be expected even accounting for its

large state population. All states, in fact, from which contestants have been cast, are overrepresented to a certain degree, because in the season or seasons for which they have representatives, their percentage of the total cast is vastly inflated over what would be expected. However, using the total states in calculating the percentage cast for a season creates a situation in which all states are *underrepresented* as only a handful of states are represented in each season.

The next logical question, then, is: do certain states put forth contestants who place better—win, even—more often than other states? When examining the percent of winners from each state versus the total percent cast from that state, we do indeed find that some states perform better than others. Figure 5 shows a map representing the winner percent versus total percent cast from each state, as well as bar graphs summarizing performance by division and region.

Figure 5. Winner Percent Versus Total Percent Cast by State, Division, and Region

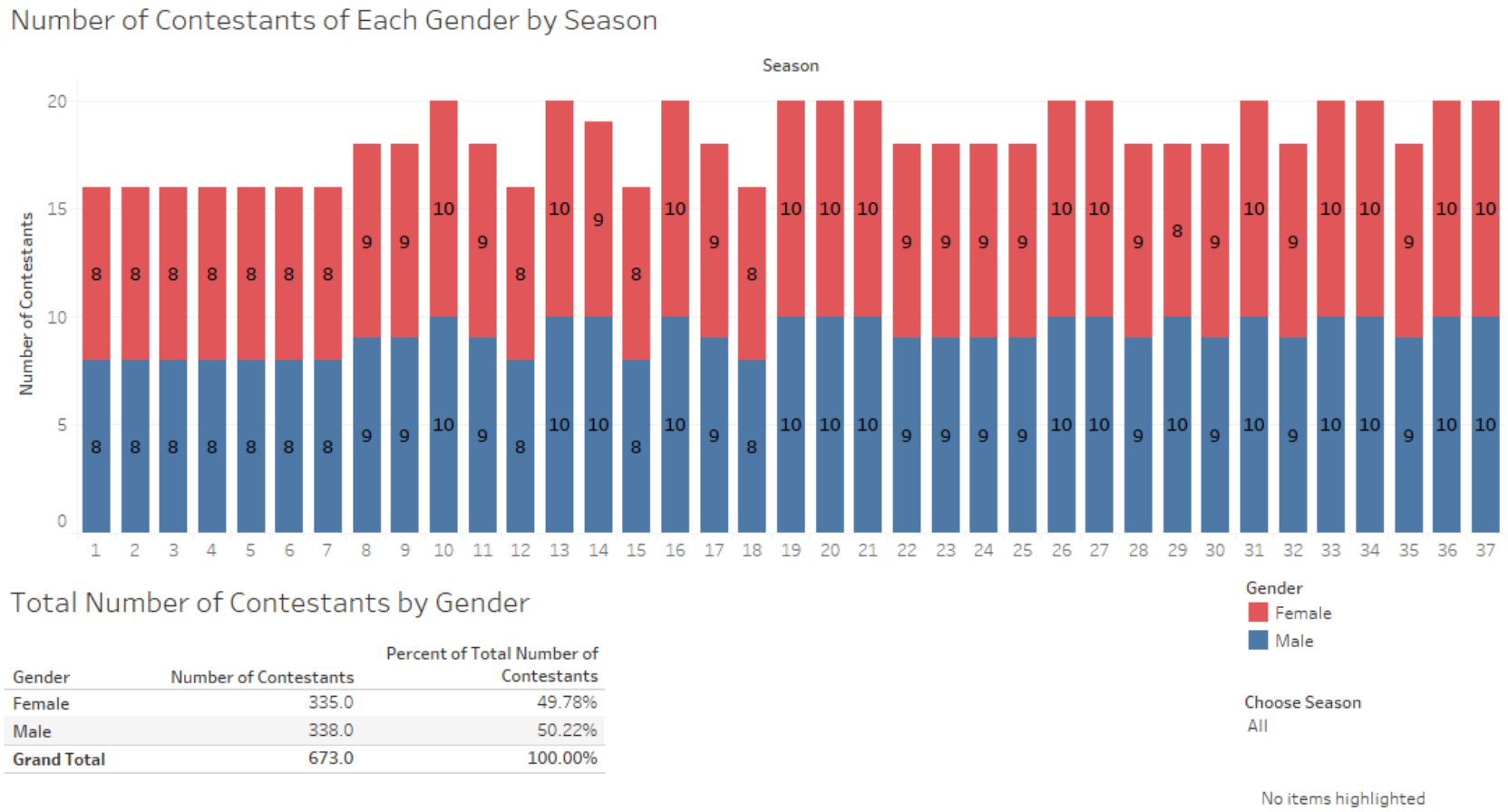


The above figure shows that states in the Northeast, specifically those from the Mid-Atlantic division (New York, Pennsylvania, and New Jersey), tend to overperform in terms of winning the game, whereas states in the South and West tend to underperform. It is interesting to note that despite representing a fair number in the cast, California's winning percentage does not hold up against other states. In fact, all of the states which were recruited from the most (California, New York, Florida, Texas, and Illinois) underperform relative to other states.

While the location a contestant is from may seem to hold some casting-induced bias and affect how a contestant performs, another variable has been raised even within the context of recent "Survivor" episodes themselves as a factor in how successful a contestant is: gender. In the very first episode of season 37 of "Survivor," Angelina, one of the contestants, raised the point that men have vastly outperformed women in locating hidden immunity idols on the show. In the season finale, Angelina found the seventh hidden immunity idol of the season—and (to her previously raised point) the only one to be located by a woman.

Before looking at how men and women perform in measures of success on the show such as finding hidden immunity idols, we must examine how men and women compare in their casting and portrayal by the producers of the show. Figure 6 shows the number of men and women cast for each season of "Survivor," as well as aggregated across all seasons.

Figure 6. Number of Contestants Cast by Season and Overall

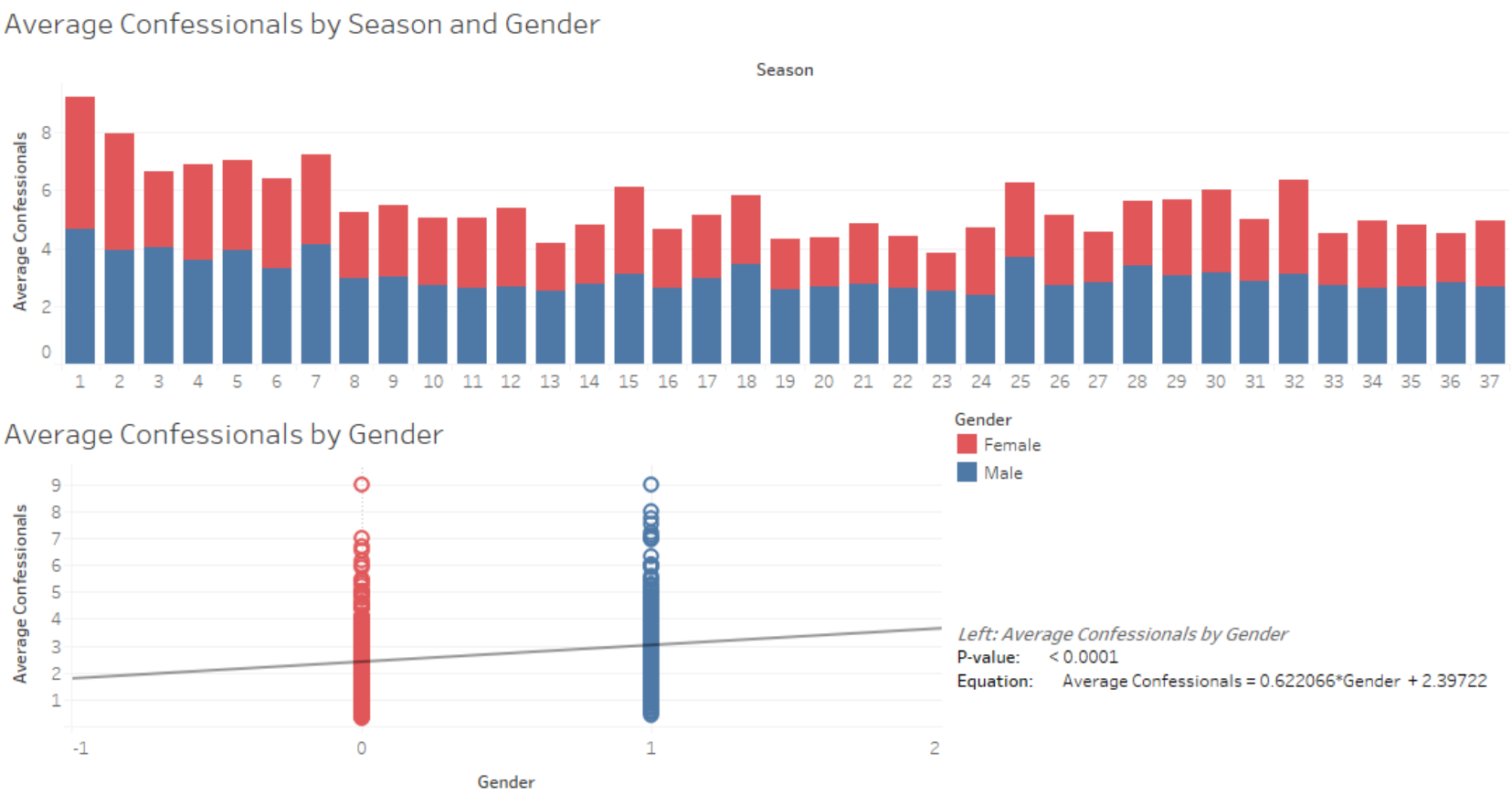


Gender	Number of Contestants	Percent of Total Number of Contestants
Female	335.0	49.78%
Male	338.0	50.22%
Grand Total	673.0	100.00%

The number of contestants cast from each gender matches in every season except for two: in season 14 there were nine females and ten males, and in season 29 there were eight females and ten males. Overall, that means that the percentages of males and females cast are nearly equivalent (49.8% of contestants are female, while 50.2% are male). This means that casting strives to ensure that men and women are equally represented on the show.

Despite ensuring that men and women are cast equivalently, Figure 7 shows that the two genders do *not* receive the same amount of screen time. Average confessionals records the number of confessionals (one-on-one interviews) a contestant has across a season divided by the number of episodes in which the contestant is a participant in the game. All else being equal, men have an average of 0.62 more confessionals than women. Men also have a greater average number of confessionals than women in 34 out of the 37 seasons.

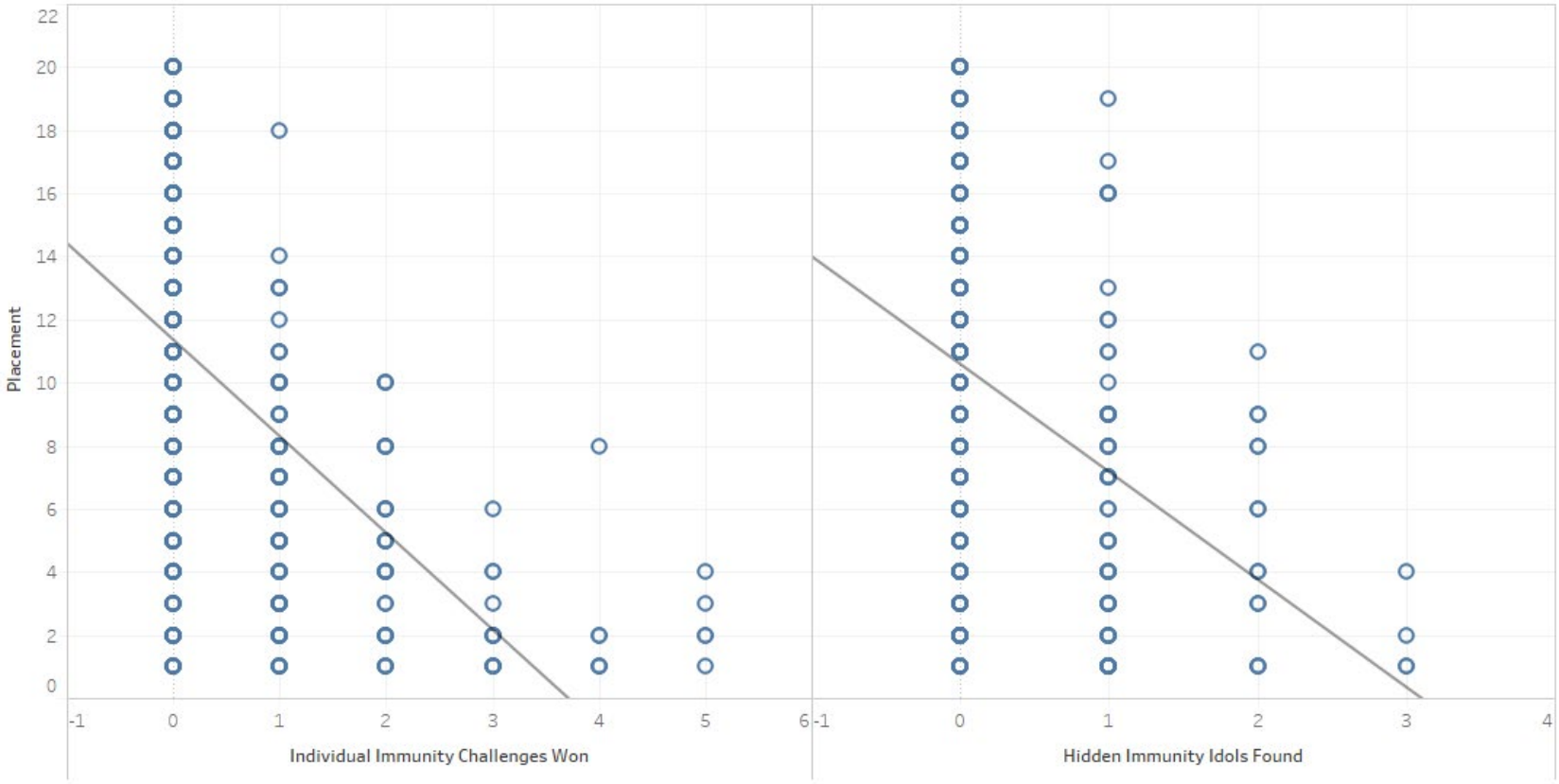
Figure 7. Average Confessionals by Season and Gender



Now that we have examined how men and women are included in a season and portrayed, we will look at whether men and women perform differently in “Survivor” in terms of several measures of success. Of course, the ultimate measure of success is

winning the game, but contestants receive more money the better they place as well (where place 1 is the winner). A few variables are linked to better placement in the game which have the potential to unfairly differentiate between men and women: winning individual immunity challenges and finding hidden immunity idols. Figure 8 shows how these variables do indeed correlate with better placement in the game.

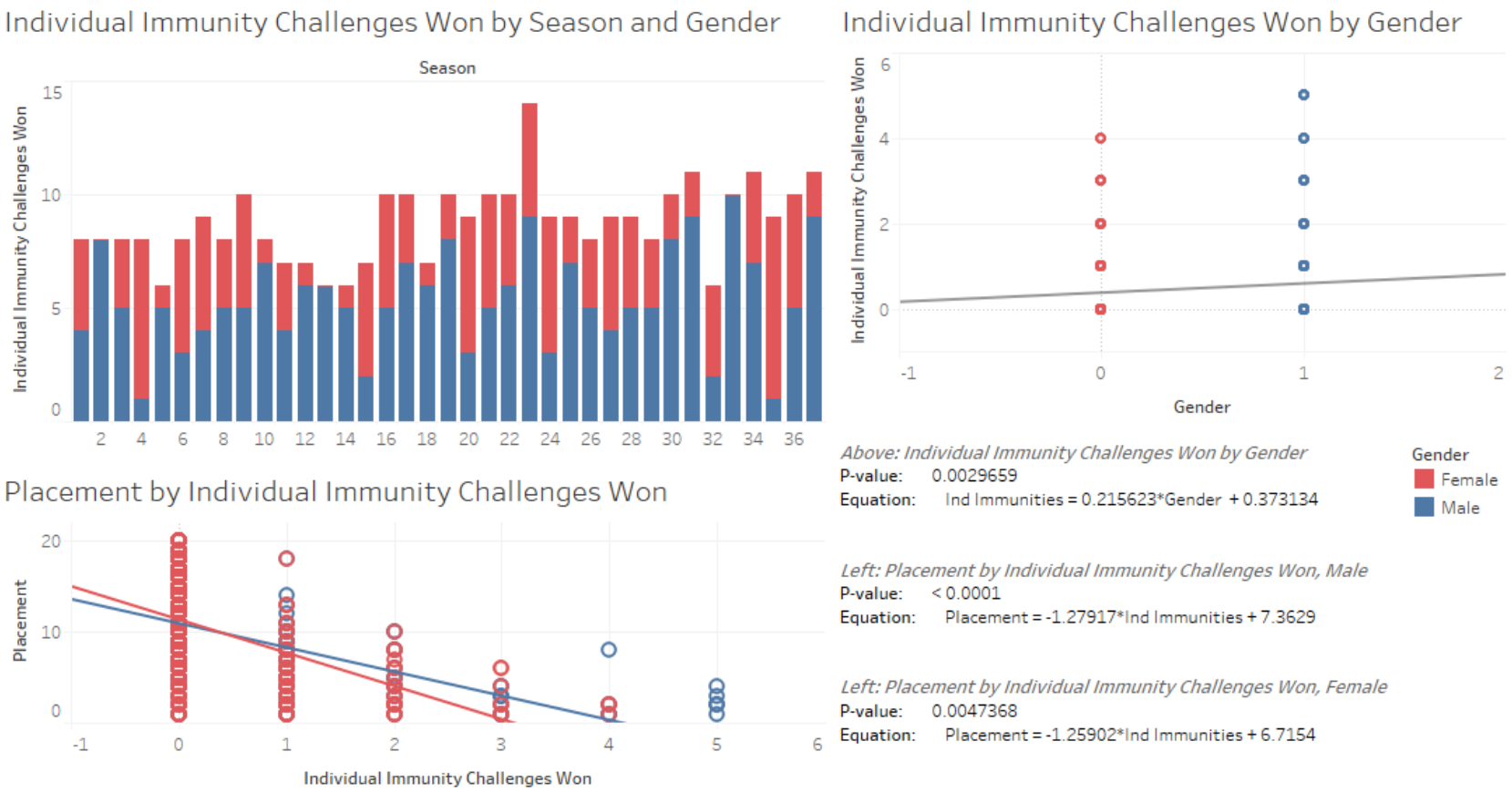
Figure 8. Final Placement by Individual Immunity Challenges Won and Hidden Immunity Idols Found



Individual immunity challenges frequently consist of physical and/or mental challenges for contestants to work through, with the fastest contestant to succeed in the task or tasks receiving individual immunity at the next tribal council. Individual immunity challenge wins are significant in that they protect contestants from the vote, allowing them to remain in the game longer, and also

provide challenge winners with another line for their “Survivor” resume should they make it to the final tribal council and attempt to argue that their game was the winning game. Figure 9 shows not only that men more frequently win individual immunity challenges per season and overall, but that women when they do win profit greatly, as they place lower/better when they do win more challenges.

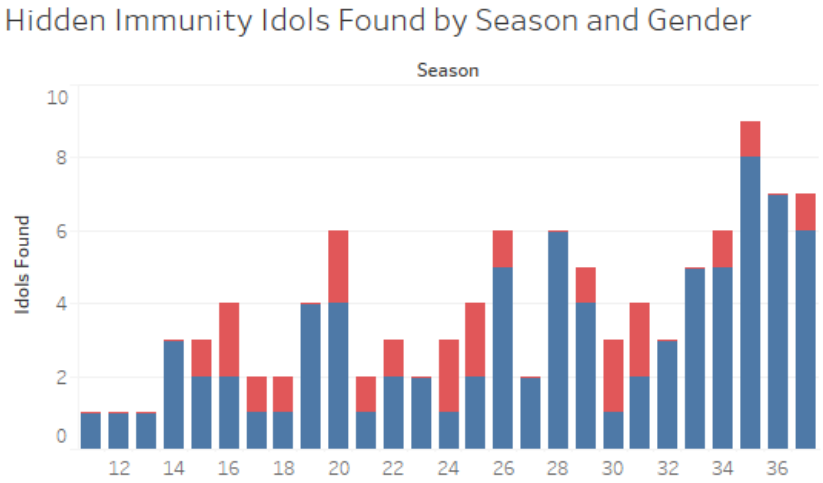
Figure 9. Individual Immunity Challenge Wins by Season and Gender; Placement by Individual Immunity Challenges Won

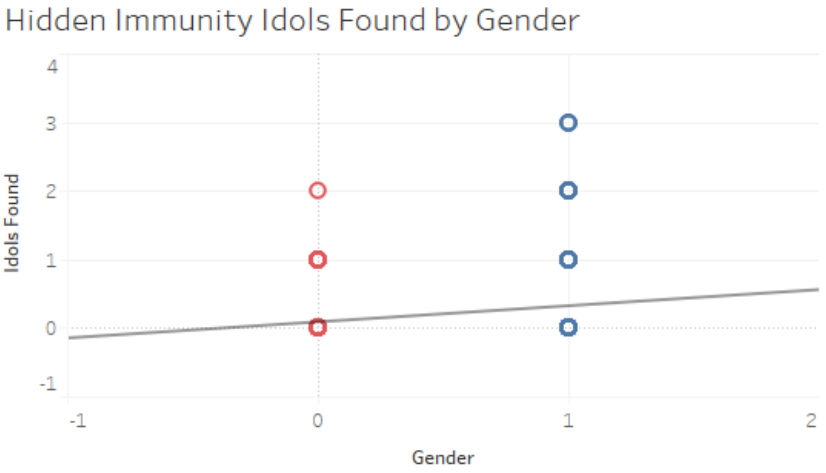


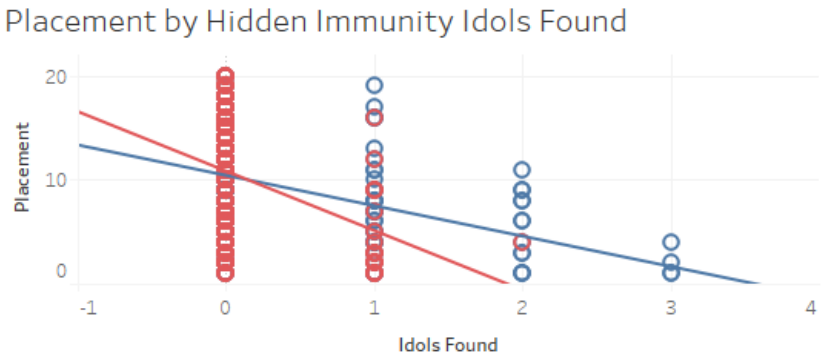
Another predictor of success in the game, finding hidden immunity idols, shows similar trends. Figure 10 shows that hidden immunity idols are found vastly more frequently by men than by women. We also see that it appears that women who do manage to

find hidden immunity idols place better than men, although there are not many data points at the high end to likely accurately calculate the slope of the trend line for women.

Figure 10. Hidden Immunity Idols Found by Season and Gender; Placement by Hidden Immunity Idols Found







Above: Hidden Immunity Idols Found by Gender
P-value: < 0.0001
Equation: Idols Found = 0.235185*Gender + 0.0876494

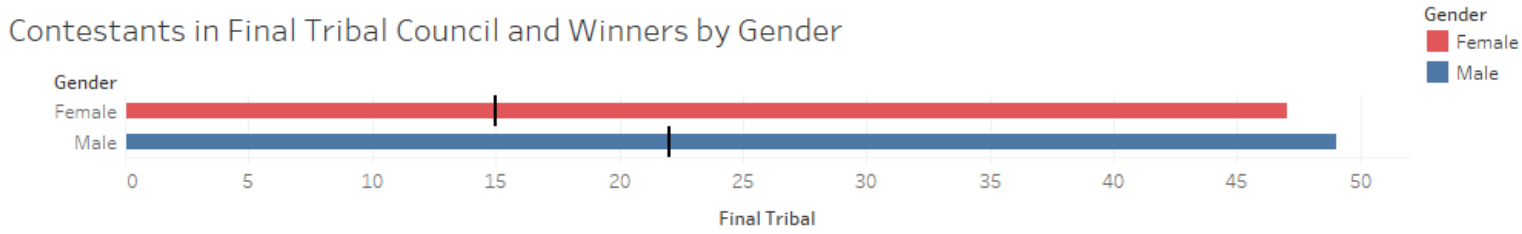
Gender
Female
Male

Left: Placement by Hidden Immunity Idols Found, Male
P-value: < 0.0001
Equation: Placement = -2.9165*Idols Found + 10.4022

Left: Placement by Hidden Immunity Idols Found, Female
P-value: < 0.0001
Equation: Placement = -5.70921*Idols Found + 10.8191

Given the apparent bias in the above measures of success, it is no surprise that although men and women are able to make it to the final tribal council at approximately the same rate (the final tribal council has been attended by 49.0% women and 51.0% men), women win less frequently than men (40.5% versus 59.5%). This is shown in Figure 11 below.

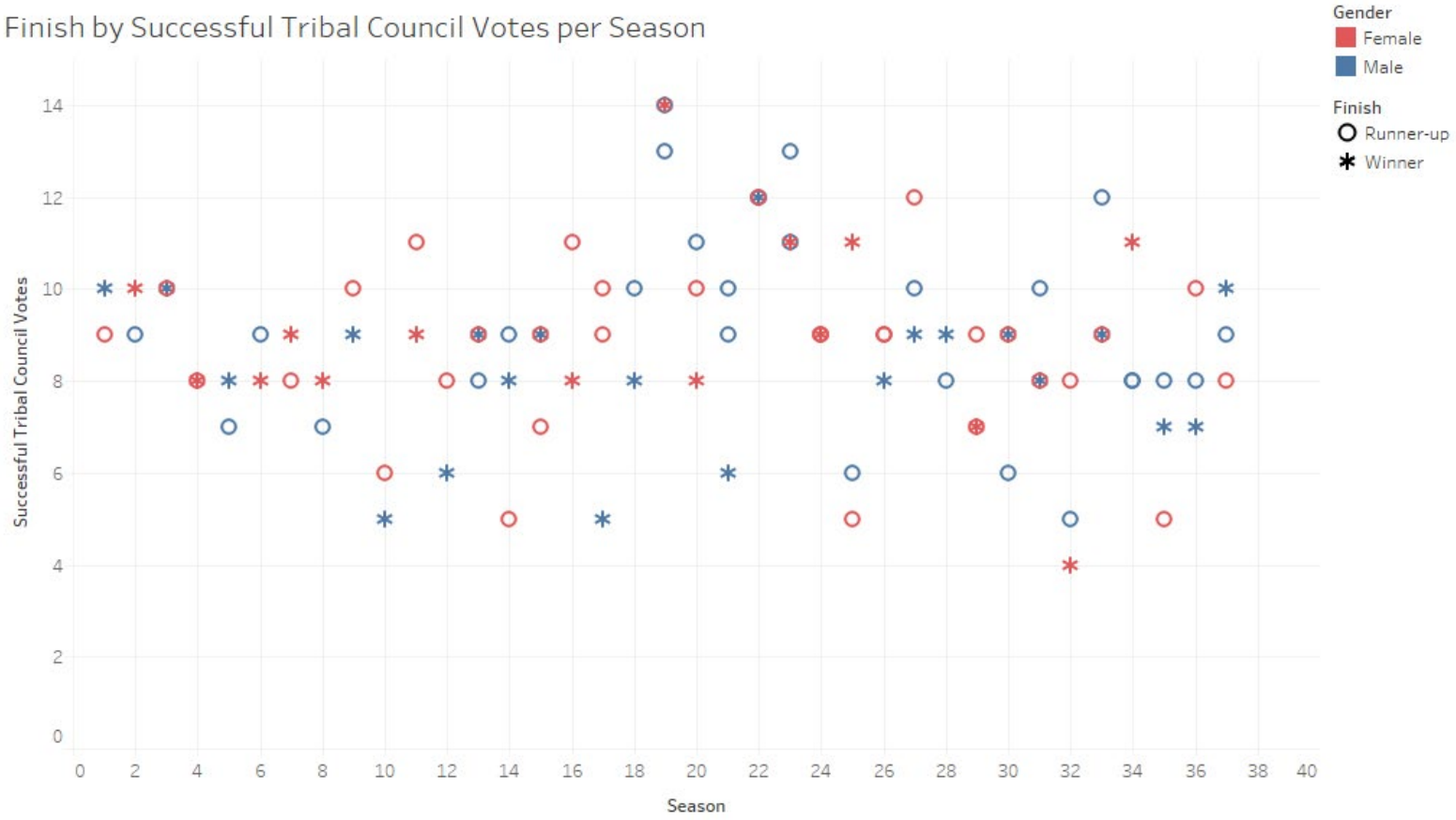
Figure 11. Contestants in Final Tribal Council and Winners by Gender



Individual immunity challenge wins and hidden immunity idol finds are either things influenced by producers (stacking the deck for men by providing largely physical challenges or planting hidden immunity idols for favored male contestants) or by other unknown factors. But how do fellow contestants treat the gender gap? One quick way to evaluate this is presented in Figure 12. Figure 12 examines the finish place (asterisks represent winners while open circles represent runners up) and gender of contestants across seasons and the number of correct tribal council votes that contestant made. Some jury members respect correct tribal council votes (when a contestant is responsible for putting them and much of their fellow alliance members, for example, on the jury and thus removing them from the game) while other jury members are bitter and give less credit to such gameplay. This figure probably has a lot of information that could be further explored in follow-up analyses, but one striking thing to note is that whenever a male and female cast the same number of correct votes throughout a season (represented by an asterisk inside of a circle of opposite color),

males more frequently are given the win in the end than females (as there are two such circles with red asterisks and seven such circles with blue asterisks). Thus, it seems as though fellow contestants are more likely to reward male players who best them than female players given that both contestants have created the same amount of damage.

Figure 12. Finish by Successful Tribal Council Votes per Season



Conclusion

Overall, most insights gained from looking at location from which a “Survivor” contestant hails are not entirely shocking. It is not at all surprising that many contestants come from a large state, or that they are recruited from that same large state which happens to house Hollywood. It is, however, interesting to pair the casting information with performance information by location to note that states with large numbers of recruits tend to underperform, or that certain states in the Northeast and Midwest tend to seem to provide an advantage. Further analysis should delve into this subset of contestants to attempt to find connections among them which are lacking from contestants of other states.

Insight gained from the gender variable, however, is more surprising. Males and females are cast at nearly the same rate, but males are shown much more frequently in episodes by the edit. Males outperform females in both individual immunity challenges and in finding hidden immunity idols, both of which are highly correlated with success in the game. Correspondingly, it is not shocking then that males win the game more frequently than females even though males and females both can make it to the final tribal council. When at the final tribal council, jury members tend to reward male contestants with votes over female contestants if the two have been responsible for equal numbers of correct votes over the course of the season. Further analysis should further delve into the discrepancy in final tribal council achievement versus winning between the two genders to determine what other factors can help explain this phenomenon.

References

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Appendix

Figure A. Where Contestants Cast for “Survivor” Live, screenshot of interactive figure