Alterac Valley

Professor Richard Colby

5/23/11

Cord Jennings

Introduction

World of Warcraft is an exceedingly popular massively multiplayer online role playing game with 12 million subscribers worldwide and a total of three expansion packs (Blizzard). Each successive expansion pack adds more levels, newer areas, and over all new content for players to explore. Even with each successive expansion, certain aspects of the game remain unchanged. For instance, though Blizzard may create new ways to complete quests, such as the addition of vehicles in the expansion *Wrath of the Lich King*, there remains a basic structure behind which quests rarely deviated from. The game consists of three primary features—a narrative-based questing system, group dungeon and raid encounters, and player versus player (PVP) combat. PvP encounters are encounters where player controlled characters battle one another until one of the character dies. Although Yee found PVP low on his initial motivation scale, this might be due to PvP's evolution in *WoW* from a chaotic melee to an organized team-based arena. Such is the case of PvP encounters in Battlegrounds. Battlegrounds are self-contained instances specifically for PvP encounters, which can range from 20 players in Warsong Gulch to 80 in Alterac Valley and Isle of Conquest. Since the release of the first two battlegrounds, Warsong Gulch and Alterac Valley, the basic concept behind them has remained the same: compete against the opposing team by completing predetermined objectives.

Alterac Valley is one of eight battlegrounds in *World of Warcraft,* as well as one of the largest. The battleground takes about 5 minutes to get from one side to the other on foot. Each faction starts on the opposite side of the map from the other. On the south side of the map is the Horde Stronghold also known as Frostwolf Keep. On the north side of the map is the Alliance Stronghold also known as Dun Baldar (See Figure 1.)

Figure 1

The objective of the battleground is to eliminate all of the opponent's reinforcement points. Eliminating the opponents reinforcement points can be done in multiple ways: by killing the enemy general, destroying enemy fortifications, killing the enemy captain, killing player characters, and by completing in-instance quests. If the opposing team's general is killed, all reinforcement points are instantly eliminated; all other methods require multiple completions to eliminate the enemy's reinforcement points.

The unique aspect of Alterac Valley is not the size of the map, objectives, or the amount of players fielded on the battleground. It is the Alliance's unique win to loss ratio. In battlegrounds, Alliance generally loses to the Horde more often than they win. However, there is an exception: Alterac Valley. A recent collection of *World of Warcraft* character data by MMO Champion shows that Horde have a higher percentage of wins than Alliance in every battleground excluding Alterac Valley.

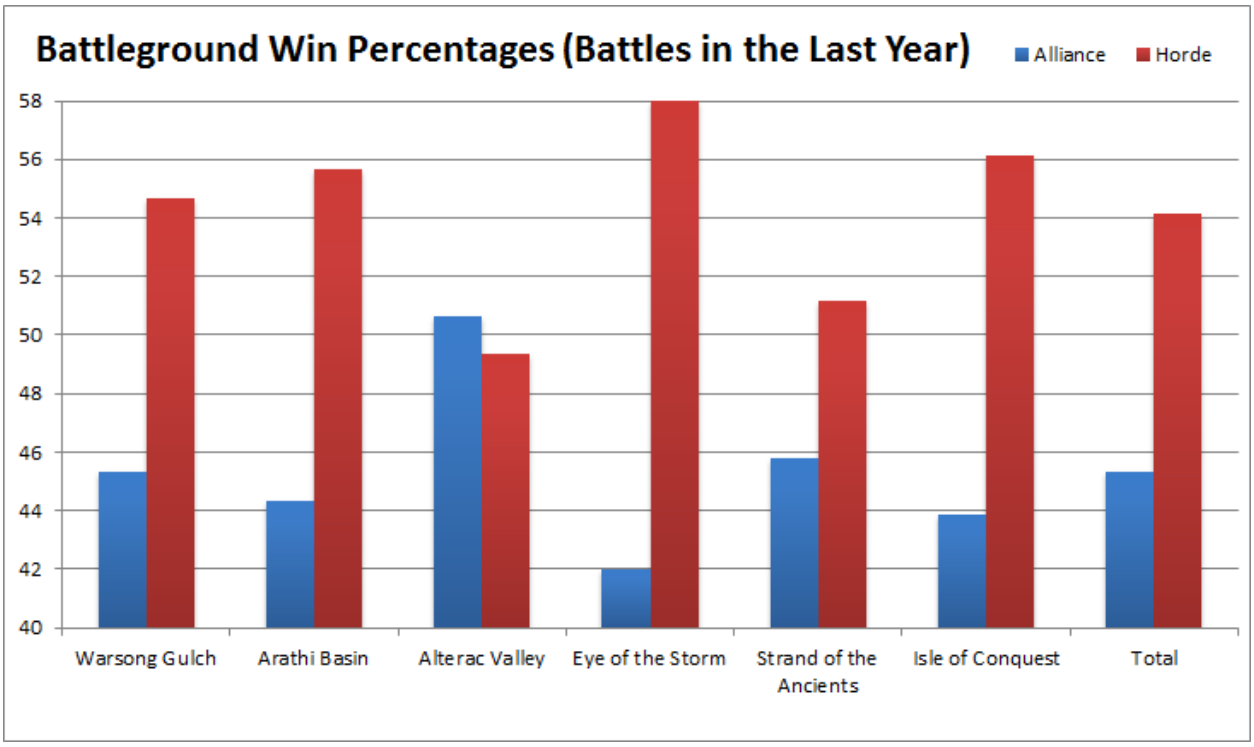

Figure 2

As seen in Figure 2, the chart taken directly from MMO Champion, the performance of the Alliance in Alterac Valley differs from their performance in all other Battlegrounds, as well as their performance over all.

Some have put forth reasons why the Horde performs better/wins more in PVP situations such as battlegrounds. In "Our Virtual Bodies, Ourselves?" Yee discusses the relationship between character appearance and one of the three main play motivations for people playing MMO's like *World of Warcraft*. Yee found that players who preferred large and dark appearing characters preferred the achievement aspect of MMO's over immersion and social motivations. In *World of Warcraft*, most large and dark appearing characters are Horde characters. With his findings, Yee concluded that, "players on the Horde side may have an edge [in battlegrounds] because the Horde side consists of more achievement-oriented players". The "edge" discussed in Yee's study may explain the Horde's larger win to loss ratio in most battlegrounds; however, Alterac Valley seems to contradict this analysis.

World of Warcraft players have claimed on multiple forums reasons why the Alliance perform differently in Alterac Valley. For instance, in the thread, "The Alterac Valley imbalance, now with 7% units of percentage more facts" on MMO Champion's *PVP* board, MasterHamster attempts to explain why there is a discrepancy between Alliance wins in other battlegrounds and in Alterac Valley. MasterHamster claims that the Alliance possesses a, "clear terrain-advantage," over the Horde. Furthermore, other posters within the same thread have similar concerns as to Alliance's "advantage." A few posts down from the original post, the user Taaj agrees with MasterHamster's claim, "This really is old news. And sadly, it will probably never change." Taaj states that the claims in MasterHamster's post are not original, and the discussion in the thread has appeared elsewhere. His statement reveals that the discussion in the thread is "old news," and not just an isolated discussion, but a continuation of a larger conversation concerning Alterac Valley.

Even though there are other similar claims as to why the discrepancy in Figure 2 exists, there is a lack of data on the subject. In my research I have found only claims to why, given previous research that says otherwise, the Alliance perform better in Alterac Valley than any other battleground. These claims are based primarily off of assumed data. Claims like MasterHamster's are based off of personal anecdotes, or reasoned assumptions, rather than measured data. I am unaware of any empirical data that can back up these assumptions. As there seems to be no experimental data present, this paper will attempt to provide an initial analysis of Alliance and Horde performance within Alterac Valley in an attempt to explain the discrepancy.

Method's

In order to collect as much qualitative and quantitative data as possible, I acted as a participant observer in ten instances of Alterac Valley. On the evening of May 17th, 2011, I logged in as a level 85 Tauren Paladin on the server Skullcrusher and queued multiple times to play in Alterac Valley. Blizzard, in order to decrease queue times, groups multiple servers into what is called a battlegroup. A battle group is a collection of servers (i.e. Skullcrusher or Bleeding Hollow) that collaborates players from those servers into individual instances of battlegrounds. Skullcrusher, the server I logged onto that night, is in the Ruin battle group.

I split my data into two categories in order to facilitate this analysis: data during and data after. Data during is data that was collected while the instance of Alterac Valley was playing out. This data includes notes taken by me about the communication of the Horde, their overall strategy, and the location at different times of Horde players. To collect as much data as possible during the battleground, and still allow me to participate in the battleground, I collected these notes by taking screenshots of the battle map once a minute as I played in Alterac Valley. While playing in battlegrounds, *World of Warcraft* provides a battle map, accessed by clicking on the map icon button located near the mini map or by hitting the "M" key. The battle map shows teammates locations and the status of objectives.

In order to analyze the maps, I focused primarily on who controlled points of interest at the end of the battleground. I assigned an arbitrary number to those points completely controlled by either faction, and a null value to contested points. A one (1) was assigned to Alliance controlled points, a negative one (-1) to Horde controlled points, and a zero (0) to points in contention. I split the data into two groups: Alliance wins and Horde wins. After adding the values for each point of interest together, I combined the data and displayed them on a battle map

of Alterac Valley. That is, if Stormpike Graveyard was under control by the Alliance for every one of 10 Alliance wins, the value for Stormpike Graveyard would be 10.

To collect travel time data, I simply timed how long it took to get from, at the beginning of the battleground, the Horde start to the closest Alliance controlled point of interest (Stonehearth Bunker), the time to the second closest point of interest (Stonehearth Outpost), and then the time to the Alliance's fortress (Dun Baldar). I also collected times to get from the Alliance start, at the beginning of the battleground, to the closest Horde controlled point of interest (Iceblood Garrison), the time to the second closest point of interest (Iceblood Tower), then the time to the Horde's fortress (Frostwolf Keep). Data was recorded as minute : second.

Data after is data that is reported once either team wins the battleground. As seen in

Figure 3

Figure 1 the data is reported on a character to character basis (i.e. the character Gankstashot had 8 killing blows, 4 deaths, 51 honorable kills, did 2,080,290 damage, and healed for 133,810 health). The data in the table can be sorted by team, and then further sorted by each reported

variable. Using this data, I captured multiple screenshots of sorted data so that after I left the battleground I could record the data. I recorded the top ten performing players in each category of data for each team. Once the data was recorded I could begin my analysis.

Results

At first glance, using basic analysis of collected data, some interesting and unusual results were seen. The mean time for the battleground was 18.5 minutes, and 90% of the battles were finished by killing the opposing teams general. The travel times for Alliance and the Horde to the first and second points of interest, as well as to the opposing team's fortress, were the same. From the Horde starting area to Stonehearth Bunker, the mean travel time was 1:31, to Stonehearth Outpost 1:36, and to Dun Baldar 2:30. For the Alliance travel times were 1:32 to Iceblood Garrison, 1:36 to Iceblood Tower, and 2:32 to the Frostwolf Keep.

	Means (Alliance / Horde)									
Instance	Killing Blows	Deaths	HK's	Damage Done	Healing Done	GY's Ass	GY's Def	Tws Ass	Tws Def	Time
1	9.1 / 10.6	9.3 / 6.3	60.6 / 100.3	3.12 / 2.59	1.65 / 2.03	3.0 / 4.0	1.0 / 2.0	6.0 / 9.0	6.0 / 1.0	24
2	9.5 / 10.4	8.7 / 7.1	95.1 / 206.1	3.56 / 3.00	2.35 / 2.71	5.0 / 2.0	2.0 / 3.0	8.0 / 4.0	2.0 / 5.0	29
3	1.9 / 2.3	2.7 / 2.6	20.5 / 12.2	1.00 / 1.66	.45 / .69	4.0 / 5.0	2.0 / 3.0	5.0 / 4.0	0.0 / 1.0	11
4	3.7 / 9.0	7.7 / 4.3	27.4 / 81.1	1.61 / 2.81	.70 / 1.37	4.0 / 7.0	4.0 / 1.0	7.0 / 11.0	7.0 / 6.0	20
5	4.7 / 5.0	5.2 / 3.4	40.9 / 33.7	1.06 / 1.73	.64 / .75	4.0 / 4.0	0.0 / 2.0	5.0 / 5.0	4.0 / 3.0	16
6	3.6 / 3.0	3.5 / 4.6	30.8 / 28.7	1.34 / 1.17	.87 / .32	4.0 / 5.0	2.0 / 1.0	5.0 / 6.0	3.0 / 1.0	12
7	3.9 / 4.2	5.1 / 4.7	34.3 / 40.2	1.75 / 1.51	.92 / .96	7.0 / 5.0	1.0 / 3.0	7.0 / 5.0	1.0 / 3.0	16
8	4.1 / 3.4	3.4 / 3.9	30.8 / 14.7	1.61 / 1.17	.93 / .46	5.0 / 4.0	1.0 / 3.0	5.0 / 6.0	4.0 / 1.0	14
9	4 / 3.6	3.1 / 3.5	22.1 / 25.5	1.29 / 1.23	.78 / .54	3.0 / 5.0	2.0 / 0.0	4.0 / 6.0	3.0 / 0.0	13
10	7.2 / 17.8	12.8 / 6	90.5 / 189.2	2.87 / 3.67	1.41 / 1.90	8.0 / 7.0	3.0 / 7.0	18.0 / 7.0	3.0 / 19.0	30

Figure 4

Alliance won a majority of the battles in Alterac Valley, winning 60% of the time. On average, they performed better than the Horde in two categories: deaths and towers assaulted. Calculated from the raw data in Figure 4, the Alliance's deaths mean was greater than the Horde (Alliance μ=6.15, Horde=4.64). The Alliance's towers assaulted mean was also greater (Alliance μ=7, Horde μ=6.3). The Horde's means were greater than the Alliance's in all other

categories: killing blows a difference of 1.76 (Alliance μ=5.17, Horde μ=6.93), honorable kills 27.87 (Alliance μ=45.3, Horde μ=73.17), damage done 122,510.43 (Alliance μ=1,920,382.46, Horde μ=2,042,892.89), healing done 104,055.48 (Alliance μ=1,068,610.56, Horde μ=1,172,666.04), graveyards assaulted .1 (Alliance μ=4.7, Horde μ=4.8), graveyards defended .7 (Alliance μ=1.8, Horde μ=2.5), and towers defended .7 (Alliance μ=3.3, Horde μ=4).

To further analyze the data, I looked to see if there was a difference in data when Alliance won versus when the Horde lost the battleground. The data, excluding deaths, looks different from the aggregate means reported above. When Alliance won they generally died more (μ difference = 0.5), dealt more damage (μ difference = 331,216.93), healed more (μ difference = 78,425.07), assaulted more graveyards (μ difference = 0.33), and defended more towers (μ difference = 1.33). The Horde, in these instances, had more killing blows (μ difference = 0.17), honorable kills (μ difference = 23.63), graveyards defended (μ difference = 0.5), and towers assaulted (μ difference = 0.17). On the other hand, when the Horde won they generally had more killing blows (μ difference = 4.15), honorable kills (μ difference = 34.23), damage done (μ difference = 803,101.48), healing done (μ difference = 377,776.3), graveyards assaulted (μ difference = 0.75), graveyards defend (μ difference = 1), and towers defended (μ difference = 3.75). The alliance had more deaths (μ difference = 3.03) and towers assaulted (μ difference = 2). In both cases the Alliance performed constant in the number of deaths, while the Horde performed constant in killing blows and honorable kills.

With differences noted between the aggregate means and Alliance wins/Horde wins, I wanted to test whether there were any differences in relationships between wins and the nine categories for both Alliance and the Horde. In order to test for relationships, I created multiple linear regressions models comparing the Alliance aggregate data and wins. The same was done

for the Horde. To make sure nothing was overlooked, I created subsets of every combination of variables and calculated r^2, as well as the p-value of every model. There were 511 possible models. I chose the model with the fewest predictors and an adjusted r^2 value above .8 as the best model to explain wins. I found that honorable kills, damage done, healing done, graveyards defended, and towers assaulted provided the best model, and explained the most variance in wins, for the Alliance.

Multiple linear regression results:
Dependent Variable: Wins
Independent Variable(s): Honorable Kills, Towers Assaulted, Graveyards Defended, Healing Done, Damage Done

Parameter estimates:

Variable	Estimate	Std. Err.	Tstat	P-value
Intercept	0.10838482	0.162035	0.668896	0.5402
Honorable Kills	-0.06766372	0.010493	-6.44841	0.003
Towers Assaulted	0.19483797	0.045118	4.318409	0.0125
Graveyards Defended	-0.25448072	0.062988	-4.04015	0.0156
Healing Done	3.94E-06	6.39E-07	6.161386	0.0035
Damage Done	-8.11E-07	2.96E-07	-2.73648	0.0521

Analysis of variance table for multiple regression model:

Source	DF	SS	MS	F-stat	P-value
Model	5	2.295437	0.459087	17.56207	0.0079
Error	4	0.104563	0.026141		
Total	9	2.4			

Table 1

As seen in Table 1, the p-value for each variable in the parameters section of the table is below .2. The small p-value means that the slope for each variable within the regression model is not zero, or that the estimate provided is more than likely correct. The p-value for overall fit is less than an alpha of .2. The adjusted r^2 of the model was 0.9. Therefore, there is a strong relationship between the variables provided and wins.

Conversely, those variables that best describe a relationship for the Horde are different from the Alliance. Only two predictors were necessary to create the best model for the Horde: number of deaths and damage done.

Parameter estimates:

Variable	Estimate	Std. Err.	Tstat	P-value
Intercept	0.927176	0.217295	4.266907	0.0037
Damage Done	7.29E-07	1.03E-07	7.094136	0.0002
Deaths	-0.43465	0.06281	-6.92005	0.0002

Analysis of variance table for multiple regression model:

Source	DF	SS	MS	F-stat	P-value
Model	2	2.140979	1.07049	28.92982	0.0004
Error	7	0.259021	0.037003		
Total	9	2.4			

Table 2

As seen in Figure 7, the p-values for both of the variables in the model are below .2 showing that the slope in the regression model for each is indeed correct: both damage done and deaths had a p-value of .0002. The p-value for overall fit is .0004, which is below my alpha of .2. The adjusted r^2 of the model was 0.86. Therefore, my model does describe a strong relationship between deaths and damage done.

As I noticed there was a difference between factors that contribute to a win for each model, Horde and Alliance, I wanted to analyze the battle maps for each instance of Alterac Valley that I recorded to see if they describe something similar. Per the Method's section, I joined the data together and created two aggregate battle maps, the first to describe Alliance wins and the second to describe Horde wins. When Alliance won they seemed to have control over most of the Horde's points of interest, and defended some of their own.

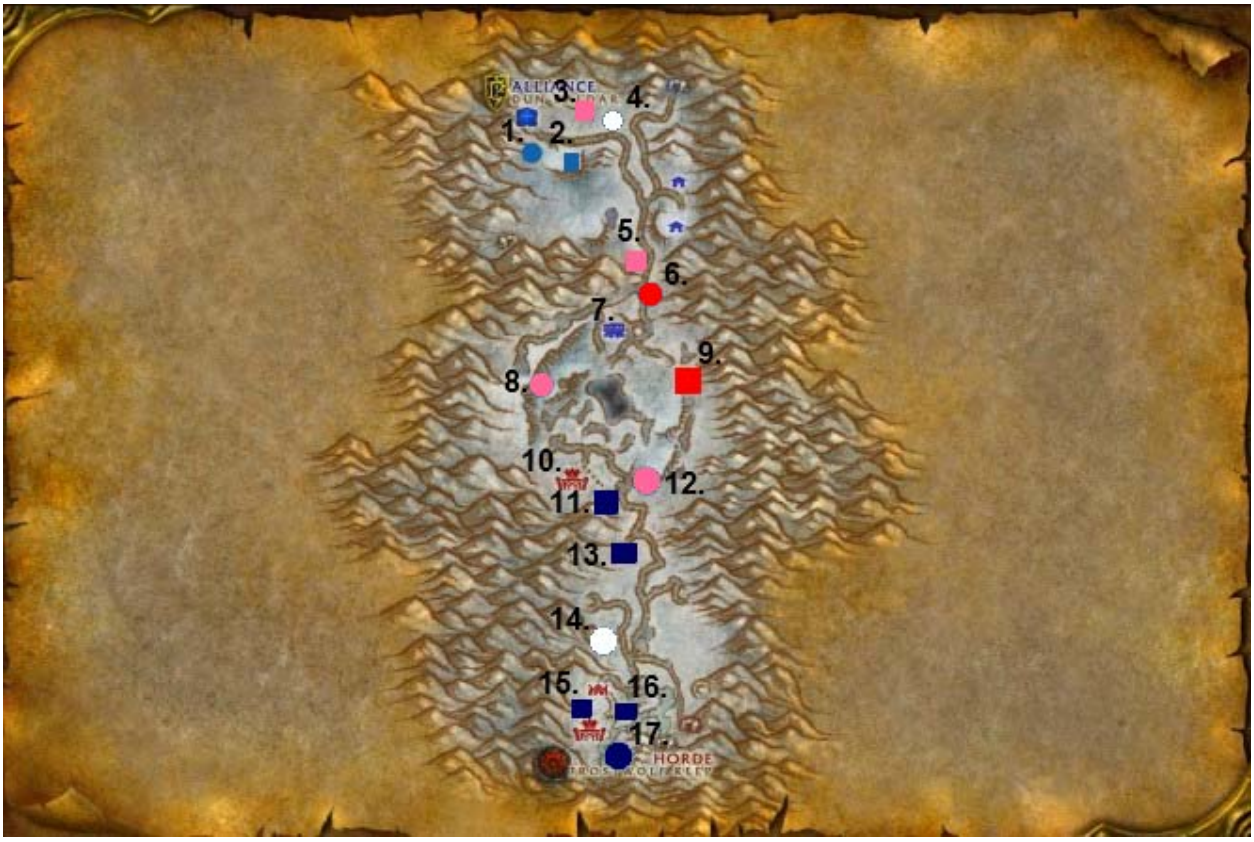

Figure 5

Blue represents Alliance controlled points; red represents Horde controlled points. The darker the color the more times a team had control over a point. White represents overall contention of a point of interest. Circles represent graveyards and squares represent towers. As seen in Figure 5, Alliance controlled all of the Horde towers, represented by the dark blue, most of the time. Iceblood Graveyard (12) was controlled be the Horde a majority of the time. Another key feature of Alliance wins was their control of Stormpike Aid Station (1) and Dun Baldar South Bunker (2), represented by the light blue. The Horde's progression during Alliance win matches was the control of Stonehearth Bunker (9) and Stonehearth Graveyard (6), represented by red. The Horde also controlled Icewing Bunker (5) as well as Dun Baldar North (3) a majority of the time, represented by pink. Key to note is the contention, or lack of control,

of both the graveyards before either team's stronghold (4, 14). Mines, not represented in the map, were in contention.

On the other hand, Horde victories looked different than Alliance victories. When the Horde won, they had control over most points in the battle, while at the same time allowing Alliance into Frostwolf Keep.

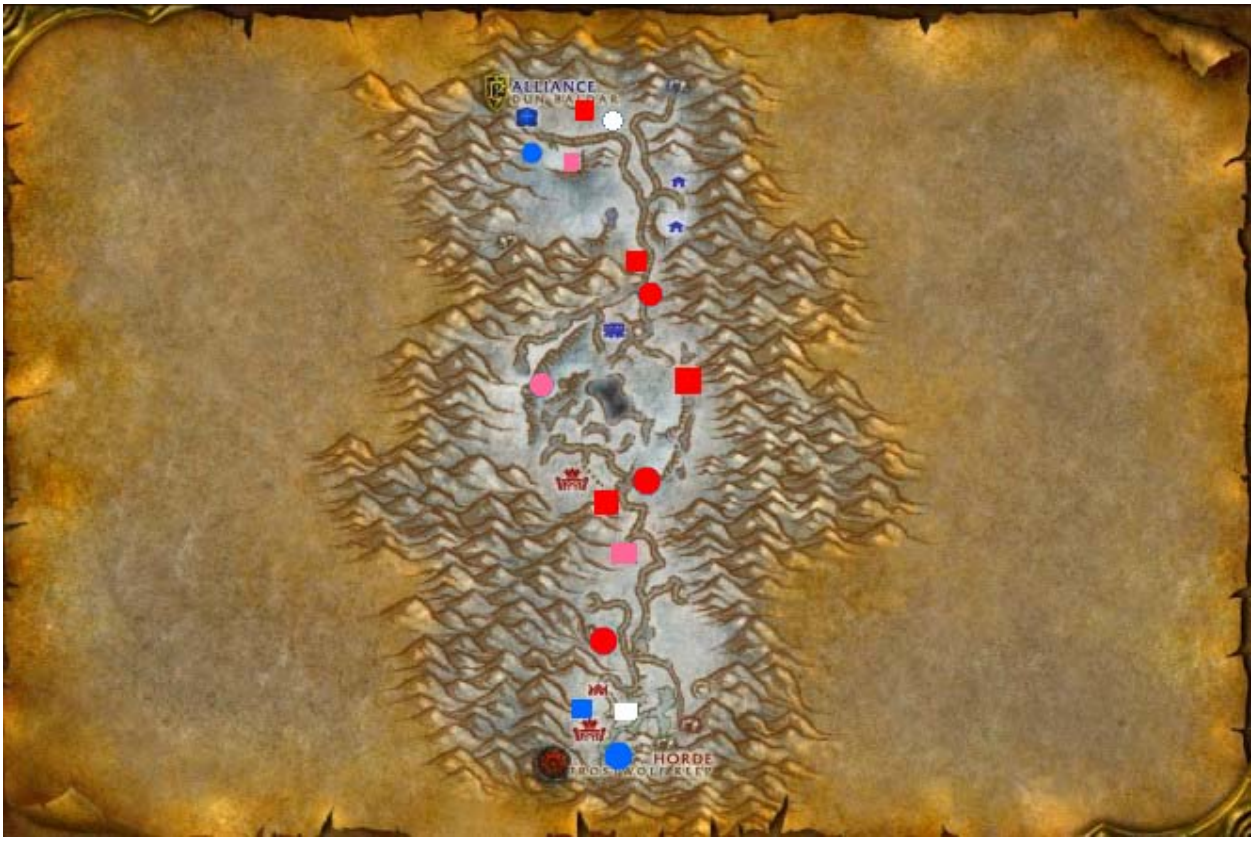

Figure 6

As seen in Figure 6, Horde controlled, most of the time, more points than the Alliance did in their victories. Though Alliance controlled some of the points in Frostwolf Keep, Horde had control over Iceblood Tower (11), Iceblood Graveyard (12), Tower Point (13), and Frostwolf Graveyard (14). In addition, Horde had control over Snowfall Graveyard (8), Stonehearth Bunker (9), Stonehearth Graveyard (6), Icewing Bunker (5), Dunbaldar North (3), and Dunbaldar South (2). In Horde wins, Alliance had control over three points, two in Frostwolf Keep (West

Frostwolf Tower [15] and Frostwolf Relief Hut [17]) and one in Dun Baldar (Stormpike Aid Station [1]). Like during Alliance wins, Stormpike Graveyard (5) was under contention. Unlike Alliance wins, Frostwolf Graveyard (14) wasn't under contention, but East Frostwolf Tower (16) was.

To make sure the results above were created from consistent performances by either team, I performed a one way ANOVA test for the points of interest data above. When Alliance won, the points of interest controlled were consistent, or all equal, with one another (p-value .68). Conversely, when the Horde won at least one of the points of interest controlled was not consistent, or equal, with one another (p-value .12). Furthermore, Tukey 80% confidence intervals of Horde points of interest data when they won, showed that 83% of the data had inconsistent point control.

Tukey 80% Simultaneous Confidence Intervals

win1 subtracted from

	Lower	Upper
win2	-0.06667	-0.06667
win3	-0.53333	-0.53333
win4	-0.53333	-0.53333

win2 subtracted from

	Lower	Upper
win3	-0.46667	-0.46667
win4	-0.46667	-0.46667

win3 subtracted from

	Lower	Upper
win4	0	0

Table 3

Table 3 shows that the Horde's only consistent performance concerning point control was between their third win (win3) and fourth win (win4), because the confidence interval contains a zero. All other confidence intervals between wins do not contain zeros: win1 and win2 [-.07, -.07], win1 and win3 [-.5, -.5], win1 and win4 [-.53, -.53], win2 and win3 [-.47, -.47], and win2 and win4 [-.47, -.47].

Discussion

The difference in personality traits, or reasons to play, that the Horde has, contributes to a play style which, while providing them with more kills and damage done, contributes to their losing a majority of Alterac Valley battles. My data suggests that Alterac Valley was designed, either on accident or on purpose, for teams that are more objective oriented. Though, 40% of the time damage done and deaths contributed to Horde wins, a better strategy is Alliance's more objective oriented approach to Alterac Valley. Additionally, the design of Alterac Valley, though different for each team's side, does not contribute to different, and therefore unequal, travel times.

The initial overview provided at the beginning of the results section was consistent with Yee's conclusion in his research. Alliance died more and the Horde killed more, did more damage, and healed more. The data suggests that, indeed, the Horde performs better in the Alterac Valley battle statistics. What's interesting is, overall, Alliance assaulted more towers. In Alterac Valley, in order to kill either team's general faster, said team must destroy the opposing team's towers. The data would suggest, because Alliance assaulted more towers, they would have an easier time with Drek'Thar, the Horde team's general. Furthermore, the Alliance seemed to have paid more attention to assaulting towers than graveyards or defending their own towers. However, the descriptive statistics above may not describe Alliance's preferences, like attacking towers versus graveyards, but describe the Horde's failures.

The Horde defended more towers and graveyards, as well as attacked more graveyards than the Alliance. This could mean that the Horde, instead of being good defenders, are poor defenders, and instead of being good attackers, are poor attackers, while the opposite is true for the Alliance. For instance, when the Alliance captured a tower, they could have either defended

it well or the Horde did not contest the capture. This circumstance would result in a single tower assault, not multiple ones, meaning the Alliance, when they captured a point, kept it. On the other hand, the data could mean when the Horde captured a graveyard, the Alliance might have contested the capture heavily, resulting in more graveyards defended and graveyard's assaulted. The data would also support this scenario.

When Alliance won they performed better than the Horde, and vice versa. When Alliance won, they dealt more damage, healed more, assaulted more graveyards, and defended more towers, which is different from the overall aggregate mean, suggesting a better performance. Likewise, when the Horde won they had more killing blows, honorable kills, damage done, healing done, graveyards assaulted, and towers defended. More importantly is where the Alliance and Horde performed consistently, regardless of whether they won or lost. The Alliance performed consistently in number of deaths, while the horde performed better in killing blows and honorable kills. In laymen terms, regardless of whether Alliance won or lost, they were better at dying, and the Horde was better at killing. Hence, my data further supports Yee's conclusion of the difference in performances in PvP of the Alliance and the Horde.

My multiple linear regression models revealed a lot about contributing factors to when the Alliance or Horde won. Alliance's strategy, or factors that contributed to their win, was different than the Horde's. The Alliance, in my sample, won 60% of the time, and they won, overall, Alterac Valley more than they lost. Therefore, the factors that contributed to an Alliance win in the sample, are likely a better strategy for winning Alterac Valley, or provides more wins to the team that uses them. Five factors were necessary to create the Alliance's model, while the Horde only needed two. In other words, five factors were necessary to contribute to an Alliance win, while only two were necessary for the Horde. The difference in factors necessary to create

a model reveals a significant difference in tactic. The five factors were honorable kills, towers assaulted, graveyards defended, healing done, and damage done. The two factors for the Horde were damage done and deaths. The Alliance's model seems to be more objective oriented than the Horde's. Not only is a more complex regression model needed to describe wins for Alliance, but Towers assaulted and graveyards defended were contributing factors to Alliance's wins. These objective oriented factors were not part of the Horde's model. The Horde's model was basic, as long as they kill things, most likely resulting in confrontations where they might be killed, the Horde was able to win.

The objective oriented strategy described above that the Alliance uses in Alterac Valley was performed efficiently by them. The points of interest maps reveal that when Alliance wins they control those points which are necessary to make the Drek'Thar battle as quick, and easy, as possible. Almost all of the time when the Alliance wins they had control over each of the Horde's towers and the Frostwolf Relief Hut. In addition, a majority of the time, the Stormpike Aid Station and South Dun Baldar Bunker were controlled by the Alliance. Hence, my data suggests, as every Alliance win was by Killing Drek'Thar, the Alliance's tactics were a mixture of Horde tower control and light Dun Baldar defense. The Horde, on the other hand, either through domination, or fluke of the Alliance, won using similar point control, however less efficiently. The Horde controlled, excluding within both Keeps, most of the points of interest on the battle map. The Alliance seemed to be in Frostwolf Keep, but failed to control not only the Horde towers before Frostwolf, but also was less successful at controlling the towers within Frostwolf. While the Alliance had similar defense of Dun Baldar, the Horde was still able to kill Vanndar Stormpike, the Alliance's general.

My study was aimed at filling a research gap where experimental data describing Alliance and Horde performance within Alterac Valley was absent. Data collection was confined to Alterac Valley, though, due to the most recent *WoW* patch, I am uncertain if data was confined to the Ruin battlegroup, or if my sample consisted of all realms. Further research might collect similar data within other Battlegrounds to see whether my findings are consistent throughout other battlegrounds. If my data is consistent, I would assume that because Alliance loses all other battlegrounds, the same reasons why Alliance wins Alterac Valley, would be the same reason why they lose other battlegrounds. Future research might also address Alliance and Horde movement, and not just point control, to see whether either team differs in character movement and location. Additionally, if my findings are correct it might be interesting to test the consistency of Alliance tactics within Alterac Valley. An experiment where an Alliance team is pitted against another Alliance team, within Alterac Valley, could be conducted to , primarily, test tactical consistency, and, secondarily, test map design equality.

Works Cited

"Battleground." *WoWWiki.* 15 May 2011. Web. 19 May 2011.

"Battleground Horde/Alliance Win Ratio, Setup of the Month." *MMO Champion.* 22 February 2011. Web. 19 May 2011.

MasterHamster. "The Alterac Valley imbalance, now with 7% units of percantage more facts." *MMO Champion World of Warcarft PVP Forum.* Dec. 2009. Web. 19 May 2011.

Taaj. "The Alterac Valley imbalance, now with 7% units of percantage more facts." *MMO Champion World of Warcarft PVP Forum.* Dec. 2009. Web. 19 May 2011.

Yee, Nick. "Our Virtual Bodies, Ourselves?" *The Daedalus Project*. 17 February 2008. Web. 19 May 2011.

Yee, Nick. “Primary Motivations” *The Daedalus Project*. 17 February 2008. Web. 25 May 2011.

“World of Warcraft®: Cataclysm™ In Stores Now.” *Blizzard Press Releases.* 7 Dec 2010. Web 19 May 2011.

Blizzard. “World of Warcraft® Subscriber Base Reaches 12 Million Worldwide.” *Blizzard Press Release.* 7 Oct 2010. Web. 19 May 2011.