

Marrow's Compendium of Dragonslaying

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Chapter 1

Preamble

This is a guide on how to play a Fury Warrior in World of Warcraft Classic. It is a work in progress and a living document. All of the information contained within reflects what is best understood as of *today*, and some of it is subject to change as more about the game is discovered.

More importantly, this is a guide for players who want to push the envelope of their class, and be the best they can be. That is not the playstyle of every player, nor am I advocating it should be. Ultimately, you should pick your race and spec so that they're both what you *enjoy* the most. To some people that is exactly what they'll find in this guide: doing all you can do to maximize your DPS and compete with your friends, or to clear the content as fast and efficiently as possible. To some other people, it might mean playing a Night Elf and raiding as Arms - and that's completely fine. Ultimately, both groups of players will find a guild and a community that fits them and enjoy this amazing game we love so much together.

Chapter 2

Introduction

2.1 What is the aim of this guide?

This guide aims to help the reader from the ground up: from the foundational mechanics of World of Warcraft (WoW) combat, to an in-depth overview of warrior abilities and their utilization, to cooldown management, raid consumables, and finally how to analyze parses and learn from your own mistakes.

2.2 What is NOT the aim of this guide

DPS simulations will not be covered. There are several reasons for this, but the most important being that there are incredible, well maintained resources currently available for that exact purpose. Notable mentions include Steppenwolf's Classic Warrior Spreadsheet (Steppenwolf, 2019) and Aurana's Classic Warrior Fury DPS Simulator (Aurana, 2019).

In the same vein, questions on how to (specifically) gear will not be covered in this guide. This is because gearing is *highly* contextual - answering questions such as "What is better, Black Dragonscale 3set or Devil-saur Set with Truestrike Shoulders?" is impossible without knowing the rest of your gear and race. Therefore, when this guide makes recommendations, please be aware that exceptions *do exist*, but are rare. By the end, I hope the reader is knowledgeable enough about the base mechanics to critically assess and reason any gearing questions that he or she may have.

Chapter 3

Mechanics

3.1 Introduction

Combat mechanics are at the core of the warrior class, and deeply impact our talent and gearing choices and combat rotation. Therefore, it is important to build a solid foundational understanding of these mechanics in order to make the correct decisions and *understand* the theory behind our choices moving forward.

There are two types of melee attacks: white (auto attacks) and yellow (special attacks). Yellow attacks function exactly like white attacks, except they *cannot* glance. Each white attack made by players against enemy mobs will result in one of the following:

- Miss
- Dodge
- Parry
- Glancing blow
- Block
- Critical Strike
- Hit

A mob being attacked from behind *cannot* block or parry, and thus these two outcomes are removed from the roll table. This means our white attacks can only either miss, be dodged, glance, hit, or critically hit. Therefore, in order to maximize our damage we need to minimize $P(Miss)$, $P(Dodge)$ and $P(Glance)$, and maximize $P(Crit)$. In the subsequent sections, we will take a deeper look into how we can achieve that.

3.2 Miss Chance, Glancing Blows, and Weapon Skill

3.2.1 Miss Chance

Blizzard has confirmed that players have an 8% chance to miss a creature that is 3 levels above them (Blizzard, 2019a). Empirical work from magey and others (magey et al., 2019) further corroborates a formula originally proposed by Beaza during vanilla (Beaza, 2006), which can be summarized as:

If the target is mob and the difference between it's defense rating and the attacker's weapon skill is 11 or more:

$$P(Miss) = 0.05 + ((T_{lvl} \times 5) - Atk_{skill}) \times 0.2 \quad (3.1)$$

If the target is mob and the difference between it's defense rating and the attacker's weapon skill is 10 or less:

Table 3.1: Glancing blow probability and damage penalty per level difference.

Level Difference	Probability	Damage Penalty
0	0.1	0.05
1	0.2	0.05
2	0.3	0.15
3	0.4	0.35

$$P(Miss) = 0.05 + ((T_{lvl} \times 5) - Atk_{skill}) \times 0.1 \quad (3.2)$$

Where T_{lvl} is the target's level, and Atk_{skill} is the attacker's weapon skill rating. While simple, this formula carries immense significance - it means that that by having 305 weapon skill, a player only has a 6% chance to miss an enemy mob 3 levels higher, which includes raid bosses. Conversely, a player with only 300 weapon skill will have an 8% chance to miss. This is a huge difference, especially in conjunction with the other benefits that weapon skill brings. It is important to note, however, that this is the behavior exhibited by wielding one one-handed weapon. If dual wielding, probability of missing an attack is calculated as:

$$P(DW_{miss}) = (P(Miss) \times 0.8) + 0.2 \quad (3.3)$$

As a disclaimer, magey notes that further testing is still required to assert the correctness of this formula.

3.2.2 Glancing Blows

Glancing blows are a type of attack that can only occur when fighting an enemy of equal or higher value, and are restricted to white attacks. In accordance with Beaza, magey et al. have determined the glancing blow probability to be as follows:

$$P(Glancing) = 0.1 + (T_{lvl} \times 5 - \min(Atk_{lvl} \times 5, Atk_{skill})) \times 0.2 \quad (3.4)$$

Where Atk_{lvl} is the player's level, and Atk_{skill} is the player's weapon skill value. Knowing that, we can compute the probability that our white attacks will glance, and the damage penalty that that glancing blow carries against enemies of different levels:

This means that against a level 63 enemy mob (all raid bosses) and with 300 weapon skill our white attacks have a 40% chance of being glancing blows, therefore only being capable of dealing 65% of their maximum damage. Needless to say this is an immense DPS loss and should be mitigated as much as possible, and the *only* way that can be done is through increasing the player's weapon skill.

3.2.3 Weapon Skill

magey's work again corroborate the impact of weapon skill on glancing blow probability, damage, and miss probability according to Beaza's formulas ((3.4), (3.1) and (3.2)). The table below summarizes that impact, but it is important to note that not all values have been experimentally confirmed due to the difficulty in acquiring specific weapon skill values that inherently comes from WoW itemization.

As we can see, weapon skill not only reduces the glancing blow damage penalty, it also reduces the hit cap and the $P(Miss)$.

The glancing blow damage penalty reduction is more easily shown graphically:

As we can see, our glancing blows increase in damage linearly with weapon skill until 307 weapon skill. This is incredibly important, as it indicates 308 weapon skill to being the soft cap for glancing blow damage

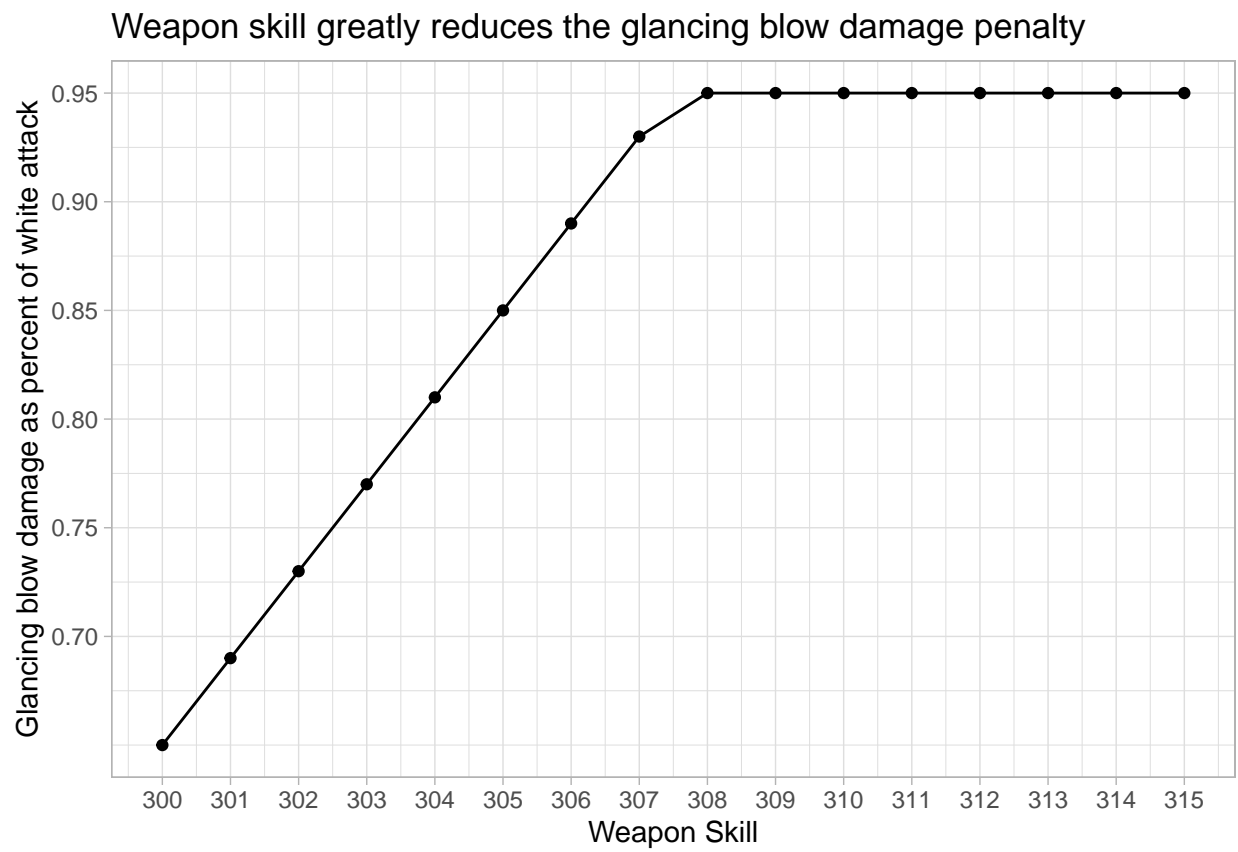


Figure 3.1: Weapon skill greatly reduces the glancing blow damage penalty

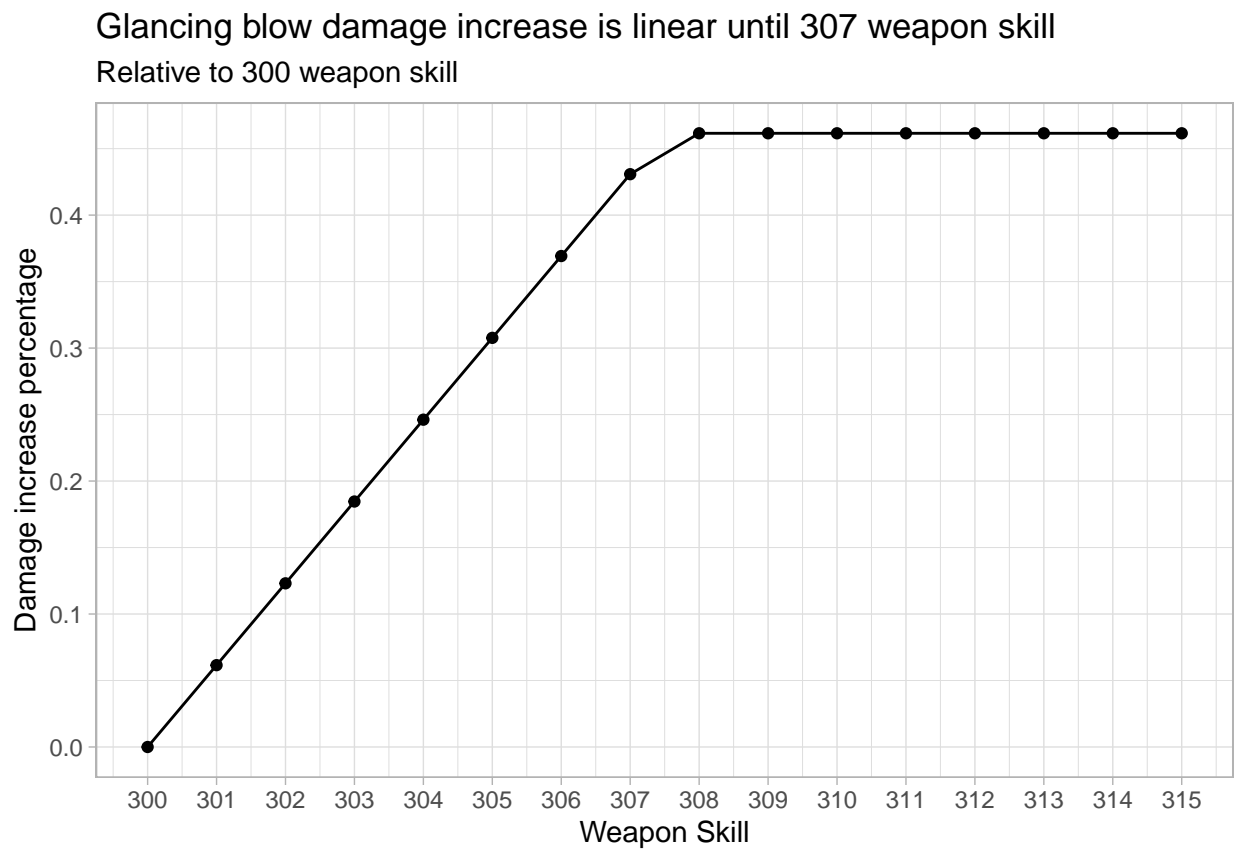


Figure 3.2: Weapon skill increases damage on glancing, relative to 300 weapon skill.

Table 3.2: Weapon skill impact on glancing blow damage reduction, miss chance, and hit cap. Damage increase is relative to 300 weapon skill.

Weapon Skill	Percent of White Attack	Glancing Blow Damage Increase	Miss Probability	Hit Cap
300	0.65	0.0000000	0.080	0.090
301	0.69	0.0615385	0.078	0.088
302	0.73	0.1230769	0.076	0.086
303	0.77	0.1846154	0.074	0.084
304	0.81	0.2461538	0.072	0.082
305	0.85	0.3076923	0.060	0.060
306	0.89	0.3692308	0.059	0.059
307	0.93	0.4307692	0.058	0.058
308	0.95	0.4615385	0.057	0.057
309	0.95	0.4615385	0.056	0.056
310	0.95	0.4615385	0.055	0.055
311	0.95	0.4615385	0.054	0.054
312	0.95	0.4615385	0.053	0.053
313	0.95	0.4615385	0.052	0.052
314	0.95	0.4615385	0.051	0.051
315	0.95	0.4615385	0.050	0.050

penalty reduction - meaning the player gains no benefits in this aspect if their weapon skill is higher than 307 when facing a raid boss.

Similarly, the impact of weapon skill on the $P(Miss)$ and hit cap is clearer when shown graphically:

As we can see, the player's hit cap starts 1% higher than $P(Miss)$ at 300 weapon skill. This is because vanilla WoW code explicitly suppresses the **first 1%** of +hit gained from talents or gear against enemy mobs with more than 10 defense skill above the player's weapon skill (Blizzard, 2019b), in accordance with (3.1). This hit suppression is **not** applied, however, if the difference between the attacker's weapon skill and the enemy mob's defense skill is less than 10 (3.2). Not that values past 305 weapon skill suffer from steep diminishing returns, where an increase of 10 points past that only translates to a hit cap decrease of 1%.

This is why weapon skill is so important: not only does it reduce the glancing blow damage penalty, it removes the inherit 1% hit suppression, and significantly reduces $P(Miss)$ until 305. This is also why a weapon skill of at least 305 and at most 308 is **highly** recommended. The first 5 points are crucial to overcome the 1% hit deficit, and the 8 points enables us to reach the maximum glancing blow damage. This is a complicated threshold to reach, however, as there are very few items in World of Warcraft that add small amounts of Weapon Skill that would enable you to get to 308. Furthermore, the fact that weapon skill's value in respect to hit chance is *vastly* diminished after 305 clearly indicates that 305 weapon skill is the **most** optimal weapon skill value for Fury Warriors in Classic WoW.

This is why any weapon skill bonus of over 5, whether given by a racial (orcs with axes, humans with maces and swords) or an item is so good - it means that single piece of gear is enough to overcome the hit suppression versus raid bosses, as well as reducing your $P(Miss)$ by 2%, and glancing blow damage penalty reduction. This is an incredible advantage, especially compared to the alternative which is gearing for weapon skill through items such as Edgemaster's Handguards, since the player with the built in weapon skill essentially has one extra item slot over a non-human, non-orc player. This is also why items that give good stats *in addition* to weapon skill, such as Aged Core Leather Gloves (ACLG), are incredibly good.

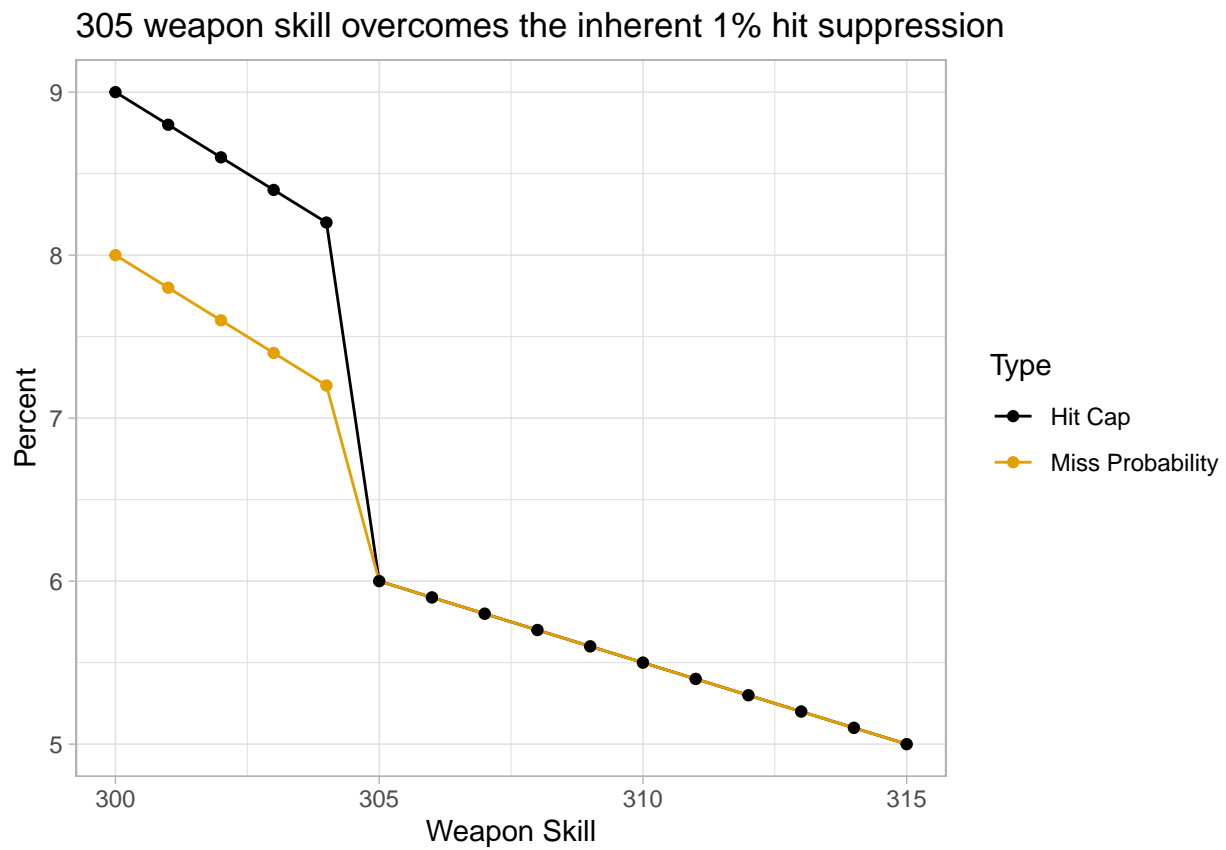


Figure 3.3: Weapon skill contributes to overcome the 1% hit suppression and the miss probability, but suffers steep diminishing returns after 305.

3.3 The Crit Cap

3.4 Flurry

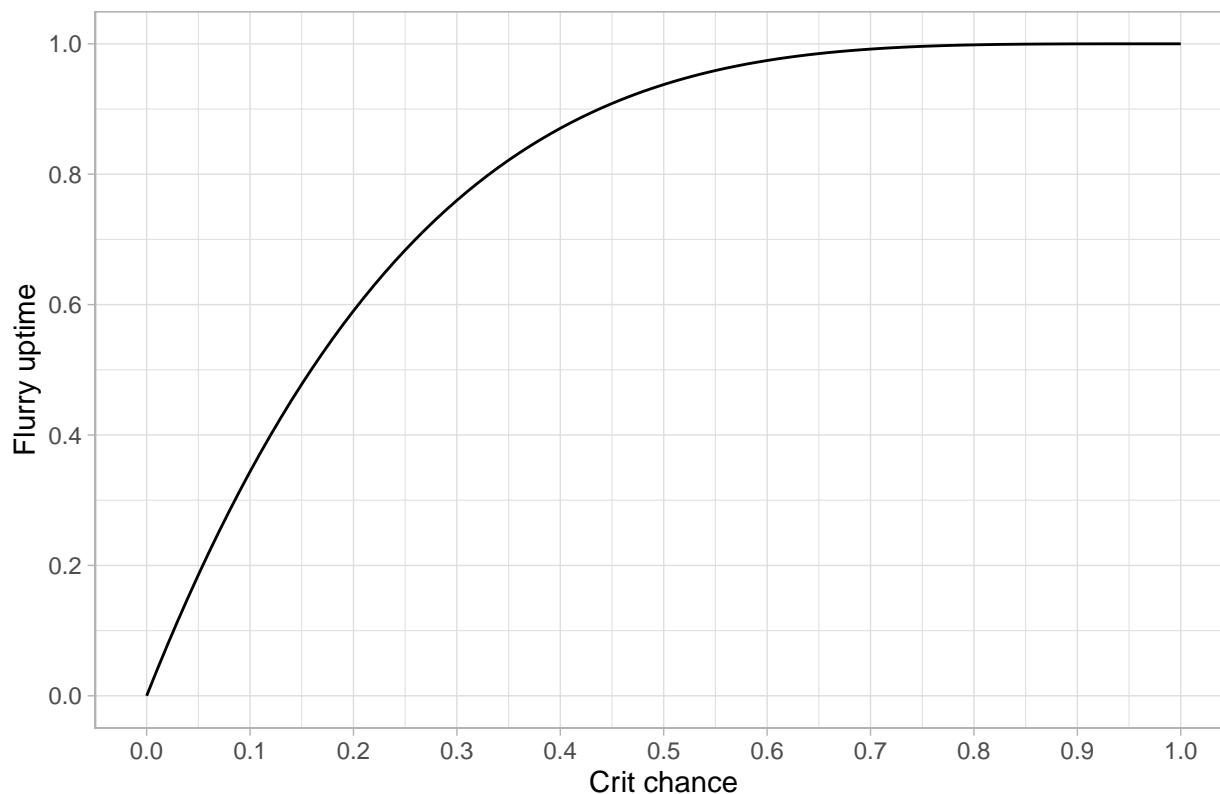
Flurry is a 5 point talent that, when maxed, increases the warrior's attack speed by 30% for the next 3 swings after dealing a critical strike. This represents a very significant damage increase, and as such warrior itemization values crit very highly in order to obtain higher and higher flurry uptimes, which can be calculated as follows:

$$F_{up} = 1 - \left((1 - P(Crit))^A \right) \quad (3.5)$$

```
flurry <- function(crit, attks){
  uptime = 1 - (( 1 - crit ) ^ attks)
  return(uptime)
}
```

Where F_{up} is the uptime, $P(Crit)$ is the player's crit chance, and A is the number of attacks made in one cycle of Flurry (3 from auto attack swings, and generally one additional from an instant attack; 4 is a reasonable number for a dual wielding player). Flurry is often misunderstood - the main misconception being that 33% crit will translate to 100% flurry uptime. This is wrong, as we can see graphically:

Crit chance impact on flurry uptime



We can now see that a $P(Crit) = .33$ only actually results in roughly 80% Flurry up-time. In fact, any amount of crit under 100% (or the crit cap) will result in less than 100% Flurry uptime, with increasing amounts of crit becoming less valuable the higher your $P(Crit)$ is. This is to say that the amount of Flurry uptime gained going for 1% crit to 11% crit is much greater than going from 40% to 50%, despite both cases representing a 10% overall $P(Crit)$ increase.

Chapter 4

Abilities and Rotation

4.1 Bloodthirst

1. Introduction to BT(CD,usage, formula, percent of overall damage)
2. Why is BT so good? Scaling
3. BT damage is weapon agnostic

4.2 Whirlwind

1. Intro to WW (CD, usage, formula, percent of overall damage)
2. When to use and prioritize WW (ST vs Multi-target fights)
3. WW damage scales with weapon topend

4.3 Execute

1. Intro to Execute (CD, usage, formula, % of overall damage)
2. Execute batching
3. Execute damage per rage

4.3.1 Execute Switch

1. Why it was effective on private servers
2. Why it's not effective in Classic a. Batching b. Execute phase duration

4.4 Heroic Strike and Cleave

1. Introduction (formula)
2. Opportunity cost - why damage per ratio is deceptive

4.4.1 HS Queuing

1. Explanation (include macro)
2. Consequences
3. When should you queue?

4.5 Slam

1. Intro to Slam
2. How spell batching affects Slam
3. Viability of Slam

4.6 Hamstring

1. Intro to Hamstring
2. Why use Hamstring?

4.7 Overpower

1. Intro to Overpower
2. Should you use OP? If so, when?

4.8 Damage per Rage

1. Damage per Rage comparison between main rotational abilities (BT, WW, Exec)
2. Execute DPR decreases the more rage you have
3. The impact of scaling on DPR, and how that affects your rotation

4.9 The Warrior Priority System

1. The Warrior Priority System

Chapter 5

Cooldowns

5.1 Death Wish

1. Intro to DW
2. Utilization

5.2 Recklessness

1. Intro to Reck
2. Utilization

5.3 Trinkets

5.4 Mighty Rage Potion

1. Intro to MRP
2. Utilization

5.5 Bloodrage

1. Intro to Bloodrage
2. Utilization

5.6 Berserker Rage

1. Intro
2. Utilization

5.7 Racial

5.7.1 Blood Fury

1. Intro
2. Formula
3. Scaling (AP/Str)
4. Utilization

5.7.2 Berserking

1. Intro
2. Utilization

Chapter 6

Consumables

6.1 Required

6.1.1 Mongoose

6.1.2 Juju/Giants

6.1.3 Firewater/Juju

6.2 R.O.I.D.S and Scorpok

6.3 Protection Potions

6.4 Assorted

6.4.1 Limited Invulnerability Potions

6.4.2 Restorative Potions

6.4.3 Free Action Potions

Chapter 7

Parsing

1. Intro to parses
2. How parses can be gamed
3. Your parse does not define how good of a player you are
4. Parses can still be very useful

7.1 Factors Affecting Parses

7.1.1 World Buffs

1. List obtainable world buffs
2. Lay out the value you get from them
3. World buffs are essential if you want to parse highly.

7.1.2 Kill Time & Raid DPS

1. Your guild is the most important factor in whether you'll parse well or not.
2. Your guild DPS severely impact your parses i. High guild DPS is essential ii. Fitting a boss kill within a Reck/DW window.

7.1.3 “What did I do wrong?”

1. Importance of critical self evaluation
2. How to look at your own parses and evaluate your performance a. BT casts per minute and interval between BTs b. Boss uptime and the importance of Charge and Intercept c. Cooldown timings

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