



MID-TERM PROJECT

AGE OF SIGMAR

Jonatan's attempt to understand this wonderful board game



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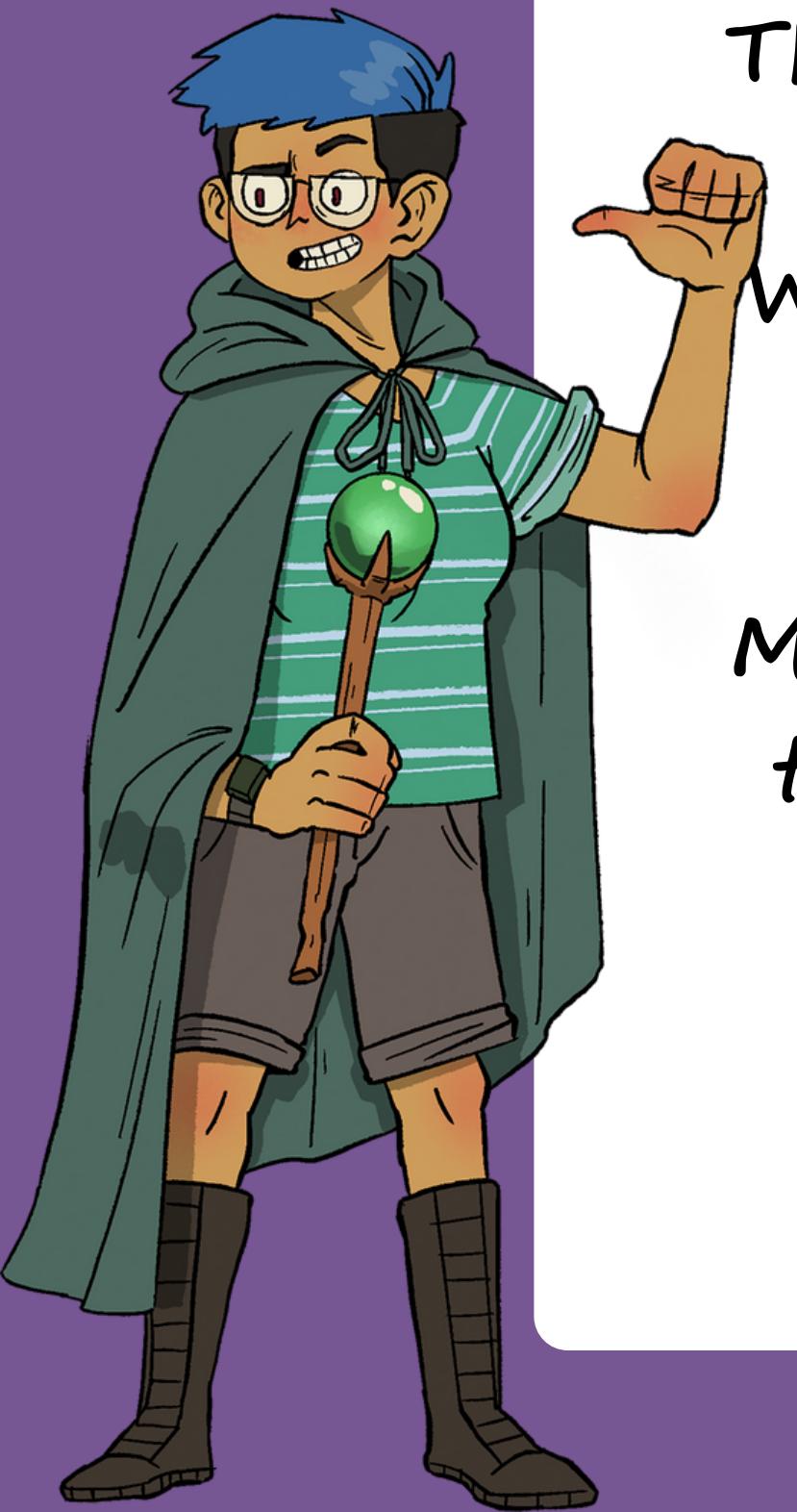
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MAIN IDEA

Those who know me, already know that one of my main hobbies is painting miniatures for Warhammer Age of Sigmar, a tabletop game set in a fantasy world with amazing creatures and characters.

My curiosity has often led me to consider learning to play the tabletop game, so this is going to be a very amateur first step to understanding how it works.

CONCEPTS

Unit WarScroll
Move
Wounds
Save
Bravery

Grand Alliance
Faction

Price
Points

Worshippers of a dark power called the Eightfold Watcher, these strange and sinister warriors have tainted arachnid blood and varanite upon their flesh to alter their form to be a dark mirror of their master.

KEYWORDS

CHAOS, SLAVES TO DARKNESS, MORTAL, CULTISTS, TARANTULOS



WARSCROLL TARANTULOS BROOD

MISSILE WEAPONS
Envenomed Projectiles
MELEE WEAPONS
Brood Weapons
Venomous Bites

Each model in a Tarantulos Brood unit is armed with Brood Weapons and Envenomed Projectiles.

BROODMASTER: 1 in every 13 models in this unit must be a Broodmaster. Add 1 to the Attacks characteristic of that model's melee weapons. In addition, Broodmasters can issue commands to their own unit.

SPIDER SWARMS: 3 in every 13 models in this unit must be Spider Swarms. Spider Swarms are armed with Venomous Bites instead of Brood Weapons and Envenomed Projectiles.

Weapon WarScroll Kind

Range
8"

Attacks
1

To Hit
4+

To Wound
2+

Rend
-

Damage
1

Range
1"

Attacks
4

To Hit
5+

To Wound
3+

Rend
-

Damage
1

Skittering Scourge: Through profane and flesh-altering rituals the warriors of the Tarantulos Brood can scuttle across terrain with the speed and skill of a true arachnid.

Attacks

When this unit makes a move, it can pass across terrain features in the same manner as a model that can fly.

To Hit

To Wound

Rend

Damage

Creeping Summons: The Broodmasters of the Eightfold Watcher have a strange and dark symbiosis with the swarms of venomous spiders that accompany them, calling forth an ever-growing horde that can overwhelm the enemy.

At the start of your hero phase, you can return D3 slain Spider Swarms to this unit for each Broodmaster in this unit.



TECHNOLOGIES

Data Extraction



Manual search for Warhammer data on social media platforms such as Instagram, searching for its WarScroll, and noting it in Excel: 50 Units.

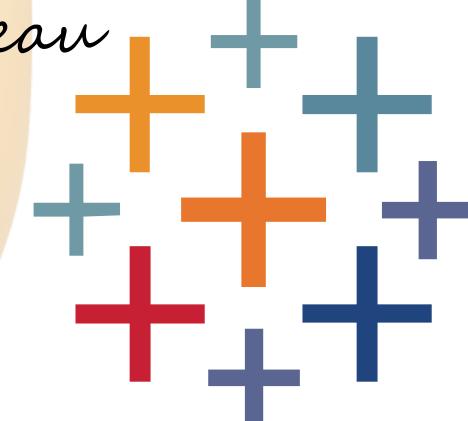
Libraries



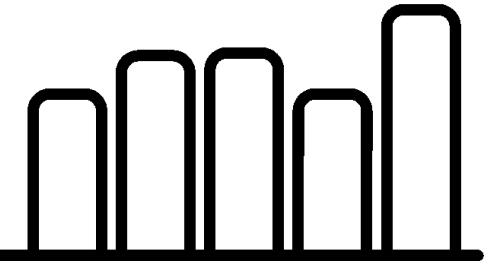
pandas
numpy
scipy
seaborn
matplotlib
streamlit
statsmodels

Visualization and interaction

Tableau



DATA ANALYSIS AND RESULTS



We have 50 units distributed across 20 factions, which are part of 4 Grand Alliances



CHAOS

Skaven
Khorne
Beasts
Nurgl
Tzeentch
Slaves to Darkness



Death

Legions of Nagash
Flesh-eater courts
Nighthaunt
Soulblight Gravelords



DESTRUCTION

Ironjawz
Gloomspite Gitz
Ogor Mawtribes



ORDER

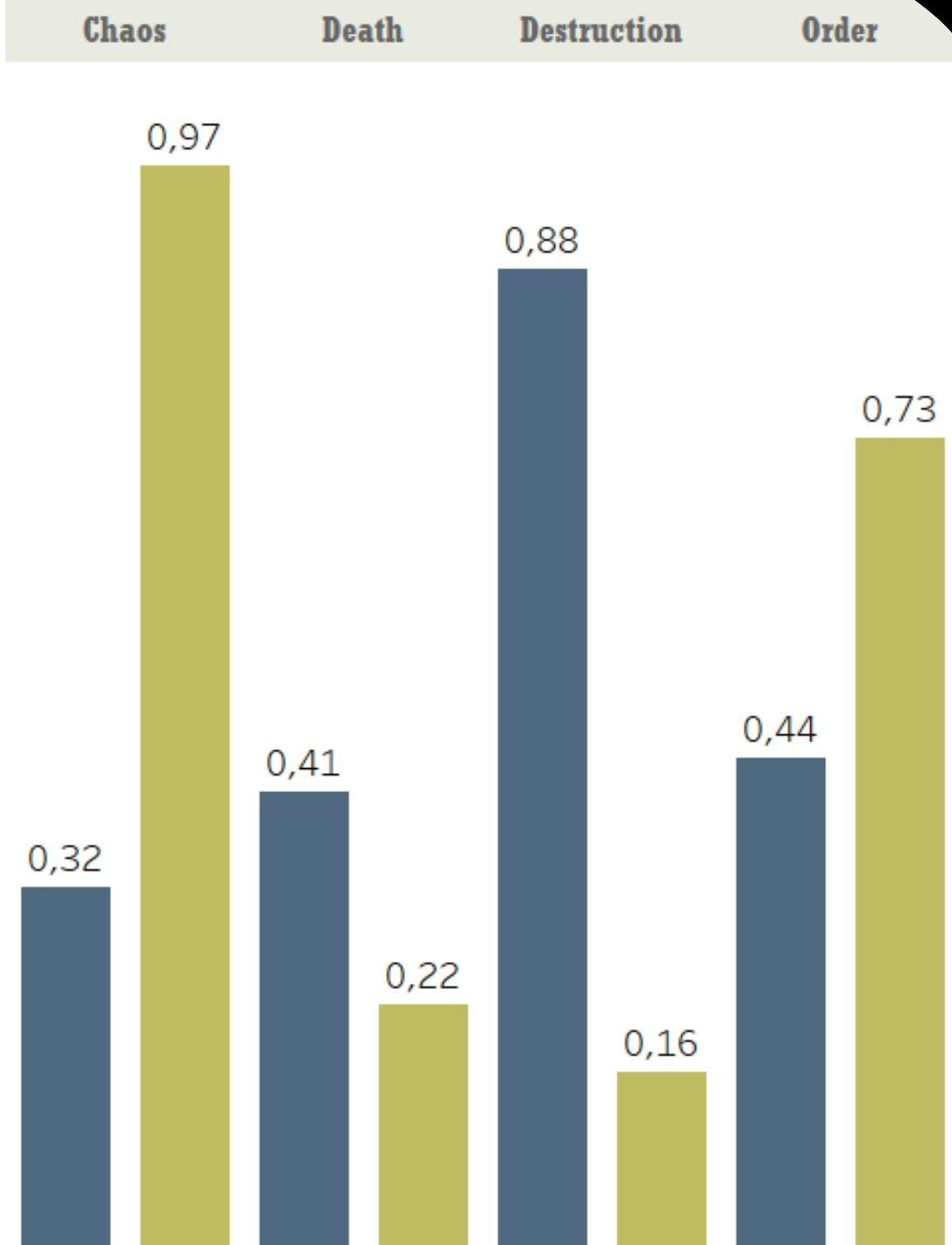
Stormcast Eternals
Sylvaneth
Daughters of Khaine
Fyreslayers
Seraphon
Kharadron Overlords
Free cities



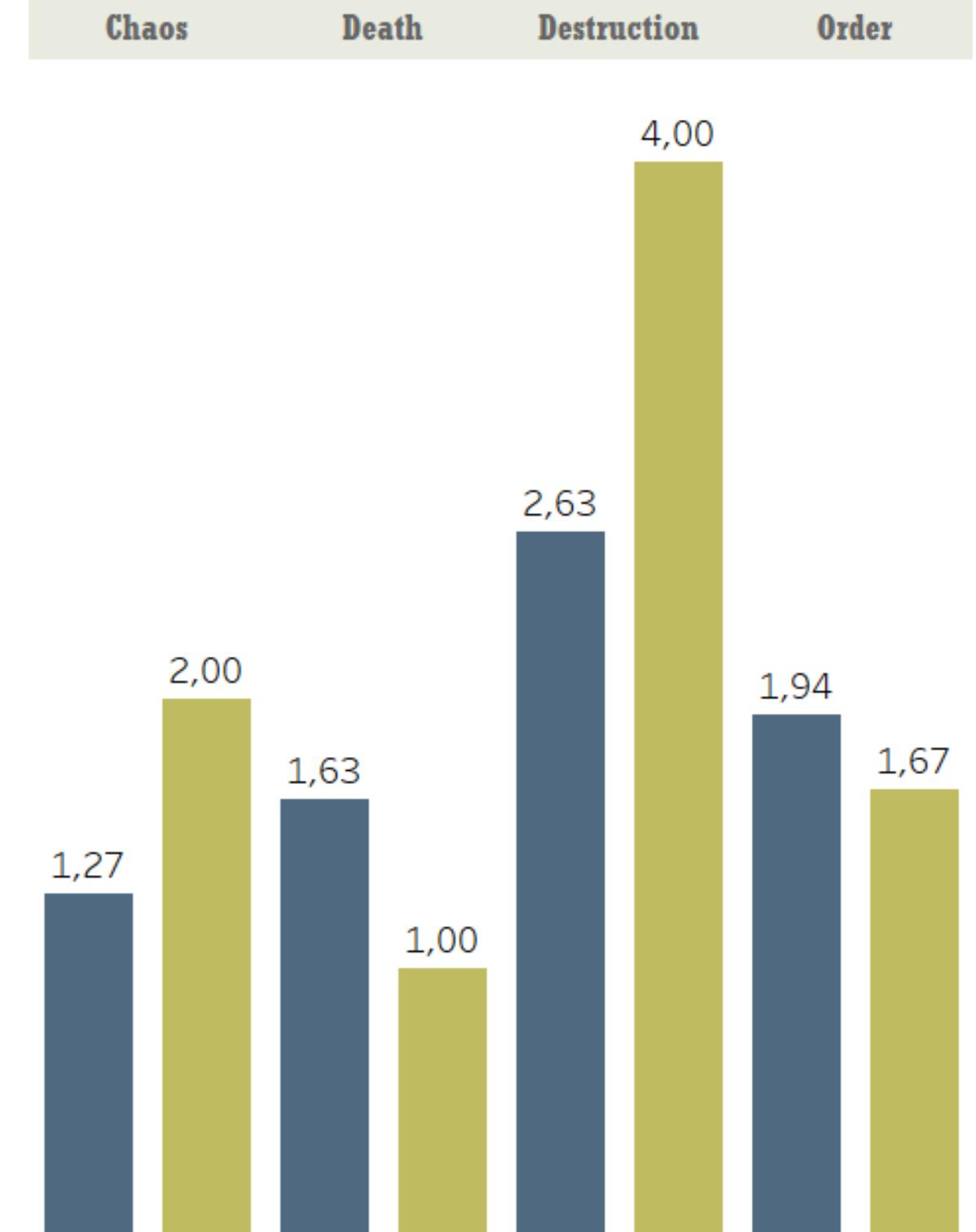
I transformed the scores from the Warscrolls into success probabilities

GRAND ALLIANCES

EXPECTED TOTAL DAMAGE



WOUNDS



These are
the 2
best predictors

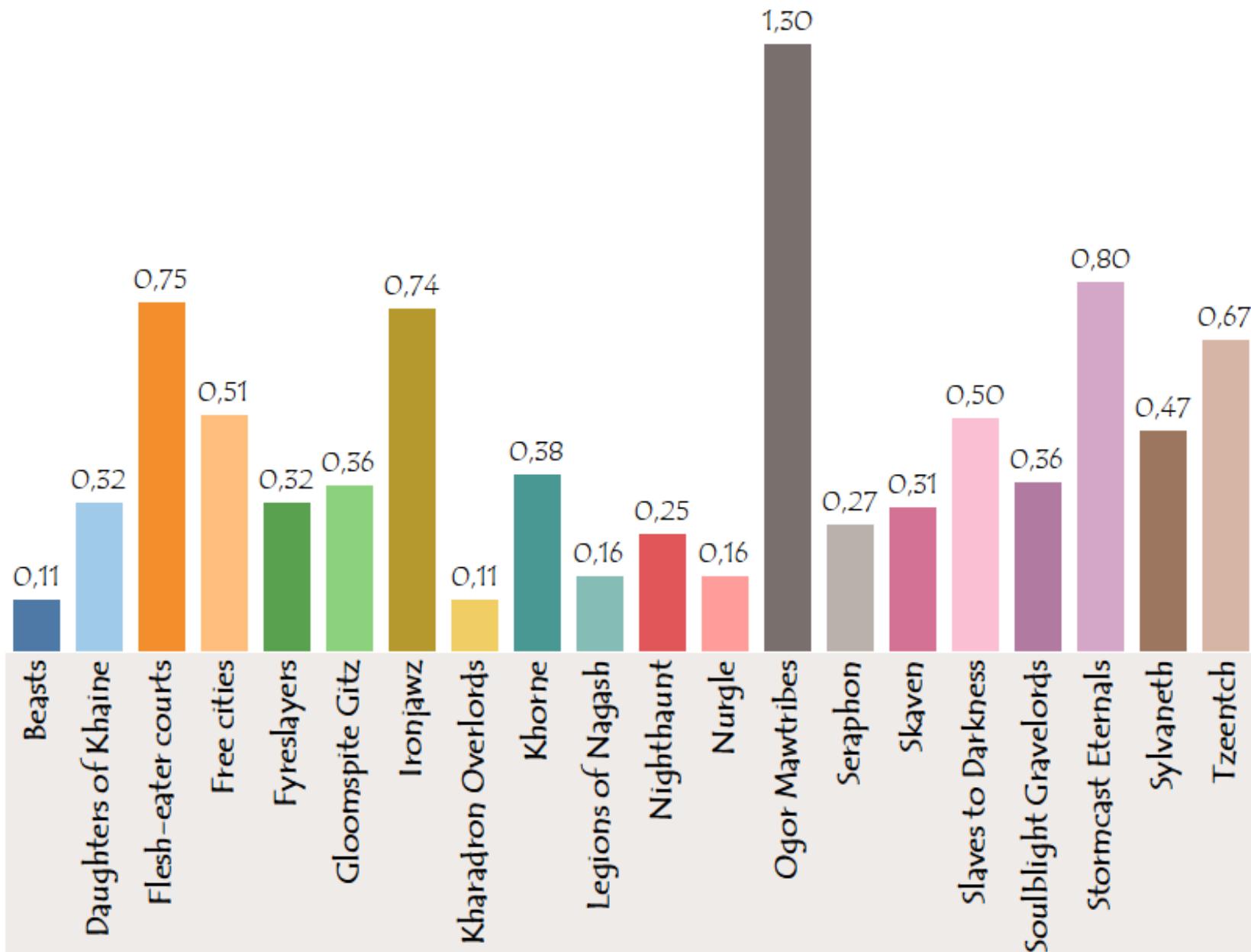


■ Mele weapon
■ Missile weapon

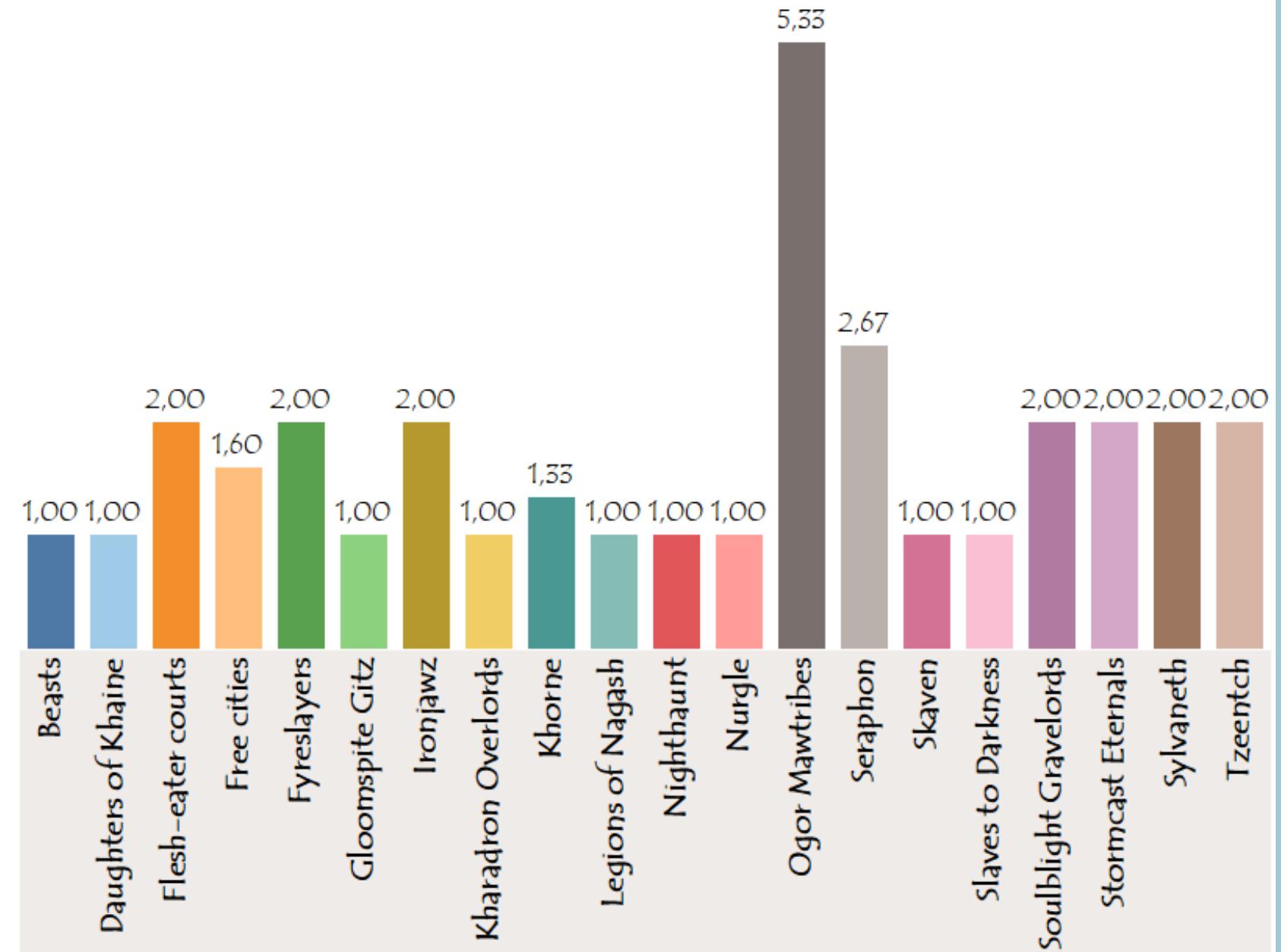
MAIN ATTRIBUTES OF FACTIONS



EXPECTED TOTAL DAMAGE



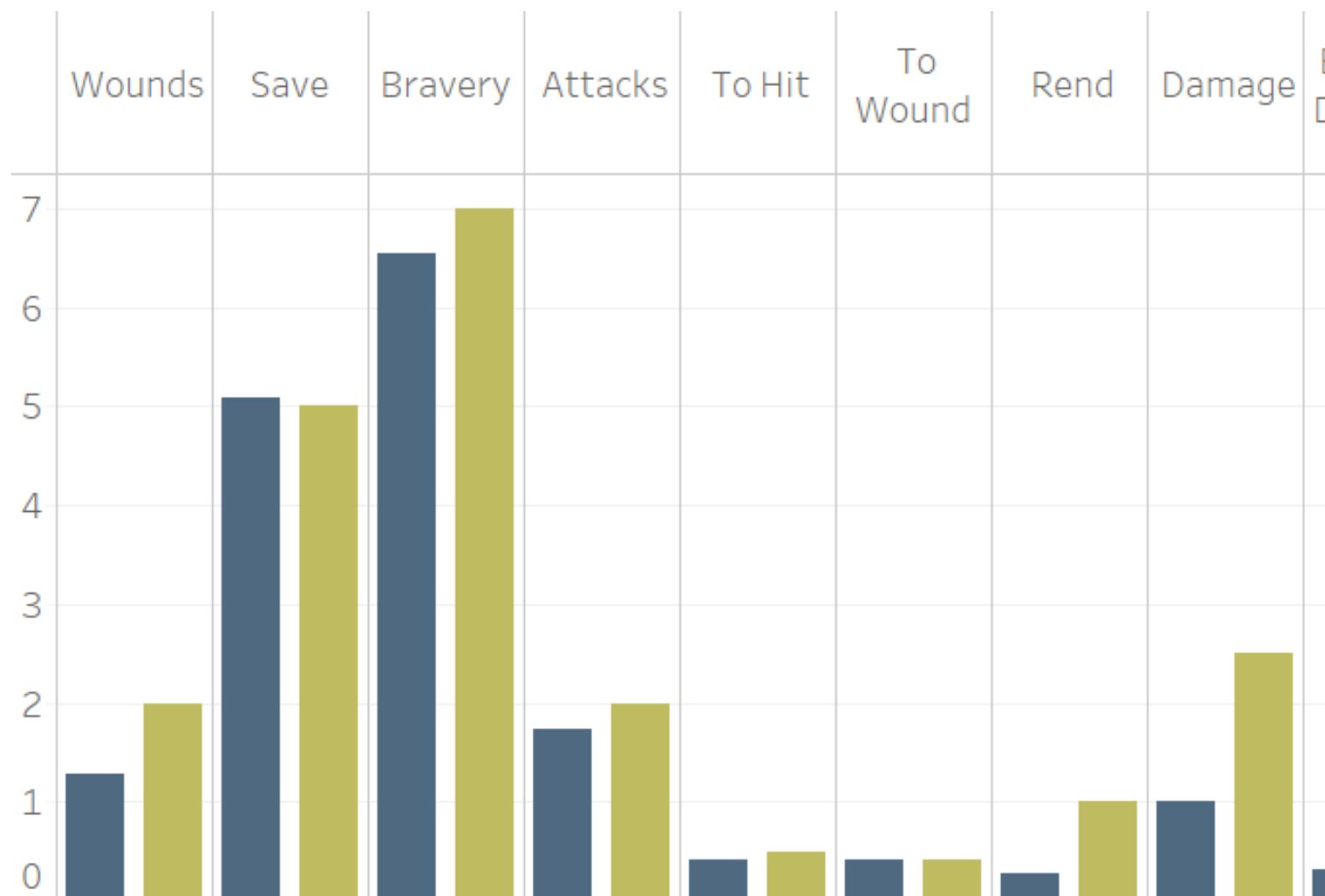
WOUNDS



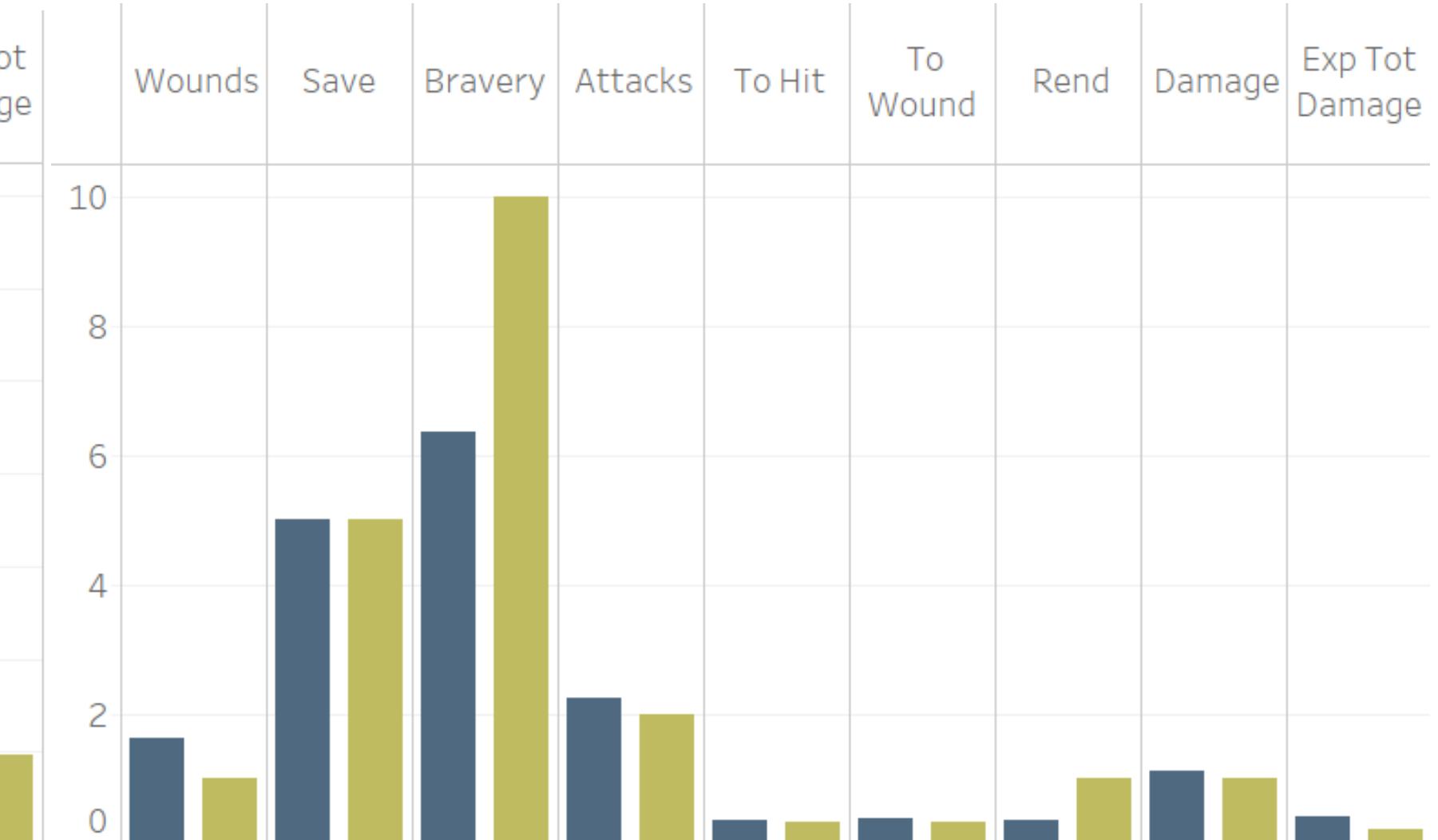
MEANS OF FACTIONS

CHAOS

Mele weapon
Missile weapon



Death

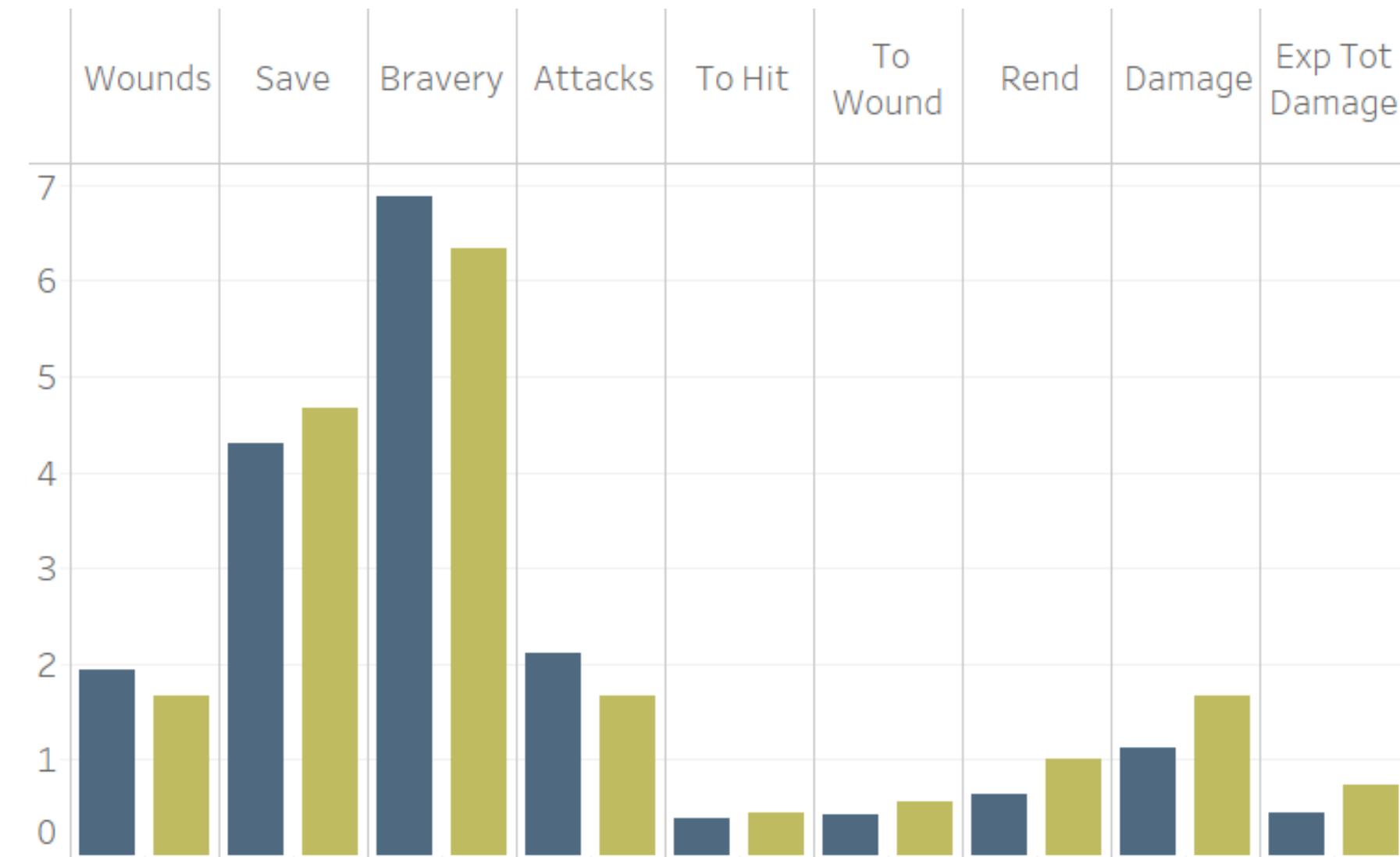
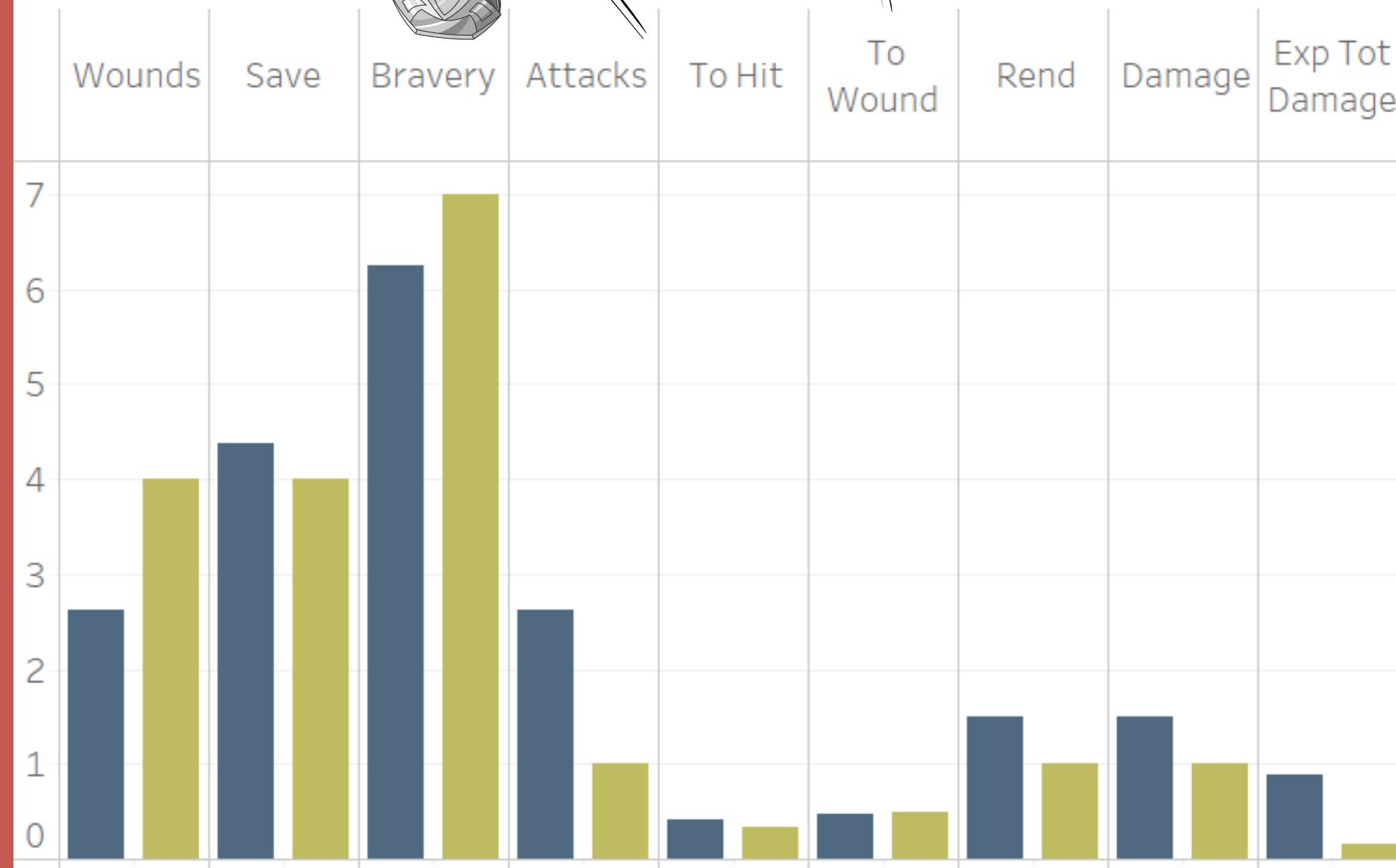




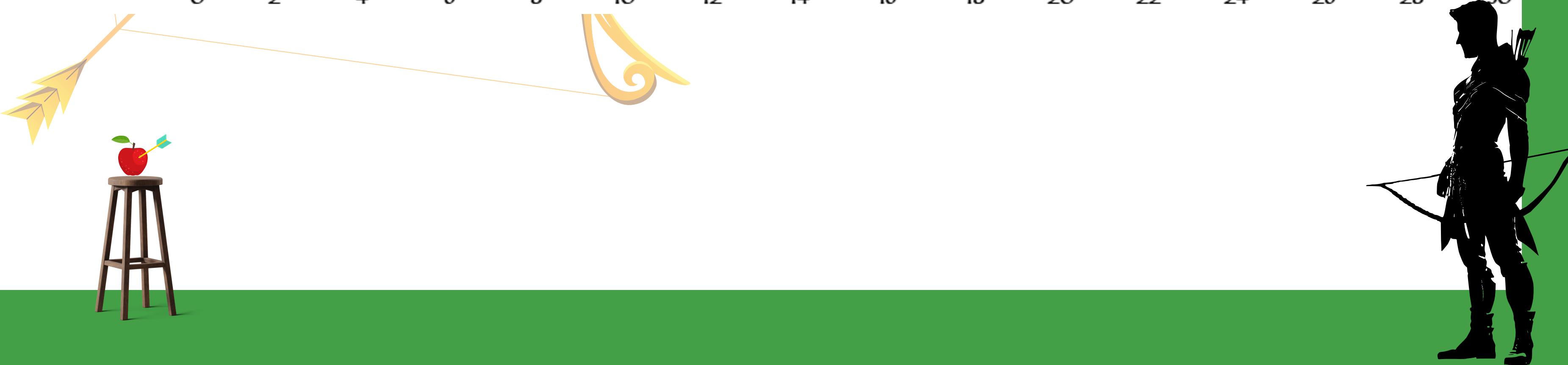
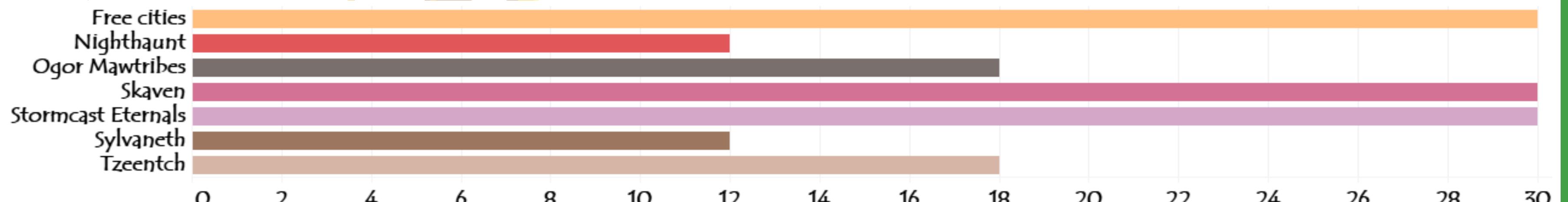
DESTRUCTION

Mele weapon
Missile weapon

ORDER



RANGE PER FACTIONS



Melee

	Chaos	Death	Destruction	Order
Move	3.341203	2.138090	1.309307	1.653872
Wounds	0.646670	1.187735	2.386719	1.088037
Save	0.136954	0.177759	0.087983	0.164250
Bravery	0.327395	0.435986	0.117709	0.155000
Price	9.141315	8.017837	10.266972	9.881281
Points	41.253099	46.598590	53.917927	53.206037
Range	0.404520	0.517549	0.755929	0.492592
Attacks	0.646670	0.886405	0.744024	0.781213
To Hit	0.088780	0.106469	0.090869	0.131742
To Wound	0.088780	0.087983	0.060104	0.103530
Rend	0.467099	0.744024	0.755929	0.785905
Damage	0.000000	0.353553	0.755929	0.332106
To Hit & Wound	0.051646	0.056569	0.057181	0.074167
Expected Total Damage	0.197199	0.402756	0.690950	0.286531

STANDARD DEVIATION OF GRAND ALLIANCES I

Move: Chaos has the highest variability

Wounds: Destruction units show the most variability

Save: Chaos and Order are relatively stable, while Death and Destruction vary more

Points & Price: High standard deviations in all alliances

Range: Consistent across factions

Attacks: Chaos and Death have slightly higher variability

To Hit & To Wound: Generally stable across alliances

Rend & Damage: Moderate variability



Missile

STANDARD DEVIATION OF GRAND ALLIANCES 2

	Chaos	Death	Destruction	Order
Move	4.242641	NaN	NaN	4.041452
Wounds	1.414214	NaN	NaN	0.577350
Save	0.000000	NaN	NaN	0.098150
Bravery	0.707107	NaN	NaN	0.098150
Price	7.071068	NaN	NaN	17.559423
Points	42.426407	NaN	NaN	70.000000
Range	8.485281	NaN	NaN	10.392305
Attacks	1.414214	NaN	NaN	0.577350
To Hit	0.000000	NaN	NaN	0.098150
To Wound	0.120208	NaN	NaN	0.098150
Rend	1.414214	NaN	NaN	1.000000
Damage	0.707107	NaN	NaN	0.577350
To Hit & Wound	0.063640	NaN	NaN	0.090000
Expected Total Damage	0.664680	NaN	NaN	0.555818

Move: Significant variability in Chaos and Order

Wounds, Save, Bravery: Limited data for Death, low variability in available data Chaos.

Points & Price: High standard deviations in all alliances

Range: Extremely high variability, especially in Chaos

Attacks: Limited data for Death, moderate variability elsewhere

To Hit & To Wound: Generally stable across alliances

Rend & Damage: Moderate variability



EXPECTED TOTAL DAMAGE |

HYPOTHESIS TESTING

Null Hypothesis (H_0): The medians of 'Expected Total Damage' are equal across all factions.

Alternative Hypothesis (H_1): At least one faction has a different median 'Expected Total Damage' compared to the others.

Normality test

Shapiro-Wilk test is applied to assess the normality of 'Expected Total Damage' within each faction. Some factions with insufficient data may not undergo normality testing.





EXPECTED TOTAL DAMAGE 2

HYPOTHESIS TESTING

Homogeneity of Variances

Levene's test is utilized to verify the equality of variances across factions.

Analysis Plan

If normality and homogeneity assumptions hold: Perform ANOVA to compare means across factions. If ANOVA indicates significant differences, proceed with Tukey's HSD test for pairwise comparisons. If assumptions are violated: Apply Kruskal-Wallis test as a non-parametric alternative to ANOVA.



CONCLUSIONS

HYPOTHESIS TESTING

Differences Among Fractions: Based on the analyzed data, the choice of fraction does not appear to have a significant impact on expected damage.

Data Normality: Some fractions did not follow a normal distribution. This is relevant as it affects the type of statistical test that can be most appropriately used.

Homogeneity of Variances: Levene's test did not show significant differences in variances between fractions, indicating this assumption for tests like ANOVA holds.

Choice of Statistical Tests: Given that not all fractions followed a normal distribution and some had small sample sizes, it was appropriate to use the Kruskal-Wallis test, a non-parametric test, instead of ANOVA.



NOW LET'S SEE THE DASHBOARD