

“Real World” Fights: A Preliminary Statistical Analysis

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Introduction

This research paper examines amateur street fights and analyzes the most salient characteristics of untrained hand-to-hand combat. In addition to collection of descriptive statistics, the following hypotheses were considered: 1) the first technique in a fight will likely be a punch; 2) punching will be the most prevalent technique employed by combatants; 3) fights that end in a knockout will be of shorter duration than fights that end in surrender, break-up, or withdrawal. Finally future areas of inquiry are identified and discussed based on a review of trends apparent in the data collected during this study.

Methodology

The data used here come from fifty amateur fight videos that were downloaded from various sites on the internet. Only relatively spontaneous combat videos—those where one or both participants appear to be untrained fighters—were selected for analysis. Any videos of professional and semi-professional fights, tournaments, staged or choreographed fights, conflicts involving multiple assailants, and fights involving weapons were intentionally omitted from the data sample in order to focus on simple, “spontaneous,”

"real world" conflicts between two people. In addition, fight videos were only included in the analysis set if they showed a clear beginning and ending, were of sufficient clarity to allow assessment and offered a relatively unobstructed view of the combatants.

The footage collected was drawn from several different internet sites. Though not acknowledged on any of these sites, it's possible that the person filming the fight and/or webmasters of the internet sites may have selected or edited fight footage based on their perception of the fight's public appeal. Specifically, it may be the case that more dramatic fights, such as those involving knock-outs, unusual techniques, or extreme levels of violence, may be disproportionately represented among the videos posted on the internet. If present, this "selection bias" would skew the results obtained toward the more violent or dramatic end of the fight spectrum. In effect, to the extent that this bias is present, we would expect the data collected to reflect what happens in more violent street fights. Arguably, such a bias may render the data more, rather than less, useful for martial arts training.

Once collected, the videos were reviewed to identify the first technique typically used, the frequency with which techniques were used, techniques leading to knock-outs, and whether or not the fight went to the ground. The average duration of the fight following the first technique was measured, and the type of ending was identified.

As a functional matter, it was necessary to enumerate and classify each combatant's techniques separately. No attempt was made to separate the combatant's data by status (such as aggressor,

initiator, defender, victim, et cetera). For data collection purposes the techniques were categorized as grabs, punches or kicks according to the working definitions given below.

Definitions

Knock-out

One of the combatants is rendered unconscious or clearly incapacitated as a result of the fight.

Break-up

Non combatants intervene to end the fight.

Surrender

One of the combatants is beaten into submission.

Withdrawal

Both combatants voluntarily stop fighting.

Grabs

A grab was defined to include hand contact resulting in a hold, throw, or take-down of an opponent. No distinction was made as to whether the grab was to the opponent's clothes, appendages, hair or other body part. A grab was only counted once, regardless of how long the grip was maintained. However, following a clear release, there was no minimum time requirement before another grab could be counted. A grab was counted regardless of whether it occurred while on the ground or in a standing position and even if executed in conjunction with other techniques.

Punches

A punch was defined to include any hand technique other than a grab, shove, or block, which was intended to impact the opponent. Examples of punches include slaps, hammer strikes, scratches, and of course, punches. Punches were counted regardless of whether or not contact was made, irrespective of whether they were executed from the ground or while standing, and even if executed in conjunction with other punches or techniques.

Kicks

A kick was defined to include any attack made with the foot regardless of whether or not contact was actually made. Such attacks were counted regardless of the position where they were executed from (i.e. standing or on the ground), the opponent’s position (again, standing or on the ground) or where on the opponent’s body the kick impacted or was aimed.

Results

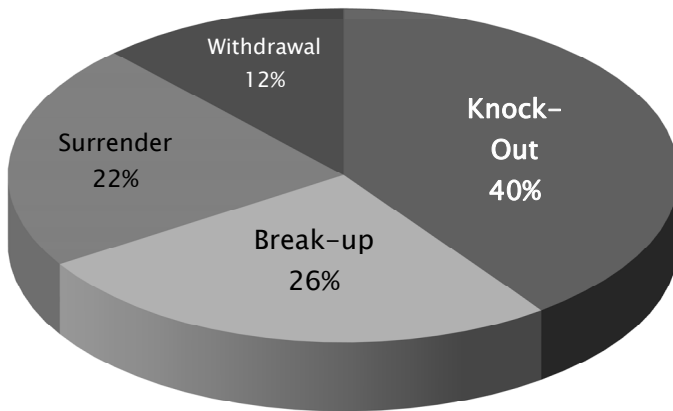
Results in General

Figure 1: Data for Fight Conclusions

Ending Type	Average Duration (sec)	Sample Size	% of Total
Knock-out	16.15	20	40
Break-up	38.15	13	26
Surrender	37.18	11	22
Withdrawal	38.83	6	12
total	29.22	50	100

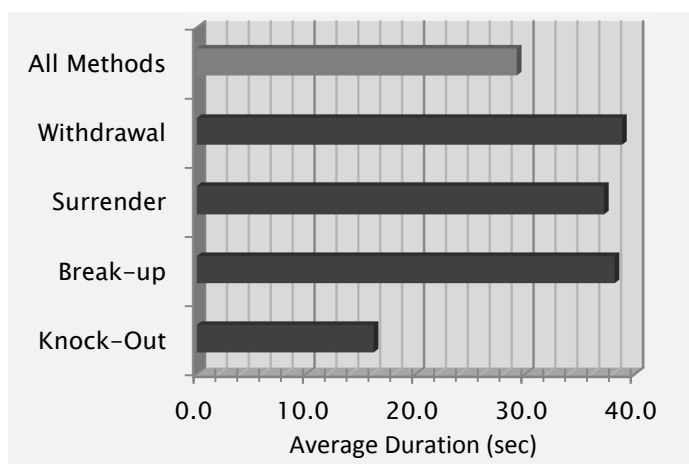
As shown in Figure 1, above, fights were found to last 29.22 seconds on average. While the greatest proportion of fights, 2 in 5, ended in knock-outs, more than 1 in 5 fights ended in surrender, while about 1 in 4 fights ended with the fight being broken up, and roughly 1 of 8 fights concluded when the combatants mutually withdrew and stopped fighting. These results are graphically in figure 3 below. Notably, in 54% of the fights the combatants ended up on the ground at some point. Of the fifty fights reviewed, 38 involved two males while 12 involved two females.

Figure 2: Relative Frequency of Fight Conclusions



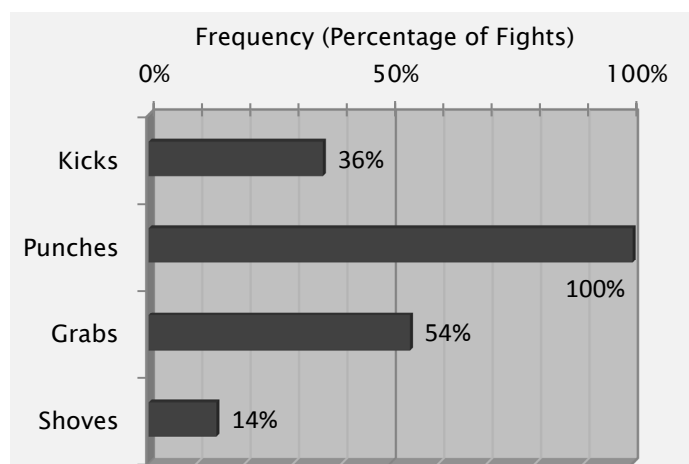
Fights ending in a knock-out tended generally to be of significantly shorter duration (16.15 seconds on average) than fights that ended by other means. This difference is shown graphically in Figure 3 below.

Figure 3: Average Fight Duration by Ending Type



While punches were a part of every fight, kicking was attempted in 36% of the fights, shoving occurred in 14% of the fights, and grabbing happened in 54% of the fights. These results are shown in Figure 4 below.

Figure 4: Frequency of Technique Types



Results by Technique

Kicks

Less than half (45%) of the knock-outs that occurred were the result of kicks.

Kicks appear to be an efficient knock-out technique. Dividing the total number of times kicks were used by the number of knock-outs resulting from that technique shows a knock-out to kick ratio of 1:3.44 while the knock-out to punch ratio is less than half as large at only 1:8.27.

Kicking is often found as a part of a set of combination techniques.

Kicking is the technique least associated with surrender.

Punches

Approximately 80% of the fights began with one combatant punching or attempting to punch the other.

Punching occurred and was the dominant technique in every fight.

Grabs

Grabbing occurred 1.60 times per fight and was the second most common technique.

Grabbing by itself never resulted in a knock-out.

Grabbing was often part of a combination attack.

Shoves

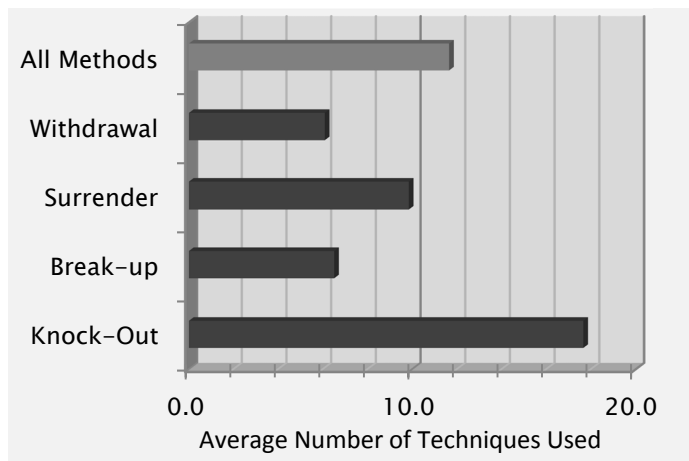
On a per fight basis, shoving was the least common activity at 0.28 shoves per fight.

Shoving never resulted in a knock-out.

Results by Fight Outcome

When looked at in terms of these fight outcomes we find the following results. Figure 5 below shows the average number of techniques used grouped according to the final result of the fight.

Figure 5: Number of Techniques Used by Final Result



Knock-outs

Knock-outs are more likely to occur early in a fight.

Fights that end in a knock-out rarely go to the ground.

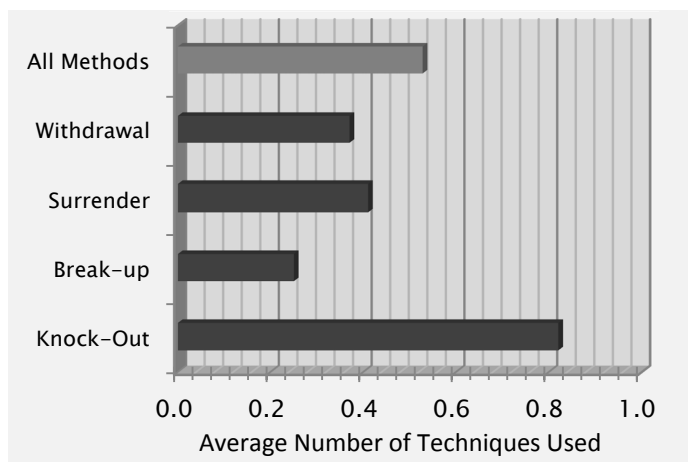
As shown in Figure 5 above, knock-outs are associated with a higher average number of techniques (17.65) than fights that end in surrender, break-up, or withdrawal (9.84, 6.50, and 6.08 techniques, respectively).

The majority of knock-outs are the result of punches.

As shown in Figure 6 below, fights that end in a knock-out are also associated with a greater number of techniques being used per second (0.82) than fights

that end in surrender, draw, or break-up (0.41, 0.37, and 0.25 per second, respectively).

Figure 6: Average Number of Techniques Used per Second, grouped by Final Result



Withdrawal

Only 12% of the fights ended in a withdrawal, making it the least likely of all fight endings (see Figure 2, page 273).

Fights that ended in withdrawal were, on average, longer than other fights (see Figure 3, page 274).

Surrender

As shown in Figure 3 on page 274, fights ending in surrender were second only to fights ending in a knock-out in terms of brevity, averaging 37.18 seconds in duration.

Fights ending in surrender were at the lowest end of the spectrum in terms of number of techniques (0.41) per second.

22% of the fights ended in surrender (Figure 2, p. 273).

As shown in Figure 7 below, fights ending in surrender showed the greatest discrepancy between the average number of punches and the average number of all other techniques.

Break-up

At 26%, fights that ended by being broken up represent the second largest outcome group (see Figure 2, page 273).

Combatants in fights that ended by being broken-up typically displayed more diverse techniques.

Combatants in these fights threw the second lowest number of punches (See Figure 7, below).

The duration and lack of activity characteristic of these fights may be a factor behind their being broken-up.

Figure 7: Average Number of Techniques by Outcome

Technique					
Count	Punch	Kick	Grab	Shove	Other
Ending Type					
Knock-out	8.27	3.44	0	0	0
Break-up	15.31	1.54	1.46	0.62	0.15
Surrender	29.82	0.82	0.20	0.27	0.36
Withdrawal	33.33	1.60	3.83	0.50	0
total	17.85	2.15	0.88	0.28	0.12

Gender Differences

While the limited sample size and in particular the small number of women in the data limits our ability to reach conclusions related to gender, the following observations were noteworthy:

- No fight involving women ended in a withdrawal.
- The most active fight, which featured more than 100 techniques, was between two women.
- The longest fight, which lasted almost 2.5 minutes, was between two women.
- All fights between women involved multiple techniques.
- Whereas men tended to use a one-handed grab to target punches, women routinely use a two-handed grab (usually of the hair) to throw the opponent to, and slam them against, the ground.

Discussion

Based on the data, if called upon to defend yourself in a one-on-one street fight, the primary technique you'll likely have to defend against will be punching. At the beginning of the fight your opponent will likely display a high level of activity and repeatedly attempt to punch you. After the initial onslaught your opponent will continue to punch, but at a slower rate. Your opponent may attempt to grab, kick, or shove you, but for the most part will rely on punching. If your opponent grabs you they are likely to do so in concert while punching or attempting another technique. While your opponent is not particularly likely to attempt to kick you, particular caution is in order here as such techniques appear to have the potential to do the greatest harm.

Informative though the data here may be, it should not be used to direct or define a training regime. The data is better viewed as providing real

world support for the need to have a balanced training program that builds solid techniques, improves cardiovascular health (stamina) and core strength, and provides some psycho-cognitive (i.e. emotional and intellectual) understanding of what being in a fight is like. Indeed, if nothing else, as both the data collected and the video footage from which it is derived make clear, the martial artist should better understand that street fights are violent events that should be avoided whenever possible.

As is often the case with research, the information presented here raises at least as many questions as it answers. In addition to a need for more elaborate analyses to determine which of the results obtained are statistically significant, there are several related areas of inquiry that should be pursued.

Other areas for possible future data analysis include:

- The target areas techniques are most commonly directed toward (such as the head).
- Tells (actions suggesting an imminent attack), if any, that trained and untrained fighters typically display.
- The frequency and effectiveness of combined techniques compared to single techniques.
- How aggressors respond to different defensive strategies (such as fighting back, being strictly defensive, and surrendering).
- Associations between being the aggressor and the outcome of the fight.
- Techniques untrained fighters favor when they or their opponent are on the ground rather than standing.

While commentary on any of the questions above is beyond the analysis performed on the data to date, the existing data set appears capable of supporting these analyses.

Conclusion

Street fights typically start out with a high level of activity that quickly tapers off. If a combatant is going to be knocked-out in a street fight it will most likely happen in the early high activity period of the fight. The vast majority of the activity in street fights takes the form of punching, however other techniques are not infrequent and kicking techniques seem more likely to result in a combatant being knocked-out. Fights that last longer and where combatants become less active are more likely to be broken-up, or result in mutual withdrawal or surrender.

Martial arts training can provide functional and practical benefits that can positively impact the outcome of a street fight. Functionally, the trained martial arts should have available to them an array of defensive techniques that, in conjunction with more powerful and accurate offensive techniques, should help them in the early part of the fight where knock-outs are most likely. More practically, given years of training and practice executing techniques, the trained martial artist should benefit from greater balance and stamina. Good stamina should allow the martial artist to maintain the high level of activity associated with the beginning of fights and become dominant in the middle and latter parts of

the fight. Good balance will also prove beneficial both in that it allows the martial artist to deliver more powerful and accurate blows, and it allows the martial artist the opportunity to adjust for and counter the opponent's off-balancing efforts. Perhaps most importantly, by virtue of their training the martial artist will know that it is best to avoid becoming involved in a street fight.