Chapter 4

RESULTS AND DISCUSSION- I

This chapter discusses the results of the first phase of analysis for the selected sample of films. The focus is to compare the overall style of the film by using descriptive statistics in terms of Average Shot length (ASL) which is the transition or the cutting rate, standard deviation, skewness of the shot duration, and interquartile range (percentiles), etc. The chapter also explores the frequency distributions of shot scale (SS), shot angle (SA) and camera movement (CM) which gives an idea of the pattern of use of these variables in different biopics. After the initial exploration of these variables separately, the relationship between the categorical independent variables (shot scale, shot angle and camera movement) and the continuous dependent variable (shot duration) is explored through Regression Analysis.

4.1 Descriptive Statistics

This section presents the descriptive analysis to give an overview of the entire pattern of style which can be compared across the sample and thus provides a significant insight into the overall style.

Table 1 presents the relevant data for descriptive statistics. Film numbers are coded as follows: F1= *Aligarh*, F2=*Mary Kom*, F3=*Rang Rasiya*, F4= *Paan Singh Tomar*, F5= *Manjhi: The Mountain Man*. N represents the total number of shots identified in all the biopics. Although the running time of all the films is approximately two hours but the number of shots vary from 565 (*Aligarh*) to 2630 (*Mary Kom*)

Table 1: Descriptive statistics-All films

Film	N	Range	Minimum	Maximum	Mean	Std. Deviation	Skewness
1	565	242	0	242	11.81	16.151	7.658
2	2630	66	0	66	2.60	3.416	6.674
3	1774	61	0	61	3.87	5.042	5.007
4	1790	59	0	59	4.21	4.769	3.950
5	1534	48	0	48	4.53	4.963	3.184

Maximum Shot Duration in *Aligarh* is for 242 seconds (approx. 4 minutes) which stands out from the rest of the sample as the maximum shot duration for other films lie between 48 seconds to 66 seconds (approx. 1 minute). *Mary Kom*, *Rang Rasiya* and *Paan Singh Tomar* are very close to each other when their maximum shot duration is compared as the values are 66, 61 and 59 seconds respectively. This also explains the range (Maximum shot duration-Minimum Shot Duration) which is similar for all the films except for the first one. Minimum shot duration is Zero for all the films since all the shots with the duration less than one second is given the value Zero, as explained in Chapter 3.

Average Shot Length (ASL)

The mean values from Table 1 give the average shot length (average shot duration) of each film. It is interesting to note that though the number of shots vary from N=565 to N=2630, but the average shot length of these films is quite close to each other. Except for the first film *Aligarh*, which has an ASL of 11.81, the ASL's of *Rang Rasiya, Paan Singh Tomar* and *Manjhi* are approximately same with their values being; 3.87, 4.21 and 4.53 seconds respectively. Even *Mary Kom* is similar in terms of ASL with its value being 2.60 seconds which is only about a second less from *Rang Rasiya* (3.87 seconds).

Aligarh has the highest ASL because it has few shots of exceptionally long duration, It can be deduced that for *Aligarh* cutting rate (rate of inserting a cut in a film) is very low as the

number of shots also suggest that it is a very slow paced film. *Mary Kom* on the other hand has the lowest ASL, indicating that the cutting rate is fast. This is so because the film consists of a number of scenes in the boxing ring which demand a fast paced action. As established by Barry Salt's study and simultaneously used by other film scholars, ASL is a very significant parameter of exploring film style and similarity of Average shot length or duration is a significant marker of the underlying similarity in the cinematic style of these biopics.

Standard Deviation

Standard deviation is a measure of dispersion, or the distribution spread of values around the mean. The values of standard deviation explain to what extent shot durations deviate from the mean. For films *Paan Singh Tomar* and *Manjhi*, the values of deviation are 4.76 and 4.96 which means that shot length/duration for these films deviate by this much amount from the mean. Similarly, for *Mary Kom,* the shots deviate by 3.41 seconds from the mean which is quite similar to F4 and F5. For *Rang Rasiya* the deviation is 5.04 seconds which is also close to films F4 and F5.

Value of standard deviation for film *Aligarh* is quite high and different from the rest of the sample. The results show a similarity in the deviation from the mean of the shot durations for the films and it is evident that *Aligarh* does not follow the pattern visible for other films.

Skewness

Skewness measures the degree of non-symmetrical distributions of values around the mean. If the shot durations would have been perfectly distributed, the value of skewness would have been zero. But that is not the case and as the values are not normally distributed for all the five films, looking at the values of skewness, it can be interpreted that for the entire sample of films, the data for shot duration is positively skewed. This means that for all the

five films, a large number of shots have their duration less than the ASL (i.e the mean) and therefore more values are clustered towards the left of the mean, making all the distributions of shot durations positively skewed for the entire sample.

The skewness in the data of shot durations of films can be observed from the histograms (see figures 1 to 5) which show the normality curve and the deviation from the mean. As the shot durations are concentrated towards the left (of the peak of bell-shaped curve/ normal probability curve), it is clear that shot duration is positively skewed for the entire sample of films.
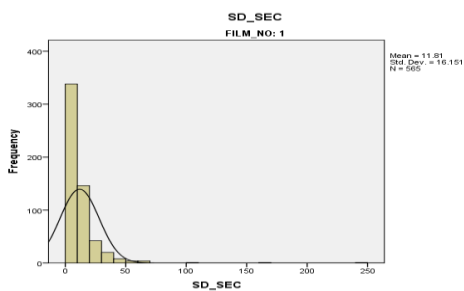
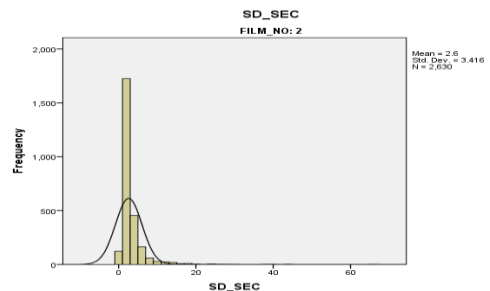
Figure1: Normal Probability curve for F1
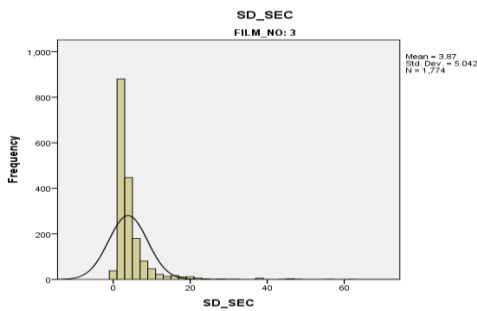

Figure 2: Normal Probability curve for F2

Figure: 3 Normal Probability curve for F3
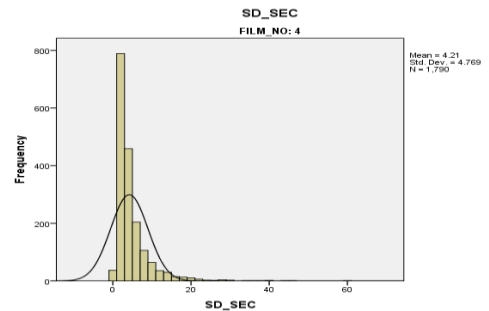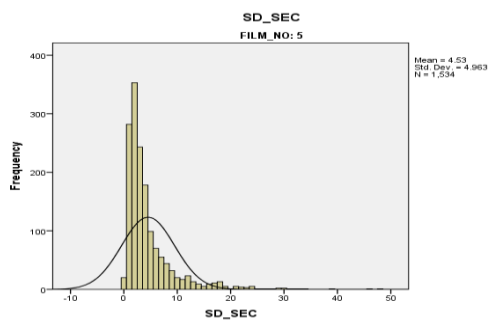

Figure 4: Normal Probability curve for F4

Figure 5: Normal Probability curve for F5

Percentiles.

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Table 2: Percentiles-All Films

Film	Percentiles		
	25th	50th	75th
1	4.00	7.00	14.00
2	1.00	2.00	3.00
3	1.00	2.00	4.00
4	2.00	3.00	5.00
5	2.00	3.00	5.00

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Percentiles give the distribution of the values of shot duration across the entire film. Observing the values for the percentiles, we can deduce whether the distribution of shot duration is similar across the five films. Table 2 shows the 25th, 50th and the 75th percentile of the distribution. 25th percentile gives the value below which the 25% of the total values fall. Similarly the 50th percentile (which is also the median) and the 75th percentile give the value below which 50% and 75% of the total values lie.

Of all the percentiles, it's the median (50th percentile) which is the most important since it gives the value of the distribution dividing it in equal halves and the median is less affected by outliers and skewed data than the mean, and is usually the preferred measure of central tendency when the distribution is not symmetrical (Australian Bureau of Statistics). Observing the values for the medians of different biopics, it is found that for films *Mary Kom* and *Rang Rasiya,* the median is 2, which means that 50% of the shots of these films are of a duration less than two seconds. For films *Paan Singh Tomar* and *Manjhi,* the median is 3, which means that 50% of the total shots identified in these films are of length less than 3 seconds.

It can be deduced from the results that the median values 2 and 3 seconds are very close but for the film *Aligarh*, the median is 7, and therefore 50% of its total shots are of duration less than 7 seconds. The results of percentiles also show that it's *Aligarh* which stands out distinctly from the rest of the sample as the other four films are quite similar in the pattern of their shot duration distribution.

4.2 Frequency Distributions

Film-wise frequency distribution tables give us an insight in the pattern of the use of different shot scales (coded as:1=Very long shot, 2= Long shot, 3= Medium long Shot, 4= Medium shot, 5= Medium close up, 6= Close up, 7= Big close up), shot angles (coded as: 1= High angle, 2=Low angle, 3= Eye Level/Neutral) and camera movements (coded as:1=Static shots, 2= Simple moving , 3= Complex moving, 4=Hand-Held/ Shaky (HH)). The values in the table are given in percentage (of the total number of shots)

a. **Shot Scale**

Table 3: Film-wise shot scale distribution in percentage

Film	VLS (1)	LS (2)	MLS (3)	MS (4)	MCU (5)	CU (6)	BCU (7)
1	2.3	5.7	6	11.7	20.7	52.7	0.9
2	1.6	2.1	3.5	10.2	14.6	62.5	5.4
3	0.3	7.6	8.2	11.2	10.6	62.1	0
4	1.3	5.6	6.8	15.4	13.9	56.1	0.8
5	2.5	10.2	10.2	18.6	17.5	40.3	0.8

Analyzing the frequency distribution of shot scales from table 3, it is found that all the films use close-ups the most (i.e. category, 6) and the percentage of use is also quite similar with F2 and F3 having almost the same percentage of 62.5 and 62.1 respectively; and F4 and F1 similar to these with 56.1 and 52.7 percent.

F5, i.e. *Manjhi* stands out from the sample as it has 40.3 percent of the total shots as close-ups which is relatively less as compared to other films. This is because it has more percentage of longer shot categories because many shots comprise of Dashrath working in the mountains and this requires a higher use of longer shot scales to portray the vast expanse of his work field (see figure 6 and figure 7).

An important pattern can be observed in the usage of medium shots (i.e. category, 4) with F1, F2 and F3 having 11.7, 10.2, and 11.2 percent of the total shots being medium scaled. Here, it can be seen that F4 and F5 deviate a bit as they have more percentage of long shots. F4 (*Paan Singh Tomar*) is shot in the ravines of Chambal which demands the depiction through long shot categories (1, 2 and 3; e.g. figure 8) and *Manjhi* as discussed above, has relatively larger percentage of long shots as compared to other films.

b. Shot Angle

Table 4: Film-wise shot angle distribution in percentage

Film	High Angle (1)	Low Angle (2)	Neutral (3)
1	0.9	0.4	98.8
2	1.9	3.8	94.3
3	4.2	2.1	93.6
4	3.2	1.7	95.1
5	10.6	5.9	83.4

Observing the table 4, which presents the shot angle distribution, it can be easily inferred that in maximum no of shots, the eye-level or neutral shots are preferred the most by all the filmmakers as shown by the percent of use. F2, F3 and F4 have almost similar percentages of neutral shots with their values being; 94.3, 93.6 and 95.1 percent. F1 i.e. *Aligarh* has relatively larger percentage of neutral shots with hardly any high angle or low angle shots, the reason being the film deals with a very sensitive and serious issue and mostly the tone is

traumatic depicting the loneliness of Professor Siras which can be best projected through neutral shots thereby giving a sense of steadiness to the shots. F5, i.e. *Manjhi* has relatively lower percentage of neutral shots because in the backdrop of the film, the filmmaker deals with the miseries and plight of the people because of caste system, which is best depicted through high angle (depicting subordinate position) and low angle shots (depicting high caste authority e.g. figure 9.); and it can be observed in the scenes such as : Dashrath gets badly beaten for touching Mukhiya after abolition of untouchability (see figure 10), Dashrath's father begging Mukhiya and offering his son as bonded labour, another labourer beaten for wearing shoes and also to show Dashrath's inferior position and inability to control situations (see figure 7) and his determination to win over the adversities (see figure 11)
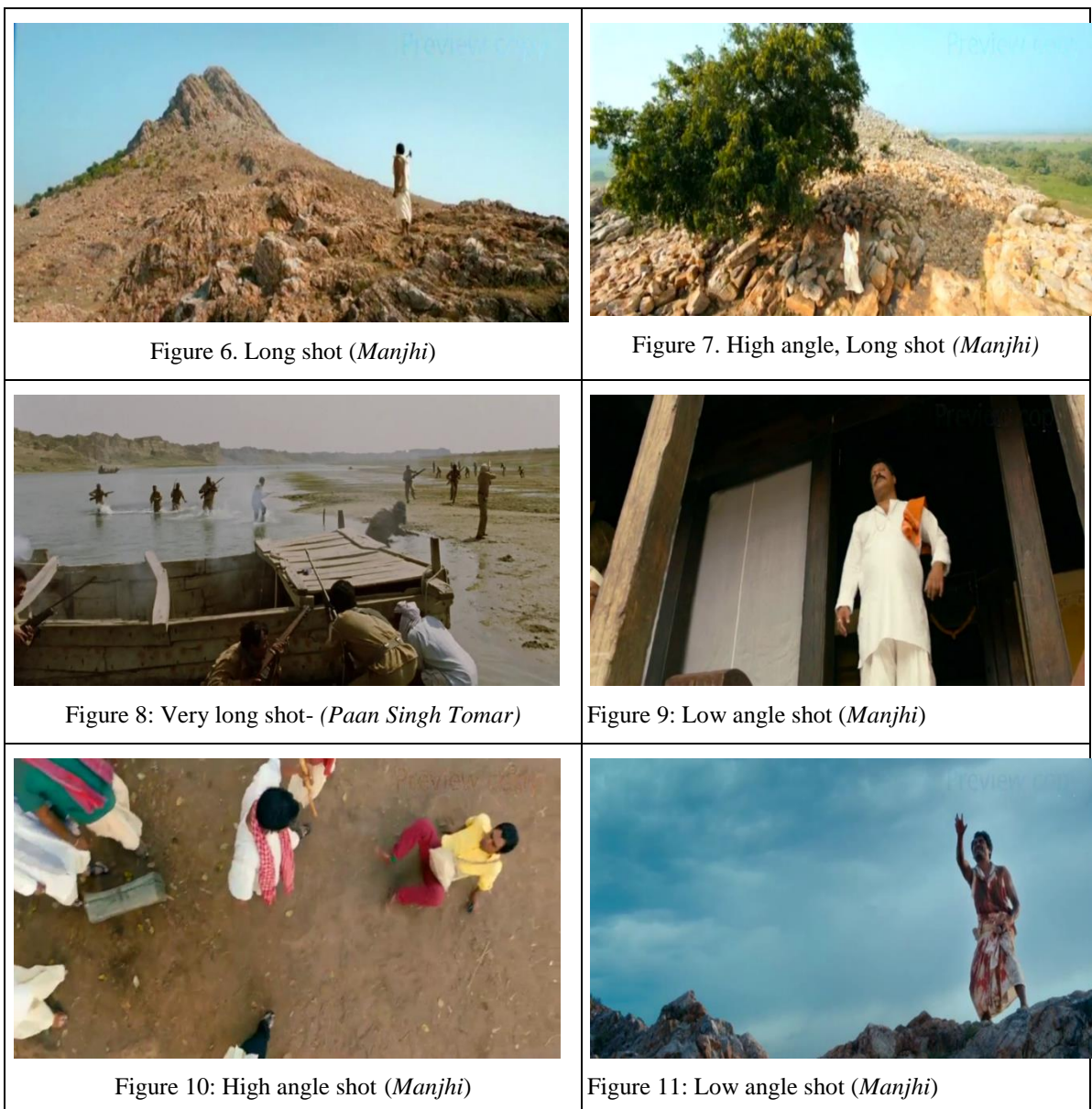
c. Camera Movement

Table 5: Film-wise camera movement distribution in percentage

Film	Static (1)	Simple Moving (2)	Complex Moving (3)	HH (4)
1	87.8	6.4	3.5	2.3
2	69.1	9	4.1	17.9
3	76.8	13.5	4.7	4.9
4	62.8	19.8	8.3	9.2
5	70.2	18.8	5.1	5.9

Like shot scale and shot angle, usage of camera movement categories from table 5 also reveals certain interesting patterns across the sample. In all the films, the most preferred are the static shots (category 1) where the camera is still, and for all the films, except F1, the percentage use of static shots is approximately between 60-75%. The second most preferred shots are of movement category 2, which is simple moving shots. F2 (*Mary Kom*) deviates

by preferring more handheld or shaky shots rather than the simple moving, due to the abundance of action scenes in the film.

Another significant pattern is the use of movement category 3. All the films minimize the use of complex moving shots, and the percentage use is similar with values like; 3.5, 4.1, 4.7 and 5.1 for films 1, 2, 3 and 5. F4 has 8.3% of complex moving shots and the least used category for this film. The possible reason can be to reduce the technical complexity in movement so that the audience can comprehend the action easily. Only F1, has category 4 as the least used movement, as the sensitivity of the narrative demands more steady shots.

Figure 6. Long shot (*Manjhi*)	Figure 7. High angle, Long shot *(Manjhi)*
Figure 8: Very long shot- *(Paan Singh Tomar)*	Figure 9: Low angle shot (*Manjhi*)
Figure 10: High angle shot (*Manjhi*)	Figure 11: Low angle shot (*Manjhi*)

4.3 Comparison of the Four Acts of the Films

Adopting the technique from Cutting et. al (2011), in this part, the films are divided into four parts of approximately thirty minutes each and all the four acts are compared across the sample. Apart from comparing the ASLs and median of the films, all the films in the sample are of approximately equal duration i.e. around two hours. First film *Aligarh* (F1) is of 1 hour 58 minutes, second film *Mary Kom* (F2) is of 2 hours and 1 min, third film *Rang Rasiya* is of 1 hour 59 minutes, fourth film *Paan Singh Tomar* is of 2 hours and 13 minutes and fifth film *Manjhi: The Mountain Man* is of 2 hours and 1 minute. There is a slight variation of few seconds at the beginning of Act I of different films as the initial credit sequences without the narrative action have not been taken into consideration (as discussed in Chapter 3) and the same holds true for the ending of Act IV. Similarly, the beginning and ending of the acts vary by few seconds for different films as the act is demarcated at the shot closest to the 30th minute, 60th minute, 90th minute and at the end of the film before the credits.

The following table No. 6 describes the division of the five films in four acts according to Shot Duration (SD) and Shot Number (SN).

Table 6: Shot division into four Acts

		Aligarh		*Mary Kom*		*Rang Rasiya*		*Paan Singh Tomar*		*Manjhi*
ACT 1	SD	02:00-30:09	SD	03:03-30:03	SD	01:00-30:00	SD	01:52-30:00	SD	02:09-30:00
	SN	1 – 136	SN	1-555	SN	1-465	SN	1-468	SN	1-413
ACT 2	SD	30:09-60:03	SD	30:03-60:02	SD	30:00-60:00	SD	30:00-60:07	SD	30:00-60:01
	SN	137-316	SN	556-1350	SN	466-957	SN	469-825	SN	414-806
ACT 3	SD	60:03-90:04	SD	60:02-89:54	SD	60:00-90:01	SD	60:07-89:55	SD	60:01-90:05
	SN	317-467	SN	1351-1810	SN	958-1412	SN	826-1216	SN	807-1183
ACT 4	SD	90:04- 114:12	SD	89:54-117:09	SD	90:01-116:05	SD	89:55-128:28	SD	90:05-117:19
	SN	468-565	SN	1811-2630	SN	1413-1774	SN	1217-1790	SN	1184-1534

4.3.1 Act-wise Organization of the Narrative Content

This section of the chapter discusses how the narrative content is organized into four acts with an objective to trace any similarity in the depiction of events across the sample of five films.

Act I

Aligarh starts with the controversial case of homosexuality of Professor Siras coming to light and the series of events that follow engulf him in an endless cycle of gloom and trauma. The first 30 minutes also project the introduction of the reporter Deepu Sebastian who acts as a friend and support for the Professor throughout the proceedings of the case. Deepu struggles hard to seek permission to cover the story of Professor Siras and when he gets a chance to meet him, his cameraman friend offends the Professor who bashes them badly. First part ends with Deepu being disappointed and sending his friend back and starts devising new ways to meet Prof. Siras.

Mary Kom starts with Mary about to deliver her first child and gets stuck on her way to the hospital due to an unrest on the streets and continuous rainfall. The flashback takes the narrative to the childhood of Mary and her passion for boxing can be witnessed from the very beginning despite the opposition of her father. This section also shows the rebellious streaks in Mary's character in challenging the conventions and aspiring for the extraordinary since her childhood. After growing up, one day she accidently lands up in the Boxing academy and meets her coach who agrees to train her after initial reservations. The act ends with Mary celebrating with her friend Onler, her first victory at Women's State Open Championship at Calcutta in 2000.

Rang Rasiya starts with the auction of Raja Ravi Varma's paintings and large public protest. The flashback takes us to the artist's childhood which establishes his extraordinary talent and

unconventional approach as he paints the walls of the temple, which are too sacred for such an act. In a series of continuous flashbacks, the act shows us the marriage of Raja Ravi Varma, and the subsequent differences with her wife over his paintings. The act has the instances of him getting the royal patronage and the title of *Raja* but soon the king passes away and he leaves the village and goes to Mumbai. He meets Sugandha who now becomes his muse and lover. His paintings earn him the charges of obscenity and a legal case is filed against him for hurting the cultural and religious sentiments of the people. The act ends with him going to a meeting of Indian National Congress where he meets Frenny and a life-long friendship starts which continues to grow even in the darkest phases of his life.

Paan Singh Tomar starts with a reporter trying to seek an opportunity to take Paan Singh's interview. During the interview, the flashback takes the narrative to his youth when he joins the army. First act deals with how he gets selected for sports in the army and the acts ends with him winning a medal at XXXIII National Games, Cuttak. He has been shown with his loving wife and two kids.

Manjhi starts with Dashrath Manjhi being devastated after his wife's death and is shown throwing stones at the mountain. The act shows his childhood marriage and him running away from the village when his father forces him into bonded labour and hands him over, to the village Mukhiya. Dashrath's rebellious and righteous character is highlighted here. The act also shows the atrocities of caste system on lower castes and their miserable conditions. After many years, Dashrath comes back and meets Phaguniya, to whom he has been married as a child. Her father refuses to send his daughter with Dashrath and instead tries to marry her off somewhere else. The act ends with Dashrath sneaking into her wife's house and convincing her to come along with him.

It can be observed that all the films start from a crucial phase of the protagonist's life which changes the entire course of his/her life. Professor Siras gets devastated and defamed with

his sexual orientation being exposed; Mary Kom's ambitions become less important after becoming a mother and she starts losing her popularity and struggles hard to achieve all that back, Raja Ravi Varma faces a lot of problems throughout his life because of the controversial nature of his artwork which is evident from the opening scene, Paan Singh Tomar is being sought after by the police even harder once the interview he gives gets published and Dashrath Manjhi spends twenty two years of his life breaking down the mountain to pieces which has taken the life of his wife.

Similarly act I of all the five films end with the beginning or growing of a relationship which is the source of motivation for the protagonist and acts as a life-long support. In *Aligarh,* it's the efforts of Deepu who tries to be a help to Professor, in *Mary Kom* she celebrates her happiness with Onler who later becomes her husband and an immense support, Raja Ravi Varma meets Sugandha and Frenny who both play a very significant role in his life, Paan Singh is shown with his family which is his support system and Dashrath in *Manjhi* also tries to bring back his wife, who motivates and inspires him even after her death.

Act II

With the start of act two, in *Aligarh* one can witness the growing friendship and trust between Prof. Siras and Deepu. Deepu is able to interview the Professor and convinces him to fight for his rights. There are a lot of people, members of LGBT community and some NGOs who come forward to support him in his struggle for justice. Meanwhile, he is asked to vacate his house from the university premises as he is suspended from the university. Amidst the lurking sadness, act two also instills some hope through court proceedings and Siras's determination to stand up for his rights. The act ends with a scene where Prof. Siras goes to seek help from his colleague and friend but returns back disappointed as he is fated to suffer the trauma and injustice alone.

In *Mary Kom,* Mary starts enjoying the initial success but has to bear the brunt of her father's anger and her father stops talking to her. An important development in Mary's life gets highlighted in this as she gets married to Onler and also conceives her twins. Therefore, it sets the pace for further hardships in her life wherein her decision to get married without asking her coach makes him furious and he refuses to train her further.

In *Rang Rasiya*, this act shows the artist at the peak of his career. He roams around the entire country to know about the mythological and cultural stories that could be depicted through paintings. His exhibition under the patronage of Baroda king, makes him a very popular painter who dares to bring Indian Gods and Goddesses out of the temple to be worshipped by all sections of the society through his paintings. But Dharmaguru Chintamani accuses him of obscenity and drags him to the court which changes the entire course of his life.

For *Paan Singh Tomar* act two starts with him losing the race at Asian games in Tokyo but he compensates the loss with his victory at the International Defense Meet. An important event in this act is that Paan Singh has to take retirement from the army owing to the unfavorable conditions at this village because of some property issues. In the last part of this act, Bhanwar Singh (Paan Singh's cousin, responsible for property dispute) brutally beats his son and when Paan Singh goes to the police to file a complaint Bhanwar Singh attacks his family in which his mother gets killed. As a consequence, Paan Singh is forced to take up weapons and turns into a dacoit or a Baagi.

For *Manjhi* act two starts with Dashrath and Phaguniya coming together and they are happily married. Though the act at times sensitize us to the plight of lower classes in villages prevalent at that time but on the whole it focuses on the familial bliss of Manjhi's life. It's only in the end of the act, things turn upside down and in an accident Phaguniya slips from the mountain and loses her life which leaves Dashrath devastated.

Again, as can be observed all the films proceed in a similar fashion in act two and a pattern of events can be identified where the act starts on a positive note with the initial success, further consisting of a series of events comprising of both ups and downs in a protagonist's life but ends with an event that transforms the entire course of his/her life and sets the ground for extreme situations and challenges. In *Aligarh*, it's the denial for help and the declaration of protagonist's sad situation, in *Mary Kom* her duties as a mother and struggles between her personal and professional life sacrificing her ambitions, Raja Ravi Varma finds himself in a legal fight, Paan Singh loses his mother and *Manjhi*, loses his wife. It's the miserable situation for all of them at the end of act two which sets the background for further action.

Act III

In act three, of the film *Aligarh*, Deepu investigates the case further and goes to meet Irfan, who is involved with Professor Siras, but gets thrashed. The progression of court proceedings is shown and we get to know of Siras's life in greater detail as the bond between him and Deepu grows. Finally, the act ends with a court scene.

In *Mary Kom*, act three shows Mary struggling with her motherly duties and her ambitions. She goes into oblivion but with the motivation of her husband she starts her training again. She even participates in a match without her coach in which she loses her temper and accuses the jury of racism and this gets her banned by the Boxing Federation. Consequently, she has to apologize against her wish so as to continue with her career.

In *Rang Rasiya*, the act starts with the establishment of a printing press by Raja Ravi Varma, his paintings gain popularity but the major turn of events take place with the printing press catching fire, court case turning against him, plague in the city symbolically worsening the conditions. He also gets into a fight with his business partner Govardhandas over the leaked

paintings of Sugandha and the act culminates with him falling terribly ill owing to the circumstantial pressure and stress of the unfavorable series of events.

In *Paan Singh Tomar*'s act three, Paan Singh maintains a full-fledged gang and trains it on military line, he avenges the death of his mother by killing Bhanwar Singh. However, in the end of the act, he is deceived by the Sarpanch of a village in which he stays for some time, gets attacked by the police and loses his elder brother in the struggle.

In *Manjhi*, it's the constant struggle of Dashrath to break the mountain which is being depicted in the third act, with instances of his hard work yielding results but the act ends with him being cheated by Mukhiya's son for a sum of 25 lakhs which have been sanctioned by the government to construct the road through the mountain.

Act three in all the films heightens the complexities and the nature of the struggle and therefore, the narrative moves towards the resolution and the ultimate culmination of the narrative in act four. In almost all the films, act three ends on a sad note, dealing with which the protagonist completes his story in the subsequent and last part of the film.

Act IV

As act four takes the narrative towards the final resolution, the film *Aligarh* has the instances of Professor Siras at a Gay Party. He finally wins the case and the entire LGBT community celebrates. Sadly, the film ends with Professor Siras committing suicide and Deepu being left devastated.

In *Mary Kom*, Mary finally manages to get her training resumed by her coach, wins many titles but struggles with the ill-health of her son. In the end, however she wins the *World Amateur Women's Boxing Championship* for the fourth time and her son also gets operated successfully.

In *Rang Rasiya*, the fourth act shows the narrative moving towards a better conclusion with Raja Ravi Varma helping Phalke to get the cinematograph and finally winning the court

case. But the story ends on a sad note as Sugandha commits suicide and Raja Ravi Varma is left struggling with trauma and hopelessness though he has Frenny at his side to motivate him through such adverse conditions.

In *Paan Singh Tomar* also, Paan Singh is successful in avenging the wrong done to him and his family but he falls into a trap after being deceived by his own gang member and eventually gets killed in an encounter.

In *Manjhi*, Dsharath marries off her daughter, and finally manages to make a road through the mountain after a relentless effort of twenty two years. The film ends with everybody celebrating the success and Dashrath is shown remembering his wife who has been his constant inspiration and sole motivation even after her death.

In all these films, the protagonist succeeds in the task undertaken after facing all the challenges and except for *Aligarh* and *Paan Singh Tomar*, none of the films end with the death of the protagonist rather they end on a positive note with further hopes for a better life.

Act-wise mean and median is calculated to analyse the cutting rate (transition rate) and pace of the acts and the shot duration distribution.

4.3.2 Descriptive Statistics of the Four Acts.

Mean

Mean of the shot duration gives the ASL (average shot length).

Table 7: Act-wise ASL of the films

FILM[1] / ACTS	F1	F2	F3	F4	F5
ACT 1	12.1	2.9	3.6	3.6	4.1
ACT 2	9.9	2.2	3.6	4.8	4.5
ACT 3	11.8	3.8	3.9	4.5	4.7
ACT 4	14.2	1.9	4.3	4.1	4.6

Table 7 presents the average shot length of the four acts of all the five films. As observed earlier also, the film *Aligarh* stands out clearly from the rest of the sample as far as the ASL

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[1] F1=*Aligarh,* F2=*Mary Kom*, F3= *Rang Rasiya,* F4=*Paan Singh Tomar,* F5=*Manjhi*

and median are concerned. ASLs for the first act are quite similar, with the mean values of both F2 and F5 being close to F3 and F4. For the second and the third act, F2 and F3 have similar ASLs and F4 and F5 have similar ASLs. For act four, F1 and F2 have the highest and the lowest ASL, and the rest three have similar values.

The reason for *Aligarh* having the largest value for average shot duration and *Mary Kom* having the smallest value, for act four, is due to the stark opposition of the climax in the two films. In *Aligarh,* it's the traumatic nature of the events and protagonist's life in the last part which is depicted through relatively longer shots and slow cutting rate thereby increasing the ASL, whereas on the other hand in the last segment of *Mary Kom* it's the fast paced action which calls for shorter shot durations and faster cutting, thereby decreasing the ASL in the last part.

An interesting trend can be observed when the ASLs of the four acts are compared. The ASL of first act is less than that of the fourth act in all the films which means that the fourth act has longer shots as compared to the first act, which establishes that the transition rate or the pace of the first act is more than the fourth in all the films. The observation can be attributed to the fact that since the first act is the establishing one, the pace of the action is usually higher which demands a shorter ASL.

Mary Kom deviates from this pattern and is an exception because the last act consists of a boxing match which is depicted using shots of shorter duration (as short as of one second) along with the parallel editing of the operation scene of her son which is an equally intense situation, and hence the transition rate is faster with ASL being small.

Median

The medians of the four acts for all the films are presented in table 8 and this also shows patterns similar to that in ASL results. With *Aligarh* being the most distinct, in act one, F2, F4 and F5 have exactly the same median with F3 being quite close. Similarly, for both acts three and four medians of F2 and F3 are same and F4 and F5 are also same. Act four observes similar medians for F3 and F5. Thus we can conclude that the act-wise analysis of

medians also show that *Aligarh* deviates the most and the shot length (duration) distribution is similar for the other four films.

Table 8: Act-wise Median of the films

ACT/FILM[2]	F1	F2	F3	F4	F5
ACT 1	6	2	3	2	2
ACT 2	7	2	2	3	3
ACT 3	8	2	2	3	3
ACT 4	9	1	3	2	3

4.4 Multiple Linear Regression

Since the systematic usage of cinematographic elements is a significant marker of film style and genre (as explored through literature review), it is important to study the relationship between these elements and understand how they interact with each other and what role they play in determining the duration of a shot (smallest unit of film considered for study)

In order to analyse the combined predicting effect of the three independent (predictor) variables (Shot scale, shot angle and camera movement) on the dependent variable (outcome), shot duration; multiple linear regression is performed, which is a statistical technique that uses several explanatory variables to predict the outcome of a response variable. The results have helped to understand to what extent shot duration is explained by scale, angle and movement.

Assumptions of Regression (From Andy Field, 2013)

1. Variables types: The dependent/outcome variable i.e. shot duration (SD) is continuous and the independent/predictor variables; shot scale (SS), shot angle (SA), and camera movement (CM) are categorical, which is a condition where multiple linear regression can be applied.

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[2] F1=*Aligarh,* F2=*Mary Kom*, F3= *Rang Rasiya,* F4=*Paan Singh Tomar,* F5=*Manjhi*

2. No perfect Multicollinearity: Multicollinearity exists when there is a strong correlation between two or more predictors in a regression model. If there exists a perfect collineraity between predictors, it becomes impossible to obtain unique estimates of the regression coefficients because there are an infinite number of combinations of coefficients that would work equally well. It can be checked through collinearity diagnostics known as variance inflation factor (VIF) and tolerance statistics which is reciprocal of VIF. VIF value should be below 10.

3. Independent errors: According to this assumption, the residual terms should be uncorrelated (or independent). It relates to lack of autocorrelation. This can be checked using Durbin -Watson coefficient, which is a test for autocorrelation. The Durbin-Watson value should lie between1 to 3.

4. Normally distributed errors: Residual errors are normally distributed for all the films. Central limit theorem assures that even when the error is not normally distributed, when sample size is large, sampling distribution will still be normal. Therefore, violations of this assumption usually have little/no impact on conclusion for large samples. In the present study, total number of shots identified are 8293, which is fairly large and reliance on central limit theorem takes care of this assumption.

Table 9 of model summary, gives us the values of R, R^2 and the Durbin Watson statistic. R are the values of the multiple correlation coefficient between the predictors and the outcome. It gives us the correlation effect of scale, angle, and movement on shot duration. It can be observed that the values are quite similar for films 1, 2, and 4 and for films 3 and 5.

Table 9: Film-wise Regression/ Model Summary

FILM	Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
				Model Summary[b]		
1	1	.138[a]	.019	.014	16.038	1.825
2	1	.112[c]	.013	.011	3.397	1.563
3	1	.204[c]	.042	.040	4.940	1.599
4	1	.152[c]	.023	.021	4.718	1.659
5	1	.262[a]	.068	.067	4.795	1.616

a. Predictors: (Constant), MOV, SCALE, ANGLE
b. Dependent Variable: SD_SEC
c. Predictors: (Constant), MOV, ANGLE, SCALE

R^2 is a measure of how much of the variability in the outcome is accounted for by the predictors. Observing the values given in the table 9, we deduce that for film 1, R^2 is .019 so the predictor variables which are scale, angle and movement can explain only 1.9% of shot duration. This further means that shot duration depends on these three variables to an extent that they can bring about 1.9% of the change in it but the rest of it is explained by some other variables not considered here. This further tells us that the duration of a shot in a biopic is very minimally explained by these three elements of cinematography. Similarly, in films 2 and 4, only 1.3 % and 2.1% of the total variation in shot duration can be explained by the three predictor variables. Its highest for film 5, i.e 6.8% followed by film 3, i.e 4.2%.

The Durbin Watson statistic informs us whether the assumptions of independent errors is tenable and as per the norms, the value should be between 1 and 3. It can be seen from the table for all the films the assumption has been met.

In table 10, which is the ANOVA table given below, the significance value (sig) is less than 0.05 ($p < 0.05$), and therefore the regression model is significantly predicting the relationship between the outcome and predictor variables.

Table 10: Film-wise Regression/ANOVA table

FILM_NO		Model	Sum of Squares	Df	Mean Square	F	Sig.
			ANOVA[a]				
1	1	Regression	2817.061	3	939.020	3.651	.013[b]
		Residual	144302.295	561	257.223		
		Total	147119.356	564			
2	1	Regression	383.829	3	127.943	11.088	.000[c]
		Residual	30300.157	2626	11.539		
		Total	30683.986	2629			
3	1	Regression	1882.925	3	627.642	25.720	.000[c]
		Residual	43193.256	1770	24.403		
		Total	45076.180	1773			
4	1	Regression	934.078	3	311.359	13.986	.000[c]
		Residual	39761.521	1786	22.263		
		Total	40695.598	1789			
5	1	Regression	2584.959	3	861.653	37.479	.000[b]
		Residual	35175.039	1530	22.990		
		Total	37759.998	1533			

a. Dependent Variable: SD_SEC
b. Predictors: (Constant), MOV, SCALE, ANGLE
c. Predictors: (Constant), MOV, ANGLE, SCALE

Table 11 which presents the coefficients of regression output given below, unstandardized Beta coefficients (b-values) tell us about the relationship between shot duration and each predictor variable. It also tells us about the nature of the relationship i.e, positive or negative; along with the information as up to what degree each predictor affects the outcome if the effects of all other predictors are held constant. Observing the b values, for films 1, 2 and 5 we find that shot scale and shot duration have a negative relationship. This means with the increase in shot duration, scale decreases (moves from category 7 towards 1) which further means long durations have long shot scales. But shot angle and camera movement each has a positive relationship with shot duration, which simply means as shot duration increases angle and movement also increase (angle moves from category 1 to 3, 3 being neutral and movement increase from category 1 to 4) and this explains that shots of longer duration are neutral and have more movement as compared to

shots with shorter duration. In films 3 and 4, both Scale and angle are negatively related and only camera movement is positively related with shot duration.

Table 11: Film-wise Regression/ Coefficeints

FILM_NO	Model		Unstandardized Coefficients	Std. Error	Standardized Coefficients	t	Sig.	Collinearity Statistics	
			B		Beta			Tolerance	VIF
1	1	(Constant)	9.586	10.409		0.921	0.358		
		SCALE	-0.889	0.507	-0.074	-1.756	0.08	0.988	1.013
		ANGLE	1.007	3.463	0.012	0.291	0.771	0.986	1.014
		MOV	3.084	1.109	0.116	2.782	0.006	0.999	1.001
2	1	(Constant)	3.439	0.6		5.734	0		
		SCALE	-0.356	0.062	-0.12	-5.747	0	0.856	1.169
		ANGLE	0.364	0.216	0.035	1.686	0.092	0.859	1.165
		MOV	0.019	0.057	0.007	0.34	0.734	0.991	1.009
3	1	(Constant)	4.508	0.885		5.094	0		
		SCALE	-0.331	0.09	-0.088	-3.66	0	0.939	1.065
		ANGLE	-0.17	0.285	-0.014	-0.597	0.551	0.944	1.06
		MOV	1.122	0.149	0.176	7.534	0	0.995	1.005
4	1	(Constant)	4.218	0.923		4.569	0		
		SCALE	-0.143	0.088	-0.039	-1.628	0.104	0.932	1.073
		ANGLE	-0.151	0.309	-0.012	-0.489	0.625	0.933	1.072
		MOV	0.706	0.115	0.144	6.153	0	0.999	1.001
5	1	(Constant)	4.949	0.627		7.887	0		
		SCALE	-0.535	0.087	-0.16	-6.153	0	0.901	1.11
		ANGLE	0.094	0.201	0.012	0.465	0.642	0.9	1.111
		MOV	1.229	0.146	0.208	8.431	0	0.999	1.001

To check the colineraity in the data, we observe the values of VIF, which should be less than 10. The VIF values being very close to 1 confirm that colineraity is not a problem with the models for all the films.

With the help of this analysis it can be broadly concluded that in the entire sample of biopics there is a similar type of relationship between predictor variables and outcome variable and

the dependence of shot duration on the cinematographic elements of scale, angle and camera movement is almost similar and is quite low.

4.5 References

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