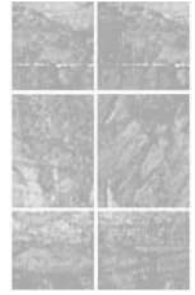# Which way did he go? Film lateral movement and spectator interpretation

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ABSTRACT

Elements of on-screen motion in film hold specific meanings and contexts depending on their usage in the moving image. The common wisdom that left-to-right is primary, preferred, and evaluated as more positive has not been directly tested with spectator responses. This study focuses on how film spectators interpret lateral motion, comparing left-to-right and right-to-left. A post-test only experimental design utilized footage from a short film as the stimulus. Participants completed a questionnaire after watching the sequence, answering items concerning affective and perceptual evaluations of the sequence. ANOVAs showed a significant difference between the experimental groups on the Positive Affect spectator evaluation scale and the Activity scale, such that right-to-left motion was perceived more negatively and as less active. There were no differences in the Uniqueness scale. Additionally, the study found no support for potential moderating impacts of religion or psychometric characteristics, indicating robustness of the main findings.

KEYWORDS

film • handedness • lateral motion • positive affect • primacy of the right

INTRODUCTION AND LITERATURE REVIEW

After a long tradition of critical scholarship on film, there is increasing interest among scholars in the empirical, scientific study of the medium. The Society for Cognitive Studies of the Moving Image, for example, emerged in the late-1990s to promote empirical approaches to the study of film and other moving image media, and recent research has answered the call by initiating investigations into moving image phenomena from both quantitative and qualitative empirical perspectives (e.g. Lieberman et al., 2009). Despite this emerging trend, there remain many unanswered questions about the mechanisms by

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which film exerts a powerful influence over audiences. Furthermore, many creative production techniques regularly employed by filmmakers and discussed in the critical literature have yet to be submitted to empirical testing.

This study considers how lateral directionality of film character and camera movement can affect spectator reactions. First, we review relevant literature and predict that audiences will respond differently to film content in which movement occurs in the two different lateral directions. Then, we present the results of an experiment testing these predictions, discussing the findings in light of film literature and proposing implications of this research for film and other moving image scholars.

The significance of formal features (i.e. Film production techniques)

The 'language' of film was in great part developed prior to the 'talkies' (Eisenstein, 1977[1949]), establishing a basic visual communication system, stemming from the use of various production and post-production techniques, movements, and other elements that can help establish meaning or elicit emotion within viewers without the use of dialogue (Bordwell et al., 1985; Salomon, 1994). An analysis of such language has been largely the province of semiotics, without empirical tests of prevalence or of spectator response (Metz, 1974; Peters, 1981; Stam et al., 1992; for coverage of general semiotics, see also Eco, 1976).

However, exceptions are noteworthy. Systematic, quantitative content analyses of film content have been on the increase, but only in recent years (for a review, see Neuendorf, 2017). Historically, empirical studies of spectator outcomes have been even less common. Several studies have used true experimental methods to test in contemporary times what Soviet Montage scholar/filmmaker Lev Kuleshov claimed to have proved in the 1920s – the so-called Kuleshov Effect,[1] whereby the juxtaposition of two or more edited shots creates a new and particular meaning for the spectator, eliciting emotional responses that might not be elicited from any single image alone (Kuleshov, 1974). Joly and Nicolas (1986) reconstituted Kuleshov's experimental stimuli and produced new footage of their own, finding confirmation of the Kuleshov Effect among their French film-school participants. Prince and Hensley (1992) executed a more rigorous test, using naïve participants with novel footage, and failed to confirm the effect. Neuendorf et al. (2012; Neuendorf and Egizii, 2017), also using naïve subjects, confirmed the Kuleshov Effect with caveats (e.g. the particular emotions expected for the man–child juxtaposition were not found to be as expected, but were nevertheless significantly different from the other conditions). Despite the mixed findings from a limited number of studies, it is assumed by scholars that the manner in which shots are edited together can indeed lead to an emotional response from the audience (Cook, 2004). Dick (2005) explicitly suggests that one shot in a film can acquire meaning

from a second shot when the two shots are linked together in instantaneous succession with one another.

Experimental tests of the efficacy of other particulars of film language have been rare and non-programmatic (see Shimamura, 2013). The current research is intended to begin to fill some of the empty space in the empirical testing of elements of the language of cinema.

The term mise en scene is used to describe how filmmakers utilize the placement of objects and characters within the frame in order to help establish meaning for the audience (Giannetti, 2014; Phillips, 2005). Just as the careful design of the mise en scene and evocative editing may affect spectators' cognitive interpretation of what they are seeing within a film, character movement on the screen also can be important in helping audience members determine the meaning of events within a story (Giannetti, 2014). Certainly, movement on the screen is a part of the language of film that audience members might either consciously or subconsciously apprehend.

The Three Axes Of Movement On Screen

Vertical movement on the screen is seen by some critical/cultural scholars as having potential impact upon the spectator's affective/emotional interpretation of a character. Giannetti (2014) posits that onscreen movement in an upward direction can make a character seem stronger or more dominant, while downward movement can be construed by the audience as a character being weaker or subservient. Kuleshov (1974) went even further in his assessment of the impact of vertical movement, suggesting that quicker movement in the upward direction can be interpreted by the audience as a character having strength, while slower upward movement toward the top of the frame can signify that a character is weaker. Similarly, Kuleshov pointed out that quicker downward movement by a character can be interpreted as weakness, while slower movement toward the bottom of the frame can be seen as signifying a character being stronger. Thus, speed of character movement and direction of character movement might actually interact with one another to create a general statement about a screen character's strength or lack thereof.

The vertical movement through screen space is just one of three axes of movement laid out by Kuleshov. The second axis is movement toward or away from the camera lens and ultimately the viewer. Kuleshov's Soviet Montage contemporary, Sergei Eisenstein (1975[1942]: 204), described the movement away from the lens as 'a spatial movement towards the horizon, or into the depth'. Psychologically, character movement away from the camera can infer that a character is withdrawing or is distancing himself or herself emotionally from the audience, and any emotional intensity will generally decrease, according to this viewpoint. If a villain in a film moves away from the lens, notes Giannetti (2014), a 'protective distance' is formed between the villain and the audience; thus the audience will feel some sense of relief. Movement along that same axis *toward* the camera, however, might be interpreted as an

aggressive move (Giannetti, 2014), so that the character might be seen as 'hostile [or] threatening' by the viewer. Indeed, research in the area of proxemics (the study of the human use of space, including considerations of personal distance; e.g. Hall, 1959) indicates that proximity between individuals can be emotionally charged; a violation of the norms of personal space (i.e. if someone comes too close) will result in greater tension, and feelings of anxiety and discomfort (Sundstrom and Altman, 1976). Research on virtual environments confirms that norms of real-world nonverbal behaviors, including proxemics, seem to hold for mediated worlds as well (Yee et al., 2007), including an aversive reaction to the invasion of personal space caused by crowding (Jeffrey and Mark, 1999). Bailenson et al. (2003) found that individuals engaged in a virtual environment attempted to 'move' out of the way of an approaching human figure that invaded their personal space, and avoidance magnitude was positively and significantly correlated with negative emotional reactions.

Thus, according to film theorists, scholars, and content creators, character movement within the frame along two of the axes of screen movement, as described by Kuleshov, can impact the spectator's cognitive or emotional response to the moving image. This has yet to be empirically tested in the realm of film.

Kuleshov (1974) defined the third axis of character movement as the lateral movement of a character across the screen, either from the left side of the screen to the right, or from the right side of the screen to the left. He explained that movement along any line of action set at an *oblique* angle to the three axes can be more difficult or more of a strain for viewers to interpret, but that lateral movement along this third axis is more distinct to an audience and is consequently easier for spectators to follow. It seems likely that aspects of this lateral movement might offer viewers some latent meaning (Giannetti, 2014). And certainly, in practice, filmmakers have used lateral motion to try to denote meaning for particular character traits or plot elements.

Case Examples Of Lateral Direction And Meaning In Film: *Strangers On A Train* And *Lola Rennt*

Idiographic evidence contained in Alfred Hitchcock's 1951 film *Strangers on a Train* seems to provide a good example of a filmmaker's efforts to use lateral character movement to convey meaning. Before the audience ever sees the faces of any characters, Hitchcock introduces us to the film's protagonist and antagonist in a series of cross-cutting shots revealing only their legs and feet. The characters walk in opposite lateral directions, implying that these two people will eventually cross paths or may come into conflict with one another. In this sequence, each time we see a pair of plain dress shoes and slacks, which we later learn belong to the film's protagonist, the virtuous and likeable Guy Haines, the walking motion is from screen left to right. In contrast, the very distinctive two-tone shoes and pinstriped pants of the antagonist, the

charming sociopath Bruno Antony, are always seen traveling from screen right to left. Guy, the protagonist, is moving in a direction with which we are comfortable and which we find acceptable, while Bruno, the antagonist, is moving in a direction that we deem uncomfortable, meaning we may already realize that something is not quite right about him. This could be exactly what Hitchcock is trying to convey to his audience (although Hitchcock himself did not profess to any intentionality in this regard; Auiler, 1999).

Giannetti (2014) says that a character seen moving from left to right or right to left across the screen is seen as a character of action due to the speed of the motion across the lens. In Tom Tykwer's film *Lola Rennt* (Arndt and Tykwer, 1998), the movie's protagonist, Lola, is definitely a person of action. An idiographic analysis of this film suggests that the notion of meaning generated by directionality of character movement along the lateral axis seems to be utilized by this director as well.

In *Lola Rennt* (1998), Lola has received a phone call from her boyfriend Manny notifying her that he is in grave danger. He has lost 100,000 Deutschmarks that belong to his gangster boss, and needs to replace this money within the next 20 minutes. In three separate 20-minute segments, the audience is presented with three alternative realities of Lola desperately trying to get this money to Manny. In each segment, Lola tries a different approach, all of which involve her running across town to reach Manny, and in each version of events a different outcome occurs. In the first segment, Lola is shown running primarily from right to left for much of the 20 minutes. She tries to borrow the money from her bank-president father, only to be turned down, and arrives slightly late to find Manny holding up a grocery store. She joins him in the robbery, and they run off with the stolen money, only to have Lola shot by a police officer.

The second segment features Lola again running across town to Manny in the right to left direction. This time she robs her father's bank at gunpoint, escapes with the money, arrives in time to stop Manny from robbing the grocery store, but this time Manny is hit by an ambulance as he crosses the street to meet Lola.

In the third segment, Lola starts out by running once again to the bank, in a right to left direction, but this time misses her father by a minute. She then, for the first time, places her faith in something other than herself. While running from left to right for the first extended period of time, Lola prays for some sign that will help her procure the money that Manny needs. It is after running in this seemingly positive direction that she is stopped suddenly by a truck horn, looks up, and sees a casino. She takes this as her sign from above, enters the casino and proceeds to win the needed 100,000 Deutschmarks. Manny also finds the original bag of money he lost, and both he and Lola end the film 100,000 Deutschmarks ahead. It seems likely that Tykwer was aware that extensive left to right character movement should be reserved for Lola for the moment when she places her faith in God, and goes about obtaining the money in a socially acceptable way.

Lateral Movement: A Primacy Of The Right

A surprising number of scholars have addressed the notion of motion within the film frame, without weighing in on the possible differences between left to right and right to left motion (e.g. Arnheim, 1957; Kracauer, 1960). In a rare empirical, quantitative investigation, Salt (2009) conducted a content analysis of form techniques in 20 selected films released in 1999, and while he counted each pan and lateral tracking shot, he did not measure whether the motion occurred left to right or right to left.

Eisenstein (1975[1942]) argued that in classical art, the artist can control the 'path of the eye' of the observer, meaning that the artist can visually draw an observer's eye to a specific point on the canvas and dictate which direction the eye then travels over the painting as it takes in the work as a whole. This is done through the careful composition and placement of the painting's subjects on the canvas. Eisenstein believed that filmmakers have that same ability as artists to control the 'path of the eye' of the audience as it travels across the screen. In a pivotal sequence from his 1938 film *Alexander Nevsky* (Eisenstein and Vasilyev, 1938), in which Russian troops are about to take part in the famed 'Battle on the Ice' sequence, Eisenstein specifically chooses to lead the spectator's eye from screen left to screen right. Eisenstein wrote, 'So these separate movements of the eye from left to right throughout the sequence add up to a feeling of something on the left, striving "with all its soul" in a direction somewhere to the right' (p. 200).

Camera movement is a principal manner in which screen motion, and perhaps meaning, is manifested (Bacher, 1976; Giannetti, 1975), in the form of pans or lateral tracking shots. Whether it is character movement or camera movement, the idea that motion within the film frame is crucial and can be meaningful has been advanced by leading film scholars (Arnheim, 1957; Kracauer, 1960). Often a character's lateral movement is captured by a camera panning in the same lateral direction. O'Leary (2003b) calls this type of panning shot a 'pan of accompaniment'. In a content analysis of 20 films directed by Howard Hawks, O'Leary notes that the director dramatically favors panning from left to right, with 64 percent of all pans moving in that direction (a statistically significant difference). Hawks is not alone, as two different analyses of both older and newer Hollywood films suggest. O'Leary (2003a) examined 20 selected classic Hollywood films and found pans to the right outnumbered pans to the left by a ratio of 115 to 74. Salt (2005) looked at Hollywood films from 1995 on and found that directors often favor the left to right direction in unmotivated camera movements (i.e. those not following the motion of a character), though this tendency may be somewhat limited, as indicated by the underwhelming ratio of 649 to 592. Still, an inclination toward rightward camera movement is apparent, and it might be asked why this preference exists. And it might also be asked what differences in spectator response accrue to the two types of camera motion.

Salt argues that the predominance of human right-handedness and right-footedness might serve as an explanation for this rightward favoritism. He writes:

> Such physical tendencies can be expected to carry through to camera operating, since a pan to the right is more readily made by a right-handed person, because the required clockwise rotation of the panning wheel on a geared head is more natural to a right-handed person than the anticlockwise turn required to pan left. (p. 103)

The argument for right-handed aesthetical rules being developed in the arts due to the larger population of people who favor their right hand is not a new one. In classical art, it is widely assumed that the source of light often originates somewhere toward the upper left portion of the canvas, because this makes it easier for right-handed artists to paint the effects of this light on the right-hand side of their work (Gombrich, 2000). Might this adherence toward right-handedness seen in camera operation and classical art ultimately and perhaps unknowingly compel film directors to move their characters from the left to the right, or pan predominantly from left to right? And is there something more to this choice of direction along the lateral axis? Can a director convey an unspoken meaning about a character and that character's situation by having them move either rightward or leftward?

Film directors may base their decision as to whether a character should move rightward or leftward across a screen on a rule that is rarely written or spoken about, which claims that character movement from the left of the screen toward the right of the screen is perceived by the audience as more normal or natural (Giannetti, 2014). The opposite is thought to be true of character movement from the right side of the frame to the left. It is conjectured that lateral movement in the leftward direction is perceived as unnatural or even uncomfortable, or perhaps even that a person moving in that direction is struggling. Exactly why an audience supposedly senses either naturalness or tension due to a difference in the direction of lateral movement is a matter that is up for debate, though Giannetti writes that it is 'because the eye tends to read a picture from left to right' (p. 99). Also, when reading text, people in Western cultures have this same tendency to read from left to right since most Western languages are presented horizontally in that direction (Bonfiglioli, 2011; Casasanto, 2009), thus movement in this direction seems more natural.[2]

Also, the side of the screen on which a character resides in a scene may provide further insight into why rightward movement may be seen as positive or natural. When discussing Alfred Hitchcock, Ebert (2004) states, 'He always used the convention that the left side of the screen is for evil and/or weaker characters, while the right is for characters who are either good, or temporarily dominant.' For this reason, a character who is good, and is on the left, or 'evil' side of the screen should strive to laterally move to the right side of the screen, and this movement could be perceived as positive or natural, while the

opposite feelings will be experienced by an audience witnessing a character moving from the right or good side of the screen toward the left or evil side.

This notion of objects located to one's left being bad, and objects placed on one's right being good, may again tie into the predominant right-handedness of the world's population (Casasanto, 2009). Research has indicated that people have the tendency to favor the side of their dominant hand. Since left-handers make up a small percentage of the overall population (estimates range from 7% to 10% worldwide over the past 50 centuries: Corballis, 2003;[3] Coren and Porac, 1977), it is possible that a right-dominant world exists, where the right side is connoted as 'right' and the left side is 'wrong', a notion that has been supported across numerous empirical studies (Casasanto, 2009).

Religious Implications Of Left To Right Movement

If, as Ebert (2004) suggests, the right side may denote 'good' and the left side 'evil' in films, is it merely due to the dominance of right-handedness in the world, or is there something more that might lead one to subscribe to this very value-laden assertion? We might examine the left–right issue from a religious perspective. As discussed in the Christian faiths, the right is the side reserved for those people whom Jesus will select to go to heaven, while those on the left will remain behind.

> And before him shall be gathered all nations: and he shall separate them one from another, as a shepherd divideth his sheep from the goats: And he shall set the sheep on his right hand, but the goats on the left. Then shall the King say unto them on his right hand, Come, ye blessed of my Father, inherit the kingdom prepared for you from the foundation of the world. (*Holy Bible, New Testament* [King James Version], 1993: 39)

Yet again, the right side seems to be favored over the left, and passages such as this from the Judeo–Christian traditions[4] might help to account for this notion that the left is the undesirable, and thus rightward movement should be the ultimate goal.

RESEARCH QUESTIONS

Based on literature outlining cultural and perceptual differences in left/right directionality, we pose the following two research questions:

RQ1: Will individual spectators attribute evaluations differently when observing movement in film from either left to right or right to left?

RQ2: Do Judeo-Christian religious beliefs serve a moderating function with regard to spectators' evaluations of film movement from left to right vs right to left?

In an exploratory vein, we question whether key psychometrics will moderate the impact of directional lateral movement. While contemporary

evidence does not support a relationship between handedness and any of the major personality inventories (Grimshaw and Wilson, 2013), the possible biological/brain-based origins of a primacy of the right leads us to wonder about the role of psychological traits in the response to rightward vs leftward motion. We have chosen the Eysenck PEN inventory of personality dimensions (psychoticism, extraversion, neuroticism), as well as standard scales of Openness to Experience (John et al., 1991) and Need for Cognition (Cacioppo et al., 1984). All five represent widely accepted personality measures, and all have been found to be related to media exposure patterns and habits in past research.

RQ3: Do major psychometric indicators (i.e. psychoticism, neuroticism, psychoticism, extraversion, openness to experience, and need for cognition) serve a moderating function with regard to spectators' evaluations of film movement from left to right vs right to left?

METHODS

Experimental stimuli

Selected footage from a short narrative 16mm film was utilized to construct a 55-second sequence highlighting character and camera lateral motion. In one version, all lateral motion was from left to right. In a second version, the 'flop' option in Avid Composer was used to simply switch the direction of all shots in the sequence – that is, all lateral motion in this version was from right to left. This electronic transform ensures that the sequences are perfect mirror images of one another. Both versions of the film sequence were silent.

The sequence was comprised of the following shots in the left to right version:

1. An exterior establishing long shot (LS) of a suburban house, with camera tracking motion from left to right.
2. An interior LS of a woman working at a computer at a dining-room table near three windows, shot from behind.
3. An interior panning shot, from left to right, from inside the dining room, following a man furtively passing the series of three windows; the camera catches brief glimpses of him as he passes from left to right.
4. An interior close-up (CU) of the woman on the left side of the frame, shot from behind, as she looks up, turning her head to the right.
5. In an interior LS, the camera follows the woman as she rises and exits the dining room, from left to right.
6. In an interior LS, the camera captures the woman from behind as she exits the back door, and stands on the porch looking at the backyard.
7. An exterior CU of the woman as she looks across the backyard, with her eyes tracking from left to right.
8. An exterior point-of-view (POV) shot of the woman's perspective, as she pans across the backyard, from left to right, ostensibly looking for the man.[5]

Validity of stimulus material

The film sequence used as stimulus material had no logos or text (which would immediately call attention to the manipulation), and it was crafted from footage from an in-production short film produced by faculty and students in the film program at a large urban university. The goal was to establish a degree of ecological validity without utilizing footage that participants would have previously seen.

Experimental protocol

Participants were recruited from Communication courses at a large urban university. The study was executed using Media Lab software, with viewing on standard desktop computer screens. In a posttest-only design with random assignment, each participant individually viewed one of the two versions of the stimulus film sequence. Efforts were made to ensure that participants remained blind to the study's intent and the nature of the manipulation. Participants were informed simply that they were to watch a film clip, and were asked to pay close attention to it. Nothing in the protocol informed the participants of the nature of the left/right lateral motion manipulation. After the viewing, participants responded to a series of questions on the computer via Media Lab. The protocol and the measurement instrument were approved by the university's human subjects Institutional Review Board (IRB).

Measures

A background questionnaire was administered via Media Lab prior to the experimental manipulation. This questionnaire included: (a) measures of standard demographics (including a measure of left- vs right-handedness); (b) exposure indicators for a wide variety of relevant media (including hours of television viewing 'yesterday', number of DVDs/videos viewed in the past month, and number of movies seen at a theater in the last month); and (c) psychometric indicators – short scales for the measurement of extraversion, neuroticism, and psychoticism (Eysenck et al., 1985), the John et al. (1991) scale for the measurement of Openness to Experience, and the Cacioppo et al. (1984) Need for Cognition scale.

In the Media Lab posttest, questions tapped concepts relevant to lateral motion differentiation. A series of nine semantic differentials tapped evaluative dimensions representing the three classic categories of stimulus differentiation (from Osgood et al., 1957, and Berlyne, 1971) as related to traditional cultural and popular interpretations of the symbolic meaning of left and right (Casasanto, 2009; Palka, 2002; www.whats-your-sign.com/symbolic-hand-meaning.html; http://boards.straightdope.com/sdmb/showthread.php?t=359438). The three dimensions are: Positive Affect (tapped via three semantic differentials: Good–Bad, Positive–Negative, Like–Don't Like), Activity (Fast–Slow, Active–Passive,

Interesting–Boring), and Uniqueness (Rare–Ordinary, Unnatural–Natural, Weird–Normal). All nine items were measured as related to the film clip just viewed, using an 11-point response scale, introduced in the following fashion: 'Please rate the clip on the following dimensions (Place a check in one box for each pair of descriptors)' followed by a matrix of nine lines of 11 equally distanced boxes, anchored by each of the nine pairs of bipolar adjectives (e.g. Good–Bad, Fast–Slow).

RESULTS

Description of sample

The sample of 101 undergraduates was 52.5 percent male, ranging in age from 18 to 54, with a mean of 25.3 years. Slightly fewer than two-thirds of the sample were White/Caucasian (64.0%), with 26.0 percent Black/African-American, 3.0 percent Asian-American, and 7.0 percent other or of mixed race. The proportion of respondents indicating they were left-handed was 10.9 percent, with 88.1 percent right-handed, and 1.0 percent ambidextrous. The participants reported watching an average of 2.28 hours of TV 'yesterday' (SD = 2.23), 1.55 movies at the theater in the past month (SD = 2.51), and 8.52 movies via DVD/BluRay/video/DVR in the past month (SD = 8.15).

The nine semantic differential items were grouped into the three evaluative dimensions as specified above: Positive Affect (k = 3, MIC[6] = .337, Cronbach's alpha [standardized] = .603), Activity (k = 3, MIC = .226, alpha = .467), and Uniqueness (k = 3, MIC = .295, alpha = .557). Means were taken for each of the three sets of items. The scores for these three dimensions were correlated as follows: Positive Affect and Activity – r = .318, p = .001; Positive Affect and Uniqueness – r = −.179, p = .073; Activity and Uniqueness – r = .067, p = .507.

The five standard psychometric scales were constructed via summation: Extraversion (k = 12, MIC = .357, alpha = .869), neuroticism (k = 12, MIC = .236, alpha = .787), psychoticism (k = 12, MIC = .086, alpha = .531), openness to experience (k = 10, MIC = .359, alpha = .848), and Need for Cognition (k = 18, MIC = .254, alpha = .860).

Analyses for RQ1: simple effects of directional movement

First, a set of single-factor ANOVAs tested whether condition (left to right vs right to left) demonstrated an impact on the three evaluative dimensions. The results are displayed in Tables 1 to 3, where we see evidence of a main effect for both Positive Affect scores ($F_{(1,99)}$ = 7.21, p = .009) and Activity scores ($F_{(1,99)}$ = 4.99, p = .028), in which the left to right condition was evaluated as possessing greater positive affect and higher activity. The Uniqueness scores did not differ significantly between conditions.

From the literature we referenced, as well as the idiographic evidence within films as described earlier, these findings generally seem to fall into line

Table 1. ANOVA test for positive affect scores.

Condition	M		SD		N
Left to right	4.67		1.73		48
Right to left	3.76		1.66		53
Total	4.19		1.75		101

Source	df	Mean square	F	Sig.	Eta squared
Main effect: Condition	1	20.66	7.21	.009	.068
Error	99	2.87			
Total	100				

Table 2. ANOVA test for activity scores.

Condition	M		SD		N
Left to right	5.62		1.74		48
Right to left	4.87		1.64		53
Total	5.22		1.72		101

Source	df	Mean square	F	Sig.	Eta squared
Main effect: Condition	1	14.17	4.99	.028	.048
Error	99	2.84			
Total	100				

with our suppositions of the primacy of rightward motion. Figure 1 displays graphically the mean comparisons tested via the three single-factor ANOVAs.

ANALYSES FOR RQS 2 AND 3: POTENTIAL MODERATORS

We next performed a series of tests of between-subjects effects of the two conditions with potential moderators of interest in an effort to determine potential alternative explanations and to provide additional details regarding the significant experimental manipulation impacts on Positive Affect and Activity.[7]

Religion was dummy coded into Judeo–Christian (1) or Other (0), in order to account for suppositions regarding Western religion as a key motivator of this effect (55% of the sample was self-designated as Judeo–Christian). As mentioned earlier, right and left hands are tied to positive and negative depictions in both the Christian and Jewish bibles. Two-factor ANOVAs were conducted with condition and Judeo–Christian status as the fixed factors, and the Positive Affect and Activity scales as dependent variables. For Positive Affect, the main effect for condition remained significant ($p = .009$), while the

Table 3. ANOVA test for uniqueness scores.

Condition	M		SD		N
Left to right	5.47		1.51		48
Right to left	5.66		1.81		53
Total	5.57		1.67		101

Source	df	Mean square	F	Sig.	Eta squared
Main effect: Condition	1	0.96	0.34	.560	.003
Error	99	2.80			
Total	100				
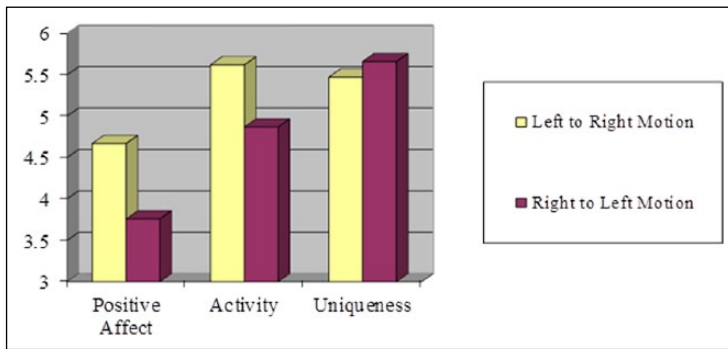
Figure 1. Single-factor mean comparisons.

main effect for Judeo–Christian religion and the interaction term were both non-significant. For Activity, as shown in Table 4, the main effect for condition remained significant ($p = .026$), and the main effect for Judeo-Christian religion was also significant ($p = .020$); the interaction term was non-significant ($p = .134$). Thus, differences in evaluation between the two stimulus conditions remain despite the use of religion as a control and potential moderator.

Tests for the psychometric indicators (extraversion, neuroticism, psychoticism, openness to experience, and need for cognition) found relatively few significant impacts, either direct or moderating. Two-factor ANOVAs were conducted with condition and each psychometric indicator (split at the median) as the fixed factors and the Positive Affect and Activity scales as dependent variables. As shown in Tables 5 through 7, three instances of significant main effects for the psychometrics were found – for psychoticism in the prediction of Positive Affect ($p = .034$) and Activity ($p = .029$) and for Need for Cognition in the prediction of Positive Affect ($p = .023$). In all three cases, however, the main effect of condition maintained significance, and there was no significant interaction effect. For the remaining seven psychometric analyses, there were no significant main effects nor significant interactions.

Table 4. Two-way ANOVA for activity scores, by condition and religion.

Condition	Judeo-Christian	*M*	**SD**	*N*
Left to right	No	4.96	1.61	23
	Yes	6.23	1.65	25
	Total	5.62	1.74	48
Right to left	No	4.71	1.72	23
	Yes	4.99	1.59	30
	Total	4.87	1.64	53
Total	No	4.83	1.65	46
	Yes	5.55	1.72	55
	Total	5.22	1.72	101

Source	*df*	Mean square	*F*	Sig.
Main effects:				
Condition	1	13.74	5.11	.026
Judeo-Christian	1	14.97	5.57	.020
Interaction effect:				
Condition X Judeo-Christian	1	6.13	2.28	.134
Error	97	2.69		
Total	100			

Importantly, in all tests, the inclusion of the potential moderating psychometric scales did *not* reduce the significance of the main effect of condition, nor were any significant interaction terms discovered.[8] Thus, the impact of condition is established as robust to the introduction of psychometric factors.

DISCUSSION

This study focused on a topic of film production that has been mired in theoretic speculation and myth (as noted by Ebert, 2004, and Salt, 2005), while at the same time often taught as fact. The results of this study show support for differing evaluations by spectators regarding the direction of lateral movement, with regard to Positive Affect and Activity. The robustness of these main findings in light of key controls/potential moderators – e.g. religion and psychometrics– clearly supports an interpretation of a preference for the right by spectators. This is definitely an important step in understanding not only effects in motion picture production and planning, but in understanding the underlying messages inherent within any visual communication.

The finding of no difference for the dependent scale of Uniqueness was unexpected, however. If indeed rightward motion is perceived as more 'normal' (Giannetti, 2014) then a difference should have been found on this

Table 5. Two-way ANOVA for positive affect scores, by condition and psychoticism.

Condition	Psychoticism	M	SD	N
Left to right	Low	4.89	1.80	24
	High	4.44	1.66	24
	Total	4.67	1.73	48
Right to left	Low	4.37	1.18	21
	High	3.36	1.82	32
	Total	3.76	1.66	53
Total	Low	4.64	1.55	45
	High	3.83	1.82	56
	Total	4.19	1.75	101

Source	df	M	F	Sig.
Main effects:				
Condition	1	15.86	5.72	.019
Psychoticism	1	12.87	4.65	.034
Interaction effect:				
Condition X Psychoticism	1	1.91	0.69	.409
Error	97	2.77		
Total	100			

scale. The results here clearly show a preference for rightward motion, but not a judgment that this direction is highly prevalent. It should be noted that while filmic movement may more frequently be shown as rightward, in real life we probably see as much leftward motion as rightward.

Two psychometrics proved to hold significant main effects for outcome measures. The mystery-type nature of the stimulus clip (i.e. a man sneaking around the windows of a house) might have played a part in these findings. The significant prediction of Positive Affect by Need for Cognition may be partly due to the particular content appealing more to those with higher Need for Cognition. Further, the significant predictions of both Positive Affect and Activity by Psychoticism might be due to those higher on that trait responding negatively to such a tension-producing stimulus. However, the role of psychoticism should be viewed with some caution, given the relatively low MIC and alpha coefficients for the psychoticism scale.

The results reported here fit fairly well with the idiographic film evidence presented earlier. The primacy of the right is a theme often repeated in popular culture. Films themselves sometimes reflect this perspective. For example, an important monologue from Charles Laughton's classic film *The Night of the Hunter* (Gregory and Laughton, 1955) explicitly describes this belief structure. The main character, an itinerant preacher, displays the letters tattooed on the fingers of his two hands, and explains:

Table 6. Two-way ANOVA for activity scores, by condition and psychoticism.

Condition	Psychoticism	M	SD	N
Left to right	Low	6.03	1.25	24
	High	5.21	2.06	24
	Total	5.62	1.74	48
Right to left	Low	5.27	1.20	21
	High	4.60	1.84	32
	Total	4.87	1.64	53
Total	Low	5.67	1.27	45
	High	4.86	1.94	56
	Total	5.22	1.72	101

Source	df	Mean square	F	Sig.
Main effects:				
Condition	1	11.44	4.15	.044
Psychoticism	1	13.60	4.93	.029
Interaction effect:				
Condition X Psychoticism	1	0.15	0.05	.819
Error	97	2.76		
Total	100			

> Would you like me to tell you the little story of right hand, left hand? The story of good and evil? H-A-T-E … it was with this left hand that old brother Cain struck the blow that laid his brother low. L-O-V-E … you see these fingers, dear hearts? These fingers has veins that run straight to the soul of man. The right hand, friends, the hand of love.

As to causation, this study refutes several possible explanations for rightward primacy. A religion-based explanation seems a natural semiotic understanding of the underlying relationship between directionality and affect. However, religion was found to be non-significant in this study, so we see no support for a religion-based interpretation. As the vast majority of people worldwide are naturally right-handed (Casasanto, 2009), there may be a tendency for both religious teachings and norms, as well as cultural products, to be congruent with this biological precursor.

The tendency to grant primacy to the right is as old as the earliest recorded religion and as new as the hottest current media technologies. Right-primacy is manifested in behaviors, such as movie theater seating (Harms et al., 2014), and in aesthetic preferences, such as directionality in paintings (Harris et al., 2009). A number of video games have featured rightward movement as the dominant direction. The Atari 2600 game *Pitfall!* (1982) pioneered the popular side-scrolling platform genre

Table 7. Two-way ANOVA for positive affect scores, by condition and need for cognition.

Condition	Need for cognition	M	SD	N
Left to right	Low	4.23	1.80	22
	High	5.04	1.61	26
	Total	4.67	1.73	48
Right to left	Low	3.44	1.69	30
	High	4.17	1.56	23
	Total	3.76	1.66	53
Total	Low	3.78	1.76	52
	High	4.63	1.63	49
	Total	4.19	1.75	101

Source	df	Mean square	F	Sig.
Main effects:				
Condition	1	16.89	6.09	.015
Need for cognition	1	14.77	5.32	.023
Interaction effect:				
Condition X Need for cognition	1	0.04	0.02	.903
Error	97	.922		
Total	100			

in which the main character 'is seen from the side and typically moves from left to right as the background and structures continuously appear on the right and disappear on the left' (Montfort and Bogost, 2009: 107). *Pitfall!* was followed by other platform games which also feature scrolling left to right movement, such as the iconic, mega-selling *Super Mario Bros.* 'Horizontal scroll' was a common aesthetic feature of games in the 80s, according to Egenfeldt-Nielsen et al. (2008: 119), who describe titles that feature them as ones in which 'the player character would fight his way from left to right, by either battling or avoiding opponents'. The dominance of rightward over leftward movement in video games seems confirmed both anecdotally (through popular examples such as *Pitfall!, Super Mario Bros.*, and their kin) and through the descriptions of games offered in scholarly works on the medium, which reference left to right movement. To date, no research has directly tested the effects of rightward versus leftward movement on players, but games likely follow the rightward pattern for many of the reasons discussed in this article. Therefore, we would expect the findings of the present study to be similar, if not more pronounced, with video game play, given the active control of players and the likely disconcerting nature of having to actually move one's character from right to left (versus simply watching such movement).

Future Research

To supplement this study's findings, further research may be useful. Initially, a content analytic approach to observed movement could be taken, studying popular film; this may be done either in an idiographic sense by observing each film as its own unit, or by looking at a large sample of films and tracking trends in movement. Additionally, in future experiments testing spectator outcomes, there may be a need to over-sample left-handed respondents to achieve a level of statistical power sufficient to fully test the impact of handedness (Casasanto, 2009). Future studies might also include populations of spectators from cultures in which textual reading is not left to right, to further probe that aspect of the issue. Another direction indicated by the results from RQ3 might be the inclusion of presence measures to determine where respondents place themselves within the filmic diegesis, with an eye to placement in screen left vs screen right. And future studies might introduce physiological measures (Shimamura, 2013) and eye-tracking protocols (Smith, 2013) to supplement the type of basic experimental research reported here.

CONCLUSION

In summary, our analyses show a preference among spectators for rightward filmic movement over leftward filmic movement, and an evaluation of rightward movement as more 'active', but no difference between the two types of movement with regard to perceived uniqueness. Religion and most psychometrics do not make a difference with regard to the evaluations of film segments differing in directionality. This points to a perceived primacy of the right that seems robust and enduring. A consideration of this empirically observed phenomenon should be incorporated into future study and theory with regard to film and the moving image. This investigation, then, is a step along the path to providing quantitative, empirical support to phenomena that have heretofore been examined via other modes, such as semiotics (Eco, 1976; Metz, 1974). This convergence of critical cultural and empirical quantitative perspectives is rarely found in film studies, and is a much needed confluence in the scholarly literature.

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NOTES

1. The name comes from a supposed experiment performed by Soviet Montage filmmaker and scholar Lev Kuleshov and his early workshop students in 1919. In the 'experiment', a man's face (that of well-known actor Ivan Mozzhukhin) was shown with no emotion at all, followed by a shot of some object, followed by the same neutral face as before.

The objects were a child, a bowl of soup, or a coffin (Fairservice, 2001). The intention of the investigation was to see if the simple act of editing film would have an effect upon the spectators' interpretation of Mozzhukhin's acting. It is almost certain that Kuleshov did not follow contemporary standards of rigorous experimental design, and that his film students were privy to the intent of the manipulation, thus casting doubt upon the validity of his 'findings'.

2. While most individuals in all world cultures are right-handed – including those cultures with right-to-left or top-to-bottom reading patterns (Corballis, 2003) – there is some evidence that certain aesthetic preferences are in fact associated with reading/writing habits (Nachson et al., 1999).

3. Corballis (2003) posits that the dominance of right-handedness worldwide, a uniquely human phenomenon, arose during the evolution of language, with a focus on Broca's area of the brain.

4. The Jewish Virtual Library (a project of the American–Israeli Cooperative Enterprise) presents numerous examples of the primacy of the right over the left in Judaism: 'As is the case in many cultures, right is favored over left in various contexts.' See: http://www.jewishvirtuallibrary.org/jsource/judaica/ejud_0002_0017_0_16755.html

5. The two versions of the stimulus film clip may be viewed at: https://www.youtube.com/watch?v=8pqGwcKWk6w (left to right) and https://www.youtube.com/watch?v=PAeD8QZt3yo (right to left).

6. MIC is Mean Interitem Correlation, the indicator of internal consistency recommended for instances of relatively few items per index or scale (Briggs and Cheek, 1986; Clark and Watson, 1995). Briggs and Cheek recommend an MIC of .20 to .40; Clark and Watson recommend an MIC of .15 to .50.

7. Given the non-significant findings for Uniqueness in the initial tests, further analyses for that dependent variable are not reported. It may be noted, however, that in tests of the six potential moderators (i.e. Judeo–Christian status, extraversion, neuroticism, psychoticism, openness to experience and need for cognition) none showed a significant interaction with the experimental treatment in the prediction of Uniqueness.

8. Further, exploratory tests using handedness as a potential moderator uncovered no significant main effects or interaction terms for handedness. However, these results should be viewed with caution, as the study sample included only 11 left-handed individuals. Additional exploratory analyses also examined the potential impact of theatrical movie-going, amount of book reading, newspaper readership, and TV watching. With regard to the three outcome scales, none of these factors proved to be significant predictors, nor served as significant in interaction with the experimental manipulation. Again, this points to the robustness of the findings of the study.

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