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Abstract

This study explores the impact of editing and shot-scale on film comprehension. Participants (n = 120) viewed a film depicting a man and woman performing a modern dance. Two versions employed editing to focus on either the male or female dancer; a third version was from a single objective camera position. After viewing, participants were asked to recall what they saw. These recalls were analyzed to examine how the editing choices influenced viewers' sense of narrativity and character.

Keyword: film, narrative comprehension, cinematics

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Understanding narratives requires inferring and monitoring the characters' internal states (Gernsbacher et al., 1998; Long et al., 1992). In text, authors can explicitly convey internal states if they choose. By contrast, filmmakers have different constraints placed on them regarding how to convey the internal thoughts and feelings of characters to the audience. Filmmakers rely on *cinematics* such as composition, shot scale (e.g., close-ups), lighting, and editing to help viewers understand the events conveyed in film in general, but internal thoughts in particular (Pudovkin, 1974).

Clinton and colleagues (2017) demonstrated that differences in cinematic features can affect how viewers understand the basic emotions that characters feel as a scene unfolds. They had viewers watch one of two different versions of a scene. Both versions were commercially released -- one as a short film and the other in the context of a feature film. The high-edited perspective version contained more cinematic devices that engendered character perspectives (e.g., close up, point of view, shot sequences) than the low-edited perspective version. Participants who viewed the high perspective version perceived greater changes in the affect of a prominent character than those who viewed the low perspective version.

The goal of the present study was to further explore the role of cinematics on understanding characters in narrative film. Participants viewed a short film about two dancers. The film was composed of two scenes. The first scene was manipulated such that participants viewed an objective version or one of two versions edited to convey perspectives of either the male or female dancer. Then, the second scene was consistent across all participants and showed the dancers in a hallway. After viewing the movie, the participants were asked to recall the film.

The recall protocols were coded for narrative features including internal states (e.g., goals, beliefs, and emotions), as well as physical characteristics (e.g., appearances or facial expressions) and actions (e.g., movements) of the dancers. Given the differences in cuts and shot-scales across editing conditions, we hypothesized that participants' recalls would vary in the degree to which they talked about the internal states, physical states, and actions of the two dancers. We were also interested in whether the editing manipulation in the dance scene would lead to differences in the mentions of internal states, physical states, and actions in the hallway scene that was consistent across conditions.

Method

Participants

120 college students (Male = 33) from a large Midwestern university participated for course credit.

Materials

The third author, a professional film maker, created three versions of the same short film. All three versions were about the same length (about 3 minutes and 25 seconds) and contained two scenes: a dance scene and a hallway scene.

The dance scene depicted a male and female dancer performing a modern dance routine. The routine was filmed several times using different shot scales and positions of the camera to afford creating different versions of the film that were intended to reflect the female or male dancer's perspective as the dance routine unfolds. The different versions were created by a professional editor who was instructed to use the available camera shots from the shoot to create versions that would convey either the female or male perspective as the dance scene unfolded (Figure 1). The *objective version* depicted the scene in one single camera shot (a continuous

piece of film) from a 90_o from the actions of the dancers (i.e., directly in front of them). A *female version* was edited such that there were close-up shots and waist shots on the female dancer that allowed the viewer to see her facial expressions at key points in the dance routine. Similarly, the *male version* focused on the male dancer. In order to maintain ecological validity of the materials, the number of shots in the female and male versions differed: the dance scene of the female version contained 70 camera shots whereas the dance scene for the male version contained 42 camera shots. The difference in the number of shots is likely due to the fact that the female was more active during the routine than the male.

The second scene was consistent across all three conditions and depicted a social interaction between the two dancers. The scene was shot with one camera shot at one end of the hallway (Figure 2).
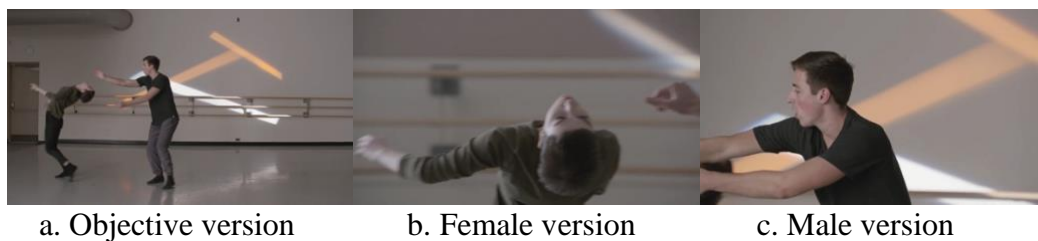

a. Objective version   b. Female version   c. Male version

Figure 1. Screenshots for the same movement during the dance scene across editing conditions

Figure 2. Screenshot of the hallway scene (consistent scene across editing conditions)

Procedure

Participants were randomly assigned to editing condition (objective, female, male). They watched the film and were then immediately prompted to recall the movie. They were instructed to provide as much detail as possible. Participants typed their recalls.

Recall Coding

We first parsed the recall to separate participants' comments about the dance scene (manipulated) and comments about the end hallway scene (consistent across participants). We coded these as two separate recalls for the presence or absence of the same features.

To analyze the recall protocols, researchers developed a coding scheme to identify the mention of the two dancers' (1) internal states, (2) physical states, and (3) actions. Each recall was scored holistically for presence or absence of each of the three features for both the male and female dancer (i.e., six codes per participant recall).

Table 1

Coding Rubric Descriptions and Examples

Code	Description	Example
Internal State	Mentions of dancers' inner feelings, including emotional, intentional, or both	*the guy doesn't want to lose her* (male's emotional state)
Physical State	Mentions of dancers' physical appearance, facial expressions, and spatial orientations	*them not really wearing costumes* (female's physical appearance; male's physical appearance)
Action	Mentions of specific movements dancers demonstrated	*At the end she was released and glided on the ground where then the young man slowly walked away* (female's action; male's action)

Three raters coded all 120 recalls. Disagreements were resolved by selecting the majority code.

Results

In a preliminary analysis, analysis of variance (ANOVA) tests indicated no effect of editing condition on total words in the recall ($F < 1.00$, $p = .95$; Table 2).

Table 2

Means and Standard Deviations for Number of Words in the Recalls as a Function of Editing Condition

	Recall Word Count	
	M	*SD*
Female	133.65	37.44
Male	132.15	53.10
Objective	130.05	52.80

Dance Scene Analysis

All participants (n = 120) recalled information from the dance scene. As shown in Figure 3, participants mentioned actions more than internal or physical states. They also tended to mention the female more often than the male. These general patterns are unsurprising given that the scene is action-driven and that the choreography of the routine emphasizes the female.

To explore the effect of the editing condition on the nature of participants' recalls, we conducted a series of chi-square analyses (Figure 3). We first investigated the effect of editing conditions on the mentions of the two dancers' internal states. Although the absolute frequencies differed, chi-square analyses did not reveal significant differences across the editing conditions. Additional chi-square analyses also revealed that the editing manipulations did not affect the frequency of mentioning physical states or actions. However, there are some interesting descriptive trends not captured by these statistical comparisons. For example, those in the male version tended to mention the male's physical state more than the female's physical state. In

contrast, participants in the female condition tended to mention the female internal states more

often than the male internal states. Future work will aim to capture how these within-participant

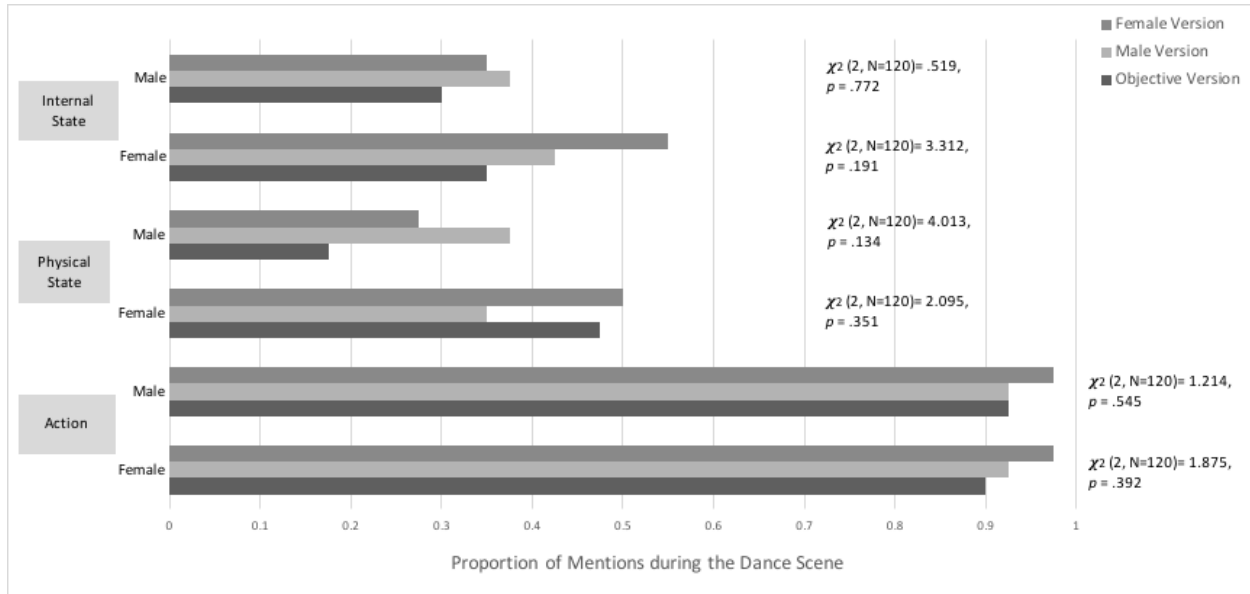differences might vary across conditions.

Figure 3. Proportion of participants who mentioned dancers' internal states, physical states, and actions in the dance scene as a function of editing condition

Hallway Scene Analysis

Most (78%), but not all, participants mentioned the second (hallway) scene. This did not

vary as a function of editing condition, $\chi_2 = 0.69$, $p = 0.71$. In order to account for these

differences, proportion scores were calculated to reflect only those who talked about the end

scene at all (Objective, n = 30; Male, n = 31; Female, n = 33).

Consistent with the dance scene, participants often mentioned dancers' actions in

describing the hallway scene (Figure 4). Interestingly, a Chi-Square analysis revealed a

significant relationship between the editing manipulation condition and the likelihood of

mentioning the male's internal states during the hallway scene, $\chi_2 = 6.320$, $p = .042$. Adjusted

residuals were calculated to investigate differences across the conditions. Residuals with an

absolute value of 1.96 indicate a likelihood greater than chance ($p < .05$; Agresti, 2002).

Participants in the male-focused version were likely to mention the male dancer's internal states

(Adjusted Residual = 2.2), whereas those in the objective version were more likely to omit this

information (Adjusted Residual = -2.1). The likelihood of a participant in the female-oriented

editing condition mentioning the male's internal state during the end scene was at chance.
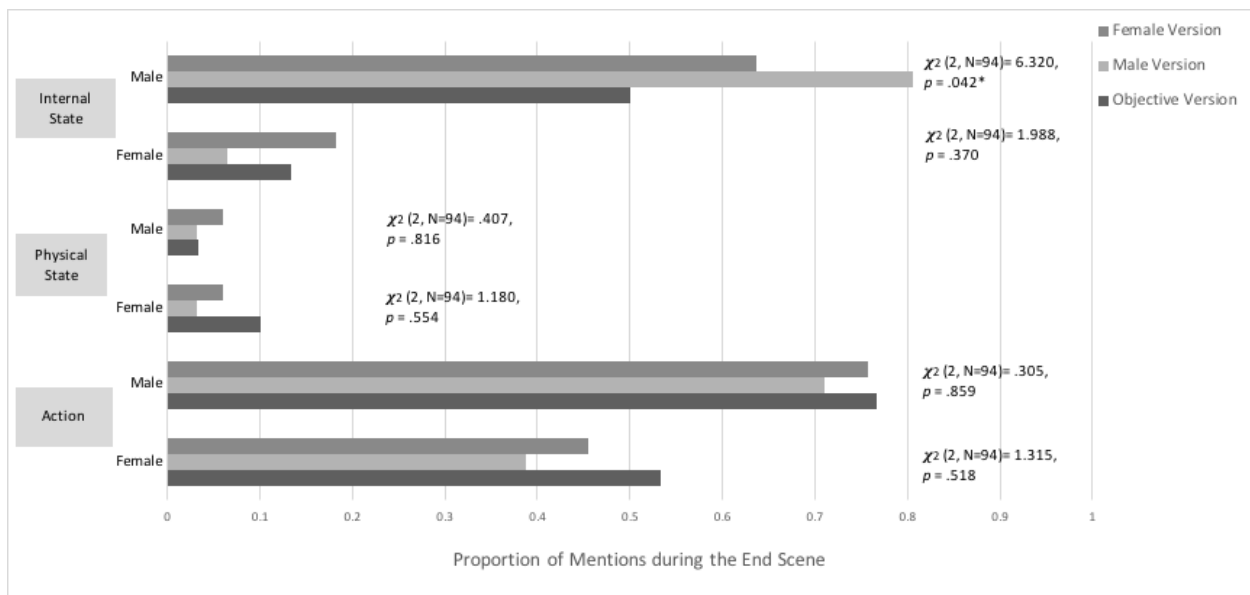

Figure 4. Proportion of participants who mentioned dancers' internal states, physical states, and actions in the end scene as a function of editing condition

In sum, this coarse-grained analysis of the recalls suggested no effects of the editing

manipulation on the way that participants talked about the manipulated scene (dance scene).

However, the editing manipulation that occurred during the dance scene had an effect on the way

participants discussed the end scene (hallway scene). In particular, those who viewed the dance

from the male perspective were more likely to mention his internal states during the end scene.

Discussion

Filmmakers must use cinematic devices associated with editing, camera (e.g., shot scale, lighting, camera movement), and mise-en-scène (e.g., content of the shot, direction of the actors) to help the audience understand the narrative (Magliano et al., 1996). Viewers are capable of tracking the internal states of multiple characters over time (Magliano et al., 2005), but little psychological research has addressed the mechanisms that enable viewers to infer those internal states in film.

Our study manipulated editing to examine the effect of cinematics on viewers' perceptions of internal states, physical states, and actions. We also investigated the degree to which differences that occurred during the dance scene would influence perceptions of the end scene. The results suggested that the content of the viewers' recalls was driven by actions in the film more so than the editing manipulation. Interestingly, the manipulation had no effect on perceptions of the manipulated scene, albeit there were trends in the data that were consistent with predictions. Importantly, we did find some evidence that the edited versions affected how the end scene was interpreted. Specifically, participants who viewed the film editing to focus on the male perspective were more likely to mention his internal states during the end scene. This finding provides modest evidence consistent with previous work (Clinton et al., 2017) suggesting that cinematic techniques influence viewers' sensitivity to characters' internal states.

One limitation in this study was that the protocols were coded for *whether or not* the participants mentioned the internal states, physical states, and actions of the characters, rather than the *number of statements* reflecting these dimensions were present. Additionally, our current coding scheme only evaluated if a participant mentioned any emotion, but did not capture if the emotion was positive or negative nor the intensity of the emotion. It is possible that the editing

conditions affected the valence of the emotions that participants perceived. We intend to conduct more fine-grained analyses that may reveal more subtle effects of the editing manipulation.

Further, our analyses focused on components of a situation model, but did not capture whether participants developed an interpretive representation (e.g., a communicative model) of the dance or the film. One informal observation was that some participants talked about the dance literally (e.g., *the man and the woman were lying on the ground motionless*). whereas others discussed a possible different meaning (e.g., *I thought that the two dancers were depicting […] the ups and downs of their relationship*). As such, analyses of this aspect of the protocols is warranted.

Our findings may also be limited due to other methodological factors. First, our sample was predominantly female (72.5%), potentially confounding the editing manipulation that was designed around characters of different genders. There were too few males in the sample to explore this possibility in the present study. Second, as mentioned previously, the choreography of the female dancer involved more movements relative to the male dancer, which resulted in more cuts in the female version of the film. This difference in cuts across editing conditions may have affected the results. Finally, these recalls were collected after viewing the entire film. The editing manipulation may impact more the moment-to-moment processing. Thus, we have collected think-aloud protocols and are analyzing them to examine the effect of editing on online processing.

In conclusion, this study suggests the need for additional research on how the cinematic techniques influence film comprehension. Such research should enable a better understanding of the relationships between comprehension, the content depicted in a film, and the manner in which that content is depicted.

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