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Coleman, David, Romao, Tico J, Villamin, Cedric, Sinnett, Scott, Jakobsen, Tanya and Kingstone, Alan (2013) Finding Meaning in All the Right Places: A Novel Measurement of Dramatic Structure in Film and Television Narratives. Projections: The Journal for Movies and Mind, 7 (2). pp. 92-110. doi:10.3167/proj.2013.070205

Official URL: http://dx.doi.org/10.3167/proj.2013.070205 DOI: http://dx.doi.org/10.3167/proj.2013.070205 EPrint URI: https://eprints.glos.ac.uk/id/eprint/2615

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# Finding Meaning in All the Right Places: A Novel Measurement of Dramatic Structure in Film and Television Narratives

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# ABSTRACT

This paper summarizes an evidenced based study that adapts a breakpoint approach to investigate how elements of television narratives (two half-hour episodes of Alfred Hitchcock Presents: Lamb to the Slaughter and The Case of Mr. Pelham) were considered meaningful to viewers during the act of viewing. Actions considered meaningful were found to be high in information and emotion content, and primarily, though not exclusively, consisted of plot points where changes in narrative direction and protagonist's goals were perceived as interpretively salient. Viewers also registered as meaningful notable scenes that were character centred and which provided subjective access to the main characters. The paper reviews segmentation behavior in the relevant film theory literature to contextualize study and concludes by summarizing other potential applications of an adapted breakpoint approach beyond the investigation of dramatic structure.

# **KEYWORDS**

# BREAKPOINT, SEGMENTATION, SEGMENTATION BEHAVIOUR, ACTION PARSING, DRAMATIC STRUCTURE, NARRATIVE SCHEMATA, TELEVISION NARRATIVE

What do individuals find meaningful when they watch a narrative film and do all individuals agree on what is meaningful? In order to address this question, we have adapted a reverse-correlation technique used to study event segmentation, or breakpoints, to identify what an audience views as meaningful within a film. In a follow-up condition, we further investigated what makes the identified moments meaningful by asking a second set of participants to rate the previously identified moments in terms of their emotional and information content. Results indicate that moments selected as meaningful possess high information and emotional content, and sheds new, empirical-based evidence on film theory.

Breakpoints were developed in the work of Newtson (1976) as a means of assessing how people observe and understand other people's behavior. In the original study, breakpoints were

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focused on procedural actions, such as household chores, with the aim of seeing whether there was any agreement between participants as to when one task ended and another one began, hence a "breakpoint" between two actions. Equally important to the breakpoints were what Newtson termed "non-breakpoints," which were the events that occurred between the breakpoints where the participants did not identify a significant change in behavior. Non-breakpoints were less well remembered by the participants in a subsequent memory test (Newtson 1976). The experiments themselves rely on self-reporting by simply asking the participant to press a button when the events in the film satisfy the criteria of a specific question. As Newtson describes: "By measuring the points in the sequence where the subject presses the button, his subjective partitioning of the behavior may be identified" (1976: 224).

We have adapted this approach to the present study in order to examine how the audience responds to dramatic structure of a short television screenplay by asking the audience to identify moments in the films that they view as "meaningful". In the original breakpoint studies, the films that were shown contained mundane procedural actions such as washing the dishes and assembling parts of a machine. In our study, participants were shown short television dramas. That is, the dramas involved much more complexity when compared with Newtson's original videos, and therefore more possible points that could be subjectively considered important. Thus, any uniformity amongst participants in the determination of 'meaning' points would be particularly informative. Just as in the breakpoint studies, we assess the results through a reverse-correlation method by observing the participants' response to specific questions, and then comparing those responses to the action on screen.

#### SEGMENTATION IN FILM THEORY

A recurrent question that informs the event segmentation literature, and which is relevant to this study, is the ways in which segmentation behaviour underpins attributions of meaningfulness of perceived events and actions (Newtson 1973; Newtson 1976; Newtson, Engquist, and Bois 1977; Wilder 1978; Zacks 2004; Zacks and Swallow 2007). The view that segmentation processes are linked with meaning has also been demonstrated in formal linguistics and psycholinguistics through the concept of 'parsing', which has its etymological roots in the Latin term *pars orationis* "part of speech" (Karttunen and Zwicky 2005). Furthermore, the concept of 'chunking' has played a similar conceptual role in studies on memory and learning, most famously in George Miller's pioneering study and his claim that people tend to organize information into 'chunks' (1956). That these concepts have become interchangeable with the notion of segmentation behaviour, as when certain authors refer to 'action parsing' (Baird and Baldwin 2001) or the 'chunking' of perceptions (Swann Jr., Pelham, and Roberts 1987), suggests that such overlapping terminology attempts to capture similar cognitive processes.

It is within this broader context that previous attempts in film theory to connect segmentation behavior with the spectatorial comprehension of film narrative are to be situated. Such attempts have tended to come in four different forms: film semiotics; cognitive film theory; scriptwriting theory; and empirical studies of narrative film comprehension. The first and most influential of these attempts is film semiotics, as initially advanced by Christian Metz (1974). He proposed that narrative films possess a 'grammar' – the 'grande syntagmatique' - that bears similarity to the grammatical structures manifested in natural languages. Metz proposed that a typology of film segments could be formalized in terms of the temporal and spatial articulations that defined them. Although there has been some debate whether Metz intended to advance film

semiotics as primarily a theory of filmic comprehension (Buckland 2000), one cannot dispute the fact that one of the enduring legacies of his theory is the attempt to understand filmic comprehension in terms of the viewer processing and making sense of the relations between film segments. This position is most clearly stated by Michel Colin who claims that "film semiology defined by Metz, in Langage et cinéma" is "an explicit theory on the spectator's understanding of a film" (1995: 106). Using the grande syntagmatique as a starting point, Colin proposed that Metz overemphasized the importance of temporal breaks in film and that it is the changes in spatial relationships that are more salient, and which better demarcate the boundaries of film segments. To 'parse' these spatially bound segments, Colin proposes that spectators possess a 'general space planner' that generates inferences as to the spatial relations between shots. A significant feature of the way in which film semiotics depicts segmentation behavior is the supposition that narrative films already arrive 'pre-chunked', so to speak, and that the spectator is cued to carve up the audio-visual stream at these temporally and spatially defined boundaries. In Metz's semiotic account, segmentation behavior ends up playing a secondary role to the determining force of the temporal and spatial markers of the film text, with filmic comprehension largely expressed as the tacit 'grammatical' knowledge deployed by the viewer to recognize these segment boundaries. In Colin's revised semiotic account, such procedural knowledge is substituted by a mental module that actively elaborates the spatial relations between shots. This greater emphasis upon the cognitive activity of the film viewer is in keeping with Colin's larger theoretical enterprise of reconceptualizing film semiotics as a branch of cognitive science, and in this light, his work should be placed alongside cognitive film theory. Like Colin's refashioning of the grande syntagmatique, cognitive film theory seeks to jettison the linguistic model of filmic comprehension proposed by film semiotics to be replaced by a cognitive account of the film

viewer who is far more actively involved elaborating and making sense of the film (Bordwell 1985: Branigan 1992). Central to this account is the concept of narrative schema, a mental construct that is used to recognize, predict and categorize narrative events (Branigan 1992). Such narrative schema also drives the segmentation behavior of the viewer. According to Branigan, narrative expectations are triggered when boundaries "in the text are perceived to correspond to the segmentation provided by the schema" (1992: 15). In this formulation, segmentation behaviour derives from a mapping of the perceived event boundaries of the film onto the segmented structure of the narrative schema. Bordwell's account (1985) is similar, although he acknowledges that other forms of schemata (such as template and procedural schemata) can be at work over and above the canonical story format, a term that serves a similar function as Branigan's account of narrative schema. Bordwell notes that "guided by something like the canonic story, the perceiver 'chunks' the film into more or less structurally significant episodes" (1985: 35). These episodes are less determined by the surface features of the film text, which are often discarded in working memory, but by the schemata that are used by the viewer to make sense of the film. At a more local level, template schemata that mentally represent the broad structure of certain activities, be it going to a library or replacing a light bulb, are more directly involved in the chunking process than the canonical story format, and presumably determine segmentation at the level of a sequence and scene.

Although scriptwriting theory (encompassing popular screenwriting manuals used by practitioners within the film and television industries to more scholarly examinations of screen and television scripts) does not advance an overt and explicit account of segmentation behaviour on the part of the viewer, the segmentation of story material into parts looms large in this literature. This perspective has been best summarized by Thompson (1999) who notes that since

the silent cinema scenario manuals have been advocating that narrative films should be structured into three parts, namely a beginning, middle and end. This three act structure was formalized in Syd Field's hugely influential manual Screenplay: The Foundations of Screenwriting, with the three acts consisting of the 'Beginning', the 'Confrontation', and the 'Resolution' (2005). Thompson develops Field's three act model by undertaking an analysis of a wide sample of Hollywood films (feature films from the 1920s to more contemporary films) and claims that most are composed of five large scale portions: the setup; the complicating action; the development; the climax; and the epilogue (1999). Thompson does not pursue the question whether these large scale portions have any bearing upon the segmentation behavior of the viewer, yet there is the assumption in her analysis, if not a basic tenet in scriptwriting theory (Newman 2006), that the aim of such structuring is to control the viewer's attention and interest. As Thompson asserts: "Why does a narrative need this type of structure? We might posit that breaking a narrative into parts gives the spectator a sense of the direction in which the action will proceed and thus aids comprehension" (1999: 22). Thompson goes on to claim that narrative structures are often learnt by viewers in the process of watching films, suggesting that such knowledge can function in a similar capacity as narrative schemas do in the cognitive film theory account by directing segmentation behavior. If so, it is possible to postulate a double correlation between narrative schemata and segmentation behavior. On the one hand, narrative schemata, as advocated in scriptwriting manuals and which go on to inform screenwriting practice, determine much of the structural features of the film text itself. If the design intention of the segmentation structure is to be perceived and registered by the viewer, then there is a strong possibility that such cues influence segmentation behavior in a bottom-up fashion. On the other, narrative schemata may be assimilated by the viewer by watching films and television programmes over time, and through

such assimilation, they can be applied in a top-down manner during the act of film viewing itself, which may trigger segmentation behavior at points in the film's narrative that correspond to the segmentation represented in the relevant narrative schemata.

It is notable that the three approaches discussed so far concerning segmentation in film have been advanced in a theoretical manner and have not been tested by these authors through empirical studies. It is necessary then to refer to those empirical studies that have investigated segmentation behavior in viewers (Carroll and Bever 1976; Schwan, Hesse, and Garsoffky 1998; Schwan, Garsoffky and Hesse 2000; Zacks, Speer, and Reynolds 2009; Zacks and Magliano 2011). Most of these studies tend to focus upon the issue whether stylistic devices such as editing facilitate segmentation behaviour. Carroll and Bever (1976) showed participants short film sequences of mundane actions that were divided into two segments, where the change between the two consisted of either a change in the action, a change by a cut, or a combination of both. Participants were then shown brief excerpts from either the first or second segment. Carroll and Bever found that participants recognized excerpts from the second segment faster when the change derived from both a cut and change in action and concluded that "cuts which coincide with event boundaries stimulate segmentation behaviour" on the assumption that segmentation behavior is correlated to recall (1976; 1054).

Two studies led by Schwan pursued the same question, but used a breakpoint method instead. In the first (Schwan, Hesse, and Garsoffky 1998), participants were shown two educational films, the first depicting a production process they were familiar with, the other a production process from a profession they were unfamiliar. Participants were instructed to press a button at points at which they perceived that a step in the production process had ended and another step began. Schwan, Hesse, and Garsoffky observed higher incidences of segmentation

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behavior when syntactical devices such as cuts and auditory cues coincided with perceived breaks occurring in the events depicted by the film, and argued that such stylistic cues "can guide the segmentation behavior of spectators" (1998: 247). The results of the second study (Schwan, Garsoffky and Hesse 2000) however contradicted these conclusions. A similar breakpoint method was employed but this time participants viewed two different versions of mundane activities (upgrading a computer and cleaning a pistol), with one version edited with cuts coinciding with identified breakpoints in the depicted actions, and the other version edited with cuts occurring at non-breakpoints. In this case, Schwan, Garsoffky and Hesse found that incidences of segmentation behavior were not connected to the presence or absence of a cut, with most segmenting occurring at "event-inherent breakpoints" (2000: 221).

Studies led by Zacks have confirmed these results. For instance, in a recent study (Zacks, Speer, and Reynolds 2009) a series of four experiments was conducted that compared the segmentation behavior of participants reading stories with that of viewers watching the narrative film *The Red Balloon* (1956), with the latter experiment employing a breakpoint method. Segmentation behavior tended to converge at points in which changes occurred at the level of the situations narratively depicted. Zacks, Speer, and Reynolds noted that the experiment did not produce any strong evidence that suggested cuts were correlated to increases in segmentation, a finding consistent with the prevalent view, held by film theorists and filmmakers alike, that continuity editing is designed to be unobtrusive and subservient to the narrative action of the story (Bordwell and Thompson 2004). One of the more important conclusions of the study was that segmentation behavior was triggered not by purely physical changes in the situations depicted, such as changes in object or character movements, but elicited more by conceptual cues relating to changes in character behavior, motivation and goals. Importantly, Zacks, Speer, and

Reynolds postulate that event boundary detection may be driven by top-down processes as viewers apply relevant schemata, a suggestion that aligns their analysis with the cognitive film theory approach.

Although not disconnected from previous segmentation studies in film theory, the present study seeks to establish what elements are initially considered meaningful to viewers during the act of viewing. This change in focus places emphasis upon ascriptions of meaningfulness instead of segmentation behavior and is better capable of identifying what elements are perceived by viewers as being interpretively salient. Such a change in focus maintains the assumption, manifest in the relevant film theory literature, that segmentation behavior and ascriptions of meaning are distinct cognitive processes that are linked in the act of comprehending a film's narrative. This study seeks to illuminate this linkage but from a different methodological angle that adapts a breakpoint approach to investigate meaning in relation to viewing film and television narratives. Such a focus also highlights significant differences between such narratives and the other materials used, be they short sequences of mundane activity or documentaries, which present design features that are distinct to their aesthetic form.

In doing so, we pursue issues more similar to those explored by Tan and van den Boom (1992) who sought to establish the affect structure of a narrative film. As Tan elsewhere observes: "The relationship between scenic structure and the course of emotions is such a close one that we are probably justified in assuming that the viewers' perception of the course of their own emotions is just as valid an indication for the segmentation of the narrative as the action itself or the conventional segmentation signals (filmic punctuation), such as fade and dissolves" (1996: 64). Like Tan, we believe that a viewer's perceptions of subjective states can be indexes

of segmentation behavior, an issue that is touched on empirically in this paper. However, our concern with meaningfulness -- be it emotionally inflected or based on narrative information -- is a primary distinction between our study and that of Tan and ven den Boom's.

## METHOD

Two half-hour episodes of Alfred Hitchcock Presents, entitled *Lamb to the Slaughter* and *The Case of Mr. Pelham*, were selected for the experiment. These episodes were selected not because of Hitchcock's canonic status but more for the reasons that they manifest mainstream narrative style, and the likelihood that participants would be unfamiliar with them. Participants were psychology students enrolled at the University of British Columbia in Vancouver, Canada who were awarded course credit for completing the experiments.

In the first experiment, a set of participants (N=15) were shown each film and asked to press a button when the action on the screen satisfied a specific question, namely, "While you are watching, if you find any moment meaningful, press and hold down the Z key, and let go when the moment ends." Button presses were recorded in real-time to 0.001 seconds using DMDX software (Forster and Forster 2003) on a standard Windows PC. Software scripts written using Perl were used to reformat the raw output and break it down into discrete one-second time bins, which was then reformatted again into tables suitable for analysis using Excel. If a button press was held down over several seconds, then it counted as a distinct press in each one-second bin.

In the second experiment, the results from the first experiment were used to select ten moments identified as meaningful from each episode: five with high convergence (50-70%) and five with low convergence (20-40%). The films were edited in Final Cut Pro (Apple) to insert a subtitle at the meaningful moments indicating that the film should be paused. A new set of

participants (N=41) were shown each film (order counterbalanced across participants) and, once the film was paused, were asked to rate the meaningful moments along two measures of the "Information content with respect to the story" and the "Emotional content with respect to the scene" both on a scale of 1 to 5 with 1 being low and 5 being high.

#### RESULTS

The results of the first experiments on *Lamb to the Slaughter* and *The Case of Mr. Pelham* are shown in Figures 1 and 2, and a description of the action on screen for the segments of response and no-response for the two episodes is shown in Tables 1 and 2. A baseline for statistically significant response convergence across observers was calculated using a standard Poisson distribution, which set the minimum level of convergence that was statistically significant at 3 of the 15 participants. In other words, if 20% (3 out of 15) or more viewers identified a meaningful moment at the same time, then it was significant. This cutoff of 20% is illustrated in Figures 1 and 2. The peaks represent convergence between participants, and for this experiment, the highest peaks represent response convergence of close to 70%, that is, 70% of the participants pressing the button within the same one-second time window. It is noteworthy that this level of response convergence is consistent with the original breakpoint studies (Newtson 1976).

The results of the second experiment are shown in Figure 3, and indicate that points of high convergence possess more information and emotional content than those of low convergence, a difference that was highly significant (i.e., the probability of finding this result by chance was far less than 1 in 1000 or p<.0001). These findings held true for both films.

# [INSERT FIGURES AND TABLES HERE]

## DISCUSSION

The results of the first experiment show that the audience recognizes distinct moments of meaning within the film, while at the same time, there are distinct moments in the film that were not recognized as meaningful. In a similar fashion to breakpoints, we think these two types of distinct moments can be viewed as meaning points and non-meaning points. In order to better understand what makes meaning points such as these meaningful, we chose to investigate further along two lines of information content and emotional content. The results show that both information content with regard to the story, and emotional content with regard to the scene, are playing a significant role in driving people to converge on particular moments as being identified as meaningful. Similarly, the less information and/or emotionally content possessed by a film at a particular moment, the less likely people are going to select it as meaningful.

Our view is that the moments that are identified by the audience as "meaningful" – that is, the "meaning point" moments - are similar to break points in that they are part of the flow from one action to the next, but that they are different from break points in that the actions which occur reveal a new course of action (and hence new goals for the characters within the story), or moments that provide greater access to the subjective states of characters. In contrast, the actions that are occurring at the moments that are not reliably identified as meaningful – the "non-meaning point" moments – represent a continuation of the direction of the plot that was established at the preceding meaningful moment, or occasions that do not offer any additional information pertaining to a character's internal states. We postulate that the viewers do not find these non-meaning point moments "meaningful" because the motivation of the characters has not changed or no additional character-centered information has been supplied.

For instance in *Lamb*, as shown in Table 1, after the wife murders her husband, she is at first in shock, but then begins to cover up the murder. The audience responds to the event where the wife turns up the oven temperature to cook the lamb (8:29-9:02), but then they do not respond to the subsequent events where she calls her friend to cancel dinner (9:03-9:32). The audience respond again at the end of the telephone call when the wife has to lie to the friend and say that nothing is wrong (9:33-9:40), but then they do not respond to her fixing her hair, putting on her coat, and going out to the store to buy more food for supper (9:41-10:33). They then respond again when the wife returns home from the store and begins to mess up the room (10:34-11:50). We think that the actions which the audience do not respond to represent an expected continuation of her intention to cover up the murder established by the previous events that do receive a response. Likewise, the events that do receive a response are unexpected as the wife at first displays no intent to cover up the murder, and, as she seems to be a sweet housewife, at first displays no intention to lie, or even, in the earlier events in the film, to murder her husband.

Likewise in *Pelham*, as shown in Table 1, the audience responds when Pelham calls home and realizes the imposter is in his apartment (7:02-7:05), and they then respond again when Pelham returns home and the Butler comments that it is strange he should be back as he only just left (7:11-7:32). However the audience does not respond when Pelham learns from the Butler that he had let himself in earlier, indicating that the imposter has a key, and they do not respond when Pelham then goes to the bedroom to check on his spare key, which is still there (7:33-8:31). We believe these events do not register as meaningful because they carry on with Pelham's line of enquiry of how the imposter was able to gain access to his home. This situation changes when Pelham then finds on his dresser a tie and collar identical to the ones he is now wearing (8:32-8:56). This new event registers as meaningful because it reveals a new and unexpected piece of information, that the double is copying his exact dress, while, in contrast, the actions before carry on from the previous piece of information, that the double has access to his home.

We believe that these characteristics of the identified meaning points are similar to the characteristics of plot points, as conventionally defined. Plot points are moments in the narrative that take the story in a new direction, basically an unexpected event that requires the characters to react in a new way to achieve their goals. Field, in describing the large changes that occur at the end of each act, describes a plot point as: "any incident, episode or event that hooks into the action and spins it around into another direction" (2005: 143). Likewise, McKee (1997), in describing the small changes that occur from scene to scene, describes plot points, or beats, as the "gap" that opens between the expectation and the reality of the characters intent. As Thompson (2003) and Hawes (2002) have noted, such plots are equally manifested in the two act dramatic structure of thirty-minute television dramas, such as "Alfred Hitchcock Presents".

It is also important to recognize that certain meaning points are correlated with events that are character-centered and which do not overtly progress the narrative. Looking at Table 1, one sees that in the second act of the *Lamb* episode, increases in meaningful responses from time-point 20:00 to 20:58 are correlated with the detective's line of inquiry and how he unknowingly implicates the wife with respect to her husband's murder. Such events are character-centered since they are wholly relevant to the wife and her broader aim to escape detection. In *Pelham*, during Pelham's recounting of the events of the double taking over his life, the audience registers as meaningful not the individual actions, but the moments in between where he lapses into despair, lamenting, "What can I do?" (18:16-18:28), indicating that he is undergoing an internal emotional change brought on by the stress of the situation. As other cognitive film theorists have argued, characters in films and television narratives serve as the main foci of spectatorial

engagement and do not function exclusively to advance the plot (Smith 1995; Tan 1996; Persson 2003). By possessing anthropomorphic traits, they also function to encourage a viewer's emotional engagement with a film by soliciting sympathy, if not empathy, towards its main characters.

Other meaning points appear connected with events that provide the viewer with greater insight into the protagonist's motivation or understanding of their mental states. Smith (1995) describes such narrative techniques as subjective access, which can vary in degree across characters. In the Lamb episode, the viewer has greatest subjective access to the wife. Consequently certain meaning points correspond to moments in which the viewer is encouraged to speculate upon her emotions. For instance, in Table 1 a distinct increase in meaningful responses occurs during the segment from 3:05 to 4:40 when the wife announces her intention to continue to make supper, suggesting that she is in a state of shock and in denial of her husband's desire to leave her. The significant spike in meaningful responses during the final segment from 23:24 to 23:54 is also illustrative. The wife's laughter at the irony of the detective's assertion that the murder weapon "might be right under our very noses", with the comedic stinger providing musical accompaniment, not only underscores the shared joke between viewer and character but presents the wife in one of her rare emotionally expressive moments. Similarly, at the end of the final confrontation in *Pelham* (22:40-22:46), when the double suggests that Pelham is mad, Pelham simply looks off into the distance and smiles, leaving it up to the audience to interpret whether this is so, a suspicion which is confirmed by the final exchange between the imposter and one of Pelham's friends (22:33-23:52).

This study has shown that from a viewer's perspective the most salient aspects of the *Lamb* and *Pelham* episodes were plot points and character-centered events. Such results stem

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from the fact that both episodes manifest mainstream narrational tendencies, as prevalent in American television dramas (Thompson 2003), where storytelling is privileged over other aesthetic functions and where dramatic structure is primarily determined through the unfolding of the plot. Such results have a bearing upon our current understanding of the segmentation behavior of viewers watching film and television narratives. Although participants were asked to identify moments they perceived as meaningful, it is notable that their responses tended to converge on moments that manifested perceptible changes occurring within the story, what we have described as plot points, or changes in access to the subjective states of the main characters. These results are consistent with the view put forward by Zack, Speer and Reynolds (2009) that the event segmentation of narratives is correlated with situational changes in story, character motivation, and goals. However, the results of the second experiment do cast some doubt on Tan and Van den Boom's more radical claim that a viewer's emotional response to the scenic structure of a film is sufficient to signal segmentation behavior (1992). As our results show, meaningfulness is not solely understood as something possessing an emotional dimension. The informational content of a scene can also be perceived as meaningful. The precise shape of such correlations between meaningfulness (be it informationally or emotionally inflected) with segmentation behavior is an important question for future research.

The value of adapting a breakpoint approach when analyzing film and television narratives, however, is not only restricted to investigating viewer responses to dramatic structure. An adapted breakpoint approach can also be used to illuminate how viewers respond to stylistic devices that are used by filmmakers in the service of narrative. For instance, film theorists (Smith 1996; Levinson 1996) have claimed that the music in a film's soundtrack often plays a pivotal role in the film's narration. It is interesting to note that in the *Lamb* episode the musical cues did sometimes coincide with meaning points suggesting that they may, on occasion, function to prompt the viewer to assign increased meaningfulness to the events depicted on the image track. Establishing the precise nature of such correlations is one exciting avenue for future investigations.

Along with the ability to investigate viewer responses to particular stylistic devices, an adapted breakpoint approach can also contribute to discussions pertaining to film and television genres. Recurrent plot structures are routinely associated with particular genres, such as the western (Wright 1975) and the musical (Altman 1987), with these primarily identified through stock dramatic personae and narrative contexts. As Figures 1 and 2 show, an adapted breakpoint approach offers an alternative means of analyzing generic structures by revealing how patterns can arise with respect to how viewers ascribe meaning to film and television narratives. More extensive studies are necessary to establish whether the different response profiles for *Lamb* and *Pelham* are representative of distinct types of narrative procedures.

Although the television examples referred to in this study are instances of mainstream narration, one must bear in mind that not all films and television programs are uniformly informed by its norms. Certain action films seek to not only engage audiences through their narratives but also enthrall through their spectacular action sequences. Similarly, the avant-garde cinema offers forms of engagement that are categorically different from those on offer from standard mainstream fare. We predict that an adapted breakpoint approach would be equally productive in analyzing such alternatives to mainstream narrative and establishing their distinct forms of engagement.

#### REFERENCES

Altman, Rick. 1987. *The American Film Musical*. Bloomington: Indiana University Press.
Baird, Jodie A., and Dare A. Baldwin. 2001. "Making Sense of Human Behavior: Action Parsing and Intentional Inference." Pp. 193–206 in *Intentions and Intentionality: Foundations of Social Cognition*, eds. Bertram F. Malle, Louis J. Moses, and Dare A. Baldwin. Cambridge: MIT Press.
Bordwell, David. 1985. *Narration in the Fiction Film*. Madison: University of Wisconsin Press.
Bordwell, David, and Kristin Thompson. 2004. *Film Art: An Introduction*. Seventh Edition. New York: McGraw-Hill.

Branigan, Edward. 1992. Narrative Comprehension and Film. London: Routledge.

Buckland, Warren. 2000. The Cognitive Semiotics of Film. Cambridge: Cambridge University Press.

Carroll, J. M., and T. G. Bever. 1976. "Segmentation in Cinematic Perception." *Science* 191: 1053-1055.

Field, Syd. 2005. *Screenplay: The Foundations of Screenwriting*. Revised Edition. New York: Delta.

Forster, Kenneth I. and Jonathan C. Forster, 2003. DMDX: A Windows Display Program with
Millisecond Accuracy. *Behavior Research Methods Instruments and Computers*, 35 (1): 116-124.
Hawes, William. 2002. *Filmed Television Drama*, 1952-1958. Jefferson: McFarland.
Karttunen, Lauri, and Arnold M. Zwicky. 2005. "Introduction." Pp. 1-25 in *Natural Language Parsing: Psychological, Computational, and Theoretical Perspectives*, eds. David R. Dowty,
Lauri Karttunen, and Arnold M. Zwicky. Cambridge: Cambridge University Press.

Levinson, Jerrold. 1996. "Film Music and Narrative Agency." Pp. 248-282 in *Post-Theory: Reconstructing Film Studies*, eds. David Bordwell and Noël Carroll. Madison: University of Wisconsin Press.

McKee, Robert. 1997. *Story: Substance, Structure, Style, and the Principles of Screenwriting*. New York: Harper Collins Publishers.

Metz, Christian. 1974. *Film Language: A Semiotics of the Cinema*. Chicago: University of Chicago Press.

Miller, George. 1956. "The Magical Number Seven, Plus or Minus Two Some Limits on Our Capacity for Processing Information." *Psychological Review* 101 (2): 343-352.

Newman, Michael Z. 2006. "From Beats to Arcs: Toward a Poetics of Television Narrative." *The Velvet Light Trap* 58: 16-28.

Newtson, Darren L. 1973. "Attribution and the Unit of Perception of Ongoing Behavior." Journal of Personality and Social Psychology 28 (1): 28-38.

Newtson, Darren L. 1976. "Foundations of Attribution: The perception of ongoing behavior." Pp. 223-247 in *New Directions in Attribution Research 1*, eds. John H. Harvey, Robert F. Kidd, and William John Ickes. Hillsdale: Lawrence Erlbaum.

Newtson, Darren L, Gretchen Engquist, and Joyce Bois. 1977. "The Objective Basis of Behaviour Units." *Journal of Personality and Social Psychology* 35 (12): 847-861.

Persson, Per. 2003. Understanding Cinema: A Psychological Theory of Moving Imagery.

Cambridge: Cambridge University Press.

Schwan, Stephan, Friedrich Hesse, and Bärbel Garsoffky. 1998. "The Relationship Between Formal Filmic Means and the Segmentation Behavior of Film Viewers." *Journal of Broadcasting and Electronic Media* 42 (2): 237-249. Schwan, Stephan, Bärbel Garsoffky, and Friedrich Hesse. 2000. "Do Film Cuts Facilitate the Perceptual and Cognitive Organization of Activity Sequences?" *Memory and Cognition* 28 (2): 214-223.

Smith, Jeff. 1996. "Unheard Melodies? A Critique of Psychoanalytic Theories of Film Music."
Pp. 230-247 in *Post-Theory: Reconstructing Film Studies*, eds. David Bordwell and Noël Carroll.
Madison: University of Wisconsin Press.

Smith, Murray. 1995. *Engaging Characters: Fiction, Emotion, and the Cinema*. Oxford: Oxford University Press.

Swann Jr., William B., Brett W. Pelham, and David C. Roberts. 1987. "Causal Chunking:

Memory and Inference in Ongoing Interaction." *Journal of Personality and Social Psychology* 53 (5): 858-865.

Tan, Ed. 1996. *Emotion and the Structure of Narrative Film: Film as an Emotion Machine*.Malwah: Lawrence Erlbaum.

Tan, Ed, and Inge J. M. van den Boom. 1992. "Explorations in the Psychological Affect Structure of Narrative Film." Pp. 57-94 in *Reader Response to Literature: The Empirical Dimension*, ed. Elaine Frances Nardocchio. Berlin: Mouton de Gruyter.

Thompson, Kristin. 1999. *Storytelling in the New Hollywood*. Cambridge: Harvard University Press.

Thompson, Kristin. 2003. *Storytelling in Film and Television*. Cambridge: Harvard University Press.

Wilder, David A.. 1978. "Effect of Predictability on Units of Perception and Attribution." *Personality and Social Psychology Bulletin* 4: 281–284.

Wright, Will. 1975. *Sixguns and Society: A Structural Study of the Western*. Berkeley: University of California Press.

Zacks, Jeffery M. 2004. "Using Movement and Intentions to Understand Simple Events." *Cognitive Science* 28: 979-1008.

Zacks, Jeffery M., and Khena M. Swallow. 2007. "Event Segmentation." *Current Directions in Psychological Science* 16 (2): 80-84.

Zacks, Jeffery M., Nicole K. Speer, and Jeremy R. Reynolds, 2009. "Segmentation in Reading and Film Comprehension." *Journal of Experimental Psychology* 138 (2): 307-327.

Zacks, Jeffery M., and Joseph P. Magliano. 2011. "Film, Narrative, and Cognitive Neuroscience" Pp. 435-454 in *Art and the Senses*, eds. Francesca Bacci and David Melcher. New York: Oxford University Press.

## FILMOGRAPHY

Hitchcock, Alfred. Original Air Date: 4 December 1955. *The Case of Mr. Pelham*. USA.Hitchcock, Alfred. Original Air Date: 13 April 1958. *Lamb to the Slaughter*. USA.Lamorisse, Albert. 1956. *The Red Balloon* (Le ballon rouge). France.

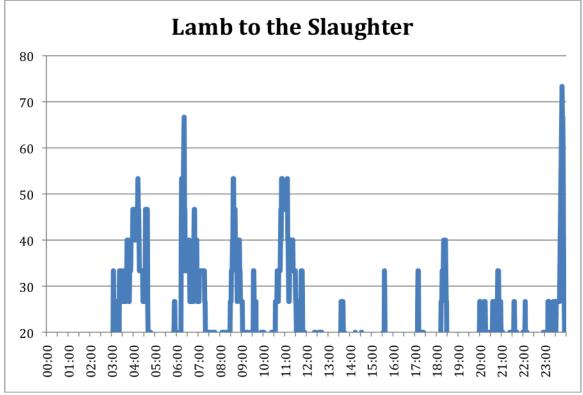


Figure 1. Timeline of "meaningful" responses (%) for Lamb to the Slaughter.

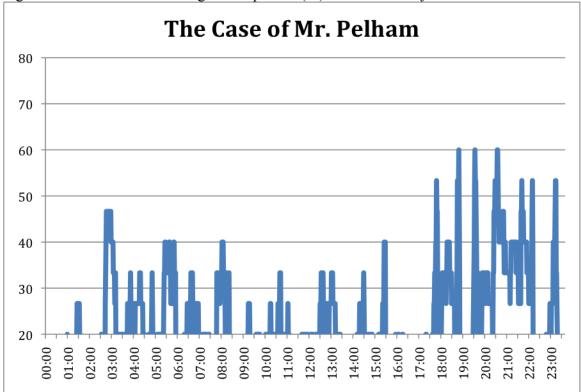
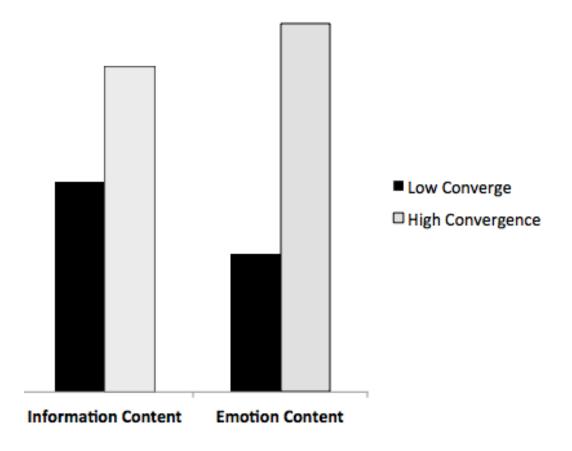


Figure 2. Timeline of "meaningful" responses (%) for The Case of Mr. Pelham.

Figure 3: Mean ratings of Information Content and Emotion Content for *Lamb* and *Pelham* films at points of low and high convergence.



Time	Description	Response
0-1:14	Credits	
1:15-3:04	<ul><li>Wife is busy tidying up the house.</li><li>Husband comes home.</li><li>Wife asks Husband about his day.</li><li>Husband pours himself a drink.</li><li>Wife tells husband her friend things their baby is going to be a boy.</li><li>Husband looks at wife with no reaction.</li></ul>	
3:05-4:40	<ul><li>Husband tells wife he is going to leave her.</li><li>Husband tells wife he is going to live with another woman.</li><li>Husband tells wife she can keep the baby.</li><li>Wife, in shock, says she will fix his supper before he leaves.</li></ul>	53%
4:41-5:53	Wife walks to the garage and takes a frozen leg of lamb out of the deep freezer. Wife sees husband is leaving and pleads with him to stay.	
5:54-7:29	<ul><li>Wife hits husband over the head with the lamb.</li><li>Husband falls to the floor.</li><li>Wife walks slowly to kitchen and puts lamb in oven.</li><li>Wife sits and thinks.</li><li>Wife walks to living room to check the body.</li></ul>	66%
7:30-8:28	Wife returns to kitchen and resumes sitting. Wife starts eating grapes. Wife walks to sink to throw out grapes.	
8:29-9:02	Wife looks at lamb in oven. Wife turns up the oven temperature. Wife walks to the telephone.	53%
9:03-9:32	Wife calls friend and says they can't come over for diner as her husband is too tired from work.	

Table 1. Description of response segments for Lamb to the Slaughter.

9:33-9:40	Wife says that there is nothing wrong, they just can't come over.	33%
9:41-10:33	Wife combs her hair. Wife picks up her purse and coat. Wife goes to the store and buys more food. Wife returns home.	
10:34-11:50	Wife drops groceries on the floor and starts to mess up the room. Wife calls the police on the telephone. (Fade to black.)	53%
11:51-13:35	The police investigate. The detective begins to question the wife.	
13:36-13:41	Detective asks wife if she thought her husband was worried when he came home.	27%
13:42-15:33	The police continue to investigate.	
15:34-15:36	The doctor speculates the murder weapon was a club. (Fade to black.)	33%
15:37-17:07	The police continue to investigate.	
17:08-17:10	Detective asks whether the wife is sure that husband kissed her, and not she that kissed him.	33%
17:11-18:12	The police continue to investigate.	

18:13-18:28	Detective says he thinks the murder was not premeditated, but rather resulted from a quarrel.	33%
18:29-19:59	The police continue to investigate.	
20:00-20:58	The two detectives speculate that the husband was not killed in a fight. The two detectives speculate that the husband was killed by someone he trusted, possibly a woman.	33%
20:59-23:23	The two detectives notice the lamb in the oven. The wife invites the police to eat the lamb. The police sit down and eat the lamb.	
23:24-23:54	Police speculate about the murder weapon while eating the lamb. The wife laughs.	73%

Time **Description** Response 0:00-1:18 Credits Pelham walks into the club bar and orders a drink. The 1:19-2:00 doctor enters and Pelham introduces himself. 2:01-2:07 Pelham asks the doctor if he can talk to him. 26% The Doctor accepts the invitation to lunch. 2:08-3:17 They seat themselves at a table. Pelham asks the doctor to charge him for the talk. Pelham begins by describing himself to the doctor. Pelham tells the doctor of the first instance when 47% 3:18-3:46 someone told Pelham they had seen him somewhere that he hadn't been. Pelham tells of a second instance. 3:47-4:18 Flashback to Pelham seated at a table with a client A friend tells Pelham he said hello to him on the street 4:19-5:00 33% and Pelham didn't respond. 5:01-5:24 Returning to present, Doctor says that doubles are not unusual. 5:25-5:27 Pelham says a club attendant told him he had left a pack 33% of cigarettes in the billiard room. 5:28-5:57 Pelham tells the doctor he hadn't been there. Flashback to Pelham questioning the club attendant. 5.58-6.30 Pelham asks the club attendant if it was a joke. 40% The club attendant says it is not a joke and insists Pelham was there.

Table 2. Description of response segments for The Case of Mr. Pelham.

6:31-7:01	Pelham describes in a voiceover how he is going to try and catch the imposter at the club.	
7:02-7:05	Pelham calls home and realizes his butler thinks he is already there.	26%
7:06-7:10	Pelham rushes home.	
7:11-7:32	Butler asks why he has returned when he only just left.	33%
7:33-8:31	Pelham asks whether the Butler let him in earlier, but the Butler replies that Pelham let himself in. Pelham asks the Butler whether he noticed anything different about him. Pelham checks his spare key.	
8:32-8:56	Pelham finds a tie and collar on his dresser that are identical to the ones he is wearing.	40%
8:57-9:48	Returning to the present, the doctor asks whether Pelham still has the ties. Pelham replies that he has both and that they were not imaginary. Pelham continues his story, recounting how he called in sick to work the next day. Pelham had the lock changed on his front door. Pelham speculates that the police could not help.	
9:49-9:52	Pelham worries that there is something inhuman at work.	26%
9:53-10:48	Flashback to Pelham returning to the office in the afternoon. The secretary brings in the documents she typed up from the morning for Pelham to read.	
10:49-10:50	Secretary tells Pelham she was glad he felt better and came in that morning. Pelham does not respond.	26%
10:51-11:09	The secretary leaves the documents with Pelham.	

	He begins to read them.	
11:10-11:17	Pelham comments that the imposter's letters are written in his style and with a knowledge of his business.	33%
11:18-11:36	Pelham tries to think of what to do.	
11:37	Pelham writes to his bank to add his middle initial to his signature.	26%
11:38-13:04	Returning to the present, Pelham says that night he went to a film before going home. Flashback to Pelham returning home. The Butler asks Pelham when he went out. Pelham asks the Butler where is his supper. The Butler says that Pelham already ate his supper.	
13:05-13:15	The Butler shows Pelham his finished dinner tray.	33%
13:16-13:22	Pelham checks his bedroom to find his pajamas still laid out on the bed.	
13:23-13:46	Pelham asks whether the Butler let him in earlier, but the Butler replies that Pelham let himself in. Pelham asks the Butler whether he noticed anything unusual about how he looked. Butler says he seemed alright then.	33%
13:47-15:55	Returning to the present, Pelham says he went to his office the next morning. Pelham says he considered the police again. Pelham says he first wanted to know from the doctor if it might be a hallucination. Doctor asks Pelham why he thinks the imposter is doing this.	
15:56-16:03	Pelham says he thinks the imposter is trying to move into his life.	40%
16:04-18:15	Doctor says the imposter may have been watching him, so he could copy his dress and manner.	

	Pelham suggests he could vary his routine, even buy a loud tie. The doctor says that this is a good idea. They end their lunch (the story now continues in the present). Pelham goes to a shop and buys a new tie. Pelham returns to his office, Secretary says he was busy working.	
	Secretary brings in the work. Pelham is shocked to see his new signature on the checks. Pelham speculates that the bank probably does not even have the letter yet.	
18:16-18:28	Pelham looks disturbed, asks himself, "What can I do?"	53%
18:29-18:36	Pelham dials his number on the telephone.	
18:37-19:12	Pelham calls his home and the imposter answers.	40%
19:13-19:16	Pelham hangs up.	
19:17-19:25	Pelham tells himself, "He's there now." (Fade to black.)	60%
19:26-20:03	Butler prepares a drink. Pelham returns home. Butler looks flustered, complaining that Pelham keeps coming and going. The imposter walks in from the living room. They look at each other.	
20:04-20:26 20:27-20:36	Butler looks shocked at seeing both Pelhams. Pelham pleads with butler that he is the real Pelham. Butler says he can't tell the difference.	53% 33%
20:37-20:57	The imposter says, "Look at that tie."	33%
20:58-21:07	Butler agrees tie is wrong.	53%
21:08-21:23	Pelham pleads with butler.	60%
21:24-21:29	The imposter tells Pelham to stop shouting. Butler	46%
21:30-21:44	further convinced. Pelham again pleads with Butler.	40%

21:45-22:01	Butler tells the imposter to ring if he needs him. Pelham	40%
22:02-22:13	asks the imposter, "Why did it happen?"	40%
	The imposter responds, "No reason, it just did." Pelham	
22:14-22:39	asserts that there is an inhuman evil at work.	53%
	The imposter asserts, "You're mad, you know."	
	Pelham smiles.	
22:40-22:46		53%
22:47-22:32	The imposter is playing pool with a friend of Pelham's at the club a year later.	
22:33-23:52	Friend says of the now insane Pelham, "Poor fellow." The imposter says, "I don't think he'll ever be right again."	53%