

# 8 Character Developments in Comics and Graphic Novels

## A Systematic Analytical Scheme

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### 1. Introduction

This chapter presents a scheme for analyzing how character developments in comics and graphic novels are signaled to readers. In particular, we focus on how the analytical scheme can be used effectively to address empirical questions in broader cultural contexts, and how the structures (re)constructed on the basis of this scheme can be employed further to empirically test readers' narrative comprehension process.

A considerable body of studies has either focused on narrativity in comics in general (Lefèvre, Mikkonen, Pratt), or has given empirical evidence of comprehension in comics (cf. Cohn, *The Visual Language*, "The Architecture"; Cohn and Bender). However, the question of how to systematically analyze comic characters and narrative events beyond the analytical unit of panel, and how to address higher-level issues regarding differences between modes and genres of comics have received little attention. This chapter will present an analytical method, which has the potential to bridge the gap between the empirical investigation of a reader's narrative interpretation process and the systematic comparison of different comic genres and styles. Moreover, this chapter also presents an empirical pilot study and combines the analytical scheme with exploratory eye-tracking experiments and the manipulation of cohesion mechanisms.

Two interrelated aspects are addressed in this chapter. First, we deal with the question of how to empirically approach the conventions of comic aesthetics and the features of genre. In particular, we will show how the analytical scheme, which we have developed on the basis of functional linguistics, has the potential to bridge the gap between higher-level interpretations of cultural conventions and lower-level empirical investigation, such as the reader's comprehension process. Second, we are concerned with the affordances and constraints of different media and materialities. One main focus of this chapter is the comparison between character development in visual-only media, for instance, a silent graphic novel, and conventional graphic novels constructed via visual-verbal

coherence. The narrative patterns constructed on the basis of the analytical scheme will reflect the different affordances and constraints of these media.

Our approach is anchored in the conceptualization of multiple inter-linked levels of meaning construction (cf. Bateman, Elleström). This approach encompasses at least three basic levels, on which Tseng has substantially based her previous research (cf. Tseng, “Analyzing Characters’ Actions”, *Cohesion in Film*, 2016, “Revisiting Dynamic Space,” “Beyond the Media Boundaries”): (1) the pre-semiotic dimensions of materiality at the lower-level, i.e., different modes, whose uses are constrained by the contexts provided by media, (2) the multiple mid-level discourse (semiotic) dimensions that are formulated within each medium and draw on the affordances and constraints of modes and materialities—namely, on the basis of the configuration of modes and materialities determined by media, and (3) higher-level cultural conventions. It is precisely this multi-levelled conceptualization which underlies the formulation of the analytical scheme in this chapter and enables the analytical bridge across media affordances, narrative comprehension, and cultural conventions. The main aim of this chapter is to unravel the narrative mechanisms at work at the mediating middle level.

## 2. Tracking Character and Event Developments

This section delineates the analytical scheme, which systematically tracks recurring narrative elements, such as main characters, objects and places, and establishes generalized event structures on the basis of the inter-relations between these narrative elements. Our analytical scheme targets event progression beyond the boundaries of the panel. Our assumption is that, although panels often act as a general indicator of how events are segmented spatially and temporally, narrative configurations of people and objects within panels also determine the perception of event developments. The analytical focus of our scheme lies precisely in tracking people and objects (including characters and things) within and across the panel frames.

The well-tested empirical approach to event segmentation (Zacks; Zacks and Tversky) relates event chunks to what Zacks and Tversky term “behavior episodes” (“Event Structure”, 6). These episodes can be broken down into actions and movements of people or things. Empirical evidence shows that people’s comprehension of the boundaries between behavior episodes often lies in the dynamic changes of actions. On the basis of a similar analytical focus, our scheme also analyses how the actions, behavior, and movement of prominent people and objects develop throughout comic narratives.

It should be also noted here that, although the analytical scheme we present is based on similar cognitive principles of event segmentation, it

differs from the event segmentation approach (Zacks) in that our analytical scheme does not examine the moment-by-moment unfolding of events. Rather, our method focuses on the most narratively significant event structures and the most dominant narrative elements. On this basis, we examine the transitions and development of these episodes, or event patterns, which are triggered by changes in the configuration of actions, objects, characters, etc. As we will see in the later sections, establishing generalized event patterns is particularly useful when we aim to conduct a comparative analysis to address higher-level issues. Such analysis requires a certain degree of abstraction for systematic bottom-up comparison. In this pursuit, the implementation of this method encompasses two bottom-up stages: (1) determining the most dominant characters, objects and settings, and (2) investigating how these elements are related to each other. We will exemplify this method by using examples from the graphic novel *City of Glass* (2004), Karasik and Mazzuchelli's adaptation of Paul Auster's (1985) eponymous novella.

### **2.a Cohesion: Tracking Recurring Objects**

To systematically track recurring objects, such as people, things and places, we analyze the linguistics-based model of *cohesion* in comics and graphic novels. This method applies the functional linguistic theory of cohesion developed by Halliday and Hasan (*Cohesion in English*) and then extended by Tseng ("Analyzing Characters' Actions") and Tseng and Bateman (forthcoming) to audiovisual media, including comics. We will illustrate our method in this subsection and combine it with action analysis in the next. In brief, cohesion allows for a systematic empirical investigation of how readers comprehend the presentation and tracking of characters, objects, and places across panel frames. Although there have been other attempts at applying notions of cohesion to comics, these have tended to restrict their accounts to specific components of cohesion and have not explicitly extended cohesion to analyze events or to address cultural issues. The proposal of Stainbrook ("A Little Cohesion"), for instance, focuses almost exclusively on sequential relations between panels in the style suggested by McCloud (*Understanding Comics*). In contrast, the account of cohesion employed here examines a broader selection of the formal devices by which reoccurrence, repetition, and modification are signaled, in order to obtain maximum leverage on the task of further constructing generalized event structures.

Tseng and Bateman (forthcoming) have provided an introduction to the concept and strategies of cohesion, demonstrating its potential for articulating finely-grained theoretical accounts of narrative construction. Their work shows how descriptions of cohesion that anchor narrative construction in the operation of concrete discourse mechanisms can help unpack the narrative complexity of texts that involve more

cognitive load for their readers' narrative interpretation processes. The theory of cohesion deals with the presentation of characters, objects, and settings in coherent narratives and how they may be tracked throughout a graphic novel. Coherence here lies in the progression of cohesive strategies across visual narrative. The cohesive strategies adopted for one element are collected together in order to build cohesive chains. These cohesive chains bind together information about salient characters, objects, and settings across images and texts. Cohesive ties between each (re)appearance of an object provide important cues that guide the viewer along intended paths of interpretation.

We provide an example of cohesive structures by discussing the construction of cohesive chains in the first two pages of *City of Glass*, displayed in Figure 8.1. Paul Karasik and David Mazzucchelli's (2004) graphic adaptation of Paul Auster's novel *City of Glass* (1985) employs a variety of metaphorical images to delineate issues of identity, time, social and family relationships. Therefore, one might expect the text to be cognitively challenging for readers who track recurring characters, objects and places, as well as their interrelations. Our specific goal for this chapter is then to show that, despite this narrative complexity, cohesion

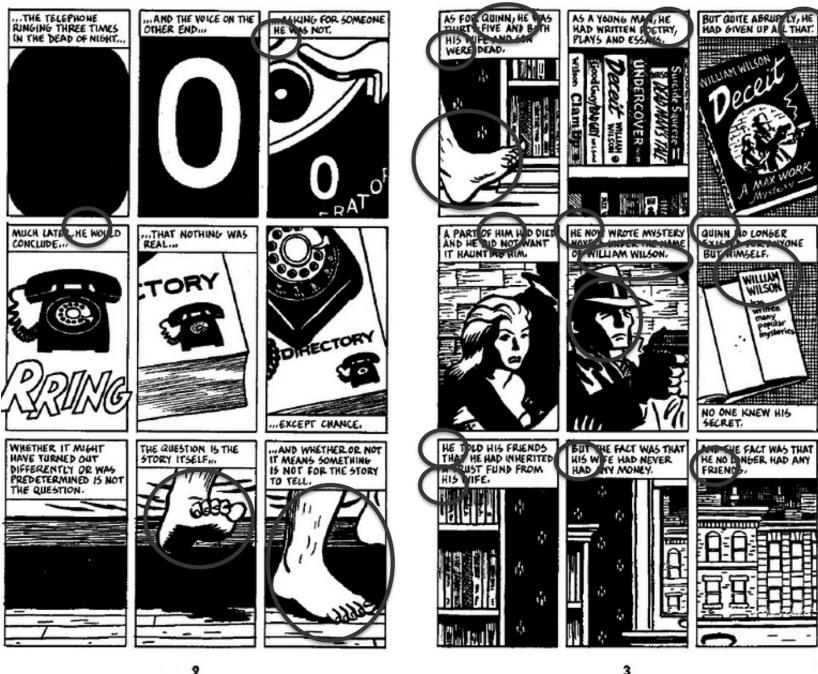


Figure 8.1 Pages 2 and 3 of the graphic novel *City of Glass*. The red circles indicate visual or verbal references to the protagonist.

Source: Reproduced with permission from the Carol Mann Agency.

still offers a rather straightforward analysis of character tracking across visual and verbal elements. As Figure 8.1 shows, the story begins with the description of the protagonist Quinn and portrays his lonely life, his family, and his profession.

The cohesive chains established on these two pages are mapped out in Figure 8.2. They track the most dominant elements: Quinn, phone, written work, and apartment. We will start to describe our method for constructing cohesive chains by detailing the strategies used for Quinn. On page 2, in panel 3, Quinn's identity is presented for the first time as "HE" in the caption text (before his full identity is revealed as "Quinn" in the first panel on page 3). The same identity is presumed/tracked again in panel 4, which explicitly repeats the pronoun "He" in the caption. The cohesive chain starts to build across these two elements. Figure 8.2

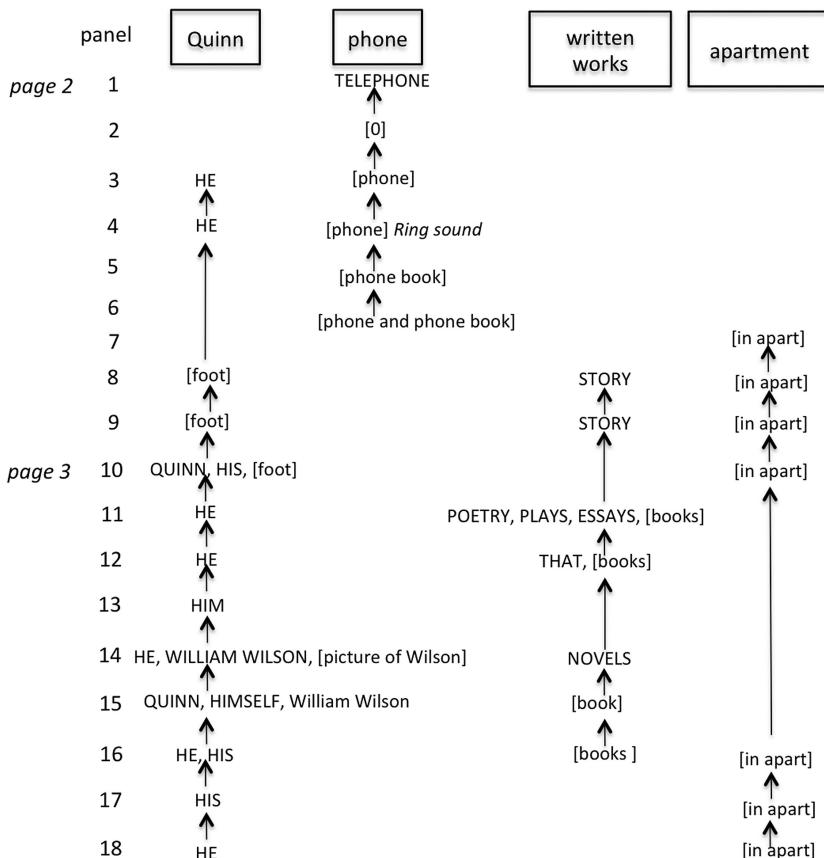


Figure 8.2 Cohesive chains of the dominant narrative elements from pages 2 and 3 of Karasik and Mazzuchelli (2004). Capital letters are text and descriptions in square brackets refer to visual depictions.

shows the maintenance of the identity chain with the help of arrows that link successive elements back to previous elements of the same chain. In panels 8 and 9 at the bottom of page 1, Quinn appears as a visual figure, with his foot referring back to the earlier use of “HE.” Cross-modal references constitute an important property of the cohesive framework of visual narratives that distinguishes it from that of the language system. In visual narratives, a character, object, or specific setting may be presented simultaneously or successively in different modes. It is worth noting that our method does not distinguish the two modes at the outset before we investigate their relation. On the contrary, our analytical perspective treats comics as multimodal texts and examines how certain discourse elements (here, the identities of narrative elements) are realized across different modes.

The cohesive chain shows the ties built for Quinn: Cohesive strategies such as explicit repetition of images and text are at work to track his identity across the page. In panel 10, Quinn’s name is mentioned for the first time and appears together with the cross-modal reference to his foot and the possessive pronoun “HIS.” The verbal elements “HE,” “HIM,” and “HIS” follow in panels 11, 12, 13, 16, 17, and 18. In addition to presenting and tracking the protagonist throughout the two pages, the cohesive chain also emphasizes how certain panels (10, 14, and 15, for example) use more than three cross-modal elements to portray Quinn’s identity. In Section 4, we will conduct an exploratory study to analyze the extent to which the cross-modality of the Quinn impacts on readers’ narrative navigation processes.

Apart from Quinn, who has dominant narrative status, as well as the richest blend of cross-modal realizations of identity, Figure 8.2 shows that three other narrative elements can be identified prominently based on their participation in cohesive structures: A telephone, written works, and the setting of Quinn’s apartment. Each of these elements participates in a cohesive chain made up of a sequence of relations, just as we have seen for Quinn’s cohesive chain. The object chain of the telephone is first introduced cross-modally in panel 1 with the text “TELEPHONE” against a close-up of Quinn’s telephone. The visual presentation of the telephone employs the dynamism of a gradual zoom out portrayed across four panels. In panel 4, the telephone is also cross-modally realized with its sound effect. The chain pattern shows a transition from one object chain to another between panels 6 and 8: The ending of the telephone chain is followed by the opening of a written works chain.

*City of Glass* establishes this second cohesive chain with the help of cross-modal objects—POETRY, ESSAYS, PLAYS, and an image of books sitting on a shelf—which all fall broadly into the same object category of written works. In other words, the relation that holds these elements together is not strictly co-reference but another type of cohesive mechanism, comprising a semantic relation that realizes ties of

similarity. Drawing on this linguistic notion, a semantic relation is established through two types of similarity ties: meronymy, a part-whole relation between two elements, and hyponymy, which refers to elements under a common broader classification. In the present case, POETRY, ESSAYS, and PLAYS are co-hyponyms, and can be considered as falling under the same classification of written work, while the relation between STORY and the images of books denotes a part-whole relation. Finally, panel 7 introduces the third chain, the setting of Quinn's apartment—through partial, gradual revelation since the floor (and perhaps the bed) initially suggest such a setting without revealing it to be Quinn's. Its specific identity will be fully revealed in panels 8 to 10, when Quinn gets up from the bed and walks barefoot towards the living room, contextualized by the books, shelf, and wall paper.

We have described the elements identified so far as prominent narrative elements. It's crucial to note that we do not make this selection on the basis of a prior interpretation of the text and its narrative but solely depending on the inclusion (or not) of elements within cohesive chains. Many more elements could have been mentioned but these do not participate in further chains and so may be formally removed from consideration. Thus, other narrative elements that might have been relevant by virtue of their presence in a panel are considered to be parts of the background since they do not participate in cohesive chains. In this way, the focus on participation in cohesive chains serves as a 'self-selection' device. Any elements that do not reappear in chains are not presented as contributing to the narrative's development (Tseng, "Cohesive Harmony").

More generally, the chain pattern emphasizes how the comic constructs different kinds of transitions. In the present example, the explicit transition between two object chains signals the thematic change of the story content. The center of attention shifts from Quinn's ringing phone to Quinn's writing, which the story portrays in relation to Quinn's apartment. It is precisely this potential for reflecting how the thematic changes are related to the main character that makes cohesive chains a perfect basis for examining the systematic progression of character development and this can be achieved by examining how the co-patterning of these cohesive chains are realized.

## *2.b Structures of the Protagonist's Behavior Episodes*

The method for tracking the character's behavior episodes lies in a combination of cohesive chains and the analysis of action and behavior. The latter focuses on prominently presented static relations and dynamic interactions which interrelate with the cohesive chains of characters, objects, and places unraveled in the previous section. Prominent actions are captured by establishing action chains. The creation of action chains

draws centrally on the notion of process types developed within functional linguistics (Halliday and Matthiessen). These process types characterize the very general kinds of activities that are constructed by the grammar of a language: This refers to how any particular language construes activities and events in the world, embedding them within particular configurations of categories deemed to be culturally significant and relevant. They describe, therefore, ‘what is being done.’ Kress and van Leeuwen (*Multimodal Discourse*) subsequently applied this linguistic notion to visual analysis. Tseng (*Cohesion in Film*, “Beyond the Media Boundaries”) further extends this concept for the analysis of audio-visual media and intermedial comparison.

The analysis of process types distinguishes perceptible dynamic actions, movements, and interactions. Thus, in Figure 8.1, for instance, William Wilson holds a gun. The character or object who initiates actions may be called the actor, for example, William Wilson and Quinn. These processes have both an agent or action initiator (Wilson and Quinn) and an object at which they direct the action. In contrast to such transactional processes, non-transactional processes only have an agent but lack an object. Thus, we see Quinn walking in panels 8, 9, and 10 in Figure 8.1. In addition to processes with explicit actions, there are also verbal processes when characters are seen speaking (speech bubbles in comics), mental or sensory processes when thoughts or feelings are involved, and a process of looking when characters are seeing and observing something. In the present example, the most prominent action types in the first seven pages are grouped together in Figure 8.3. Drawing on the functional semantic categories of action and interaction types, e.g., types of dynamic, dialogical, gazing actions and interactions between characters and characters’ mental and sensory representations (Tseng, “Analyzing Characters’ Actions”, *Cohesion in Film*), there are six basic categories of actions which link the characters and objects across these pages. Type (a) refers to verbal processes, capturing action and behavior while characters speak. Type (b) groups together the action of writing. Type (c) is about sensory processes, which depict what Quinn feels, likes, and thinks. Type (d) describes Quinn’s non-transactional action, which are actions initiated by Quinn without connection to other people and things, such as walking, leaving, and going. Type (e) groups together transactional action found in text and images when Quinn holds his son or the telephone. Type (f) describes the ringing of telephone.

The purpose of establishing cohesive chains of characters, objects, places, and actions lies in constructing generalized and prominent event patterns based on the interaction of these elements. Figure 8.4 brings together the cohesive identity chains established on pages 2–7 and action chains visualized in Figure 8.3 to describe their development. Taken together, the boxes arranged in the diagram constitute the cohesive chains of these initial pages. The chain begins with phone. This

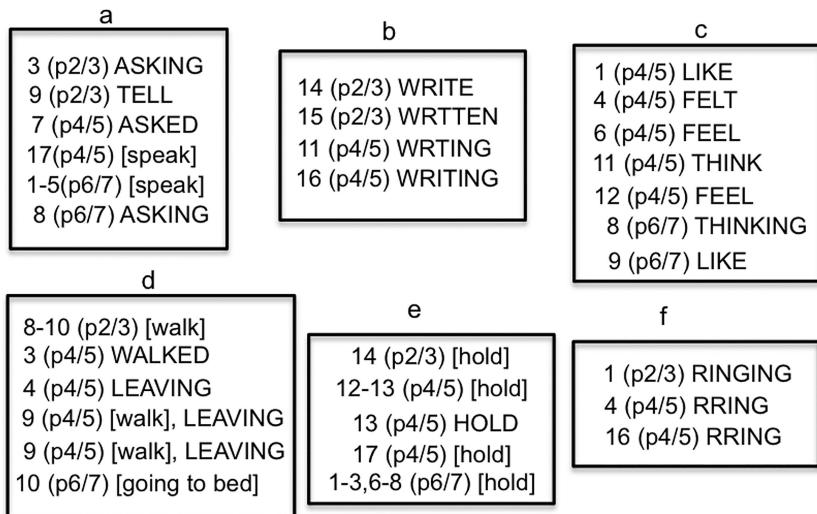


Figure 8.3 Action chains in the first seven pages of *City of Glass*. The numbers refer to the panels and pages in Figures 8.2, 8.4, and 8.5. The actions in square brackets are depicted as images; caption texts in the graphic novel are type-set in capital letters.

dominant element in the cohesive chain seen in Figure 8.2 interacts with the action type (f): The telephone's ring sound shown in Figure 8.3. The pattern also highlights the additional objects depicted on pages 4–7: NY/labyrinth (the labyrinthine quality of New York), boy (Quinn's son), phone, voice (a stranger's).

The overall event pattern indicates that there are explicit thematic changes in these pages as well. For instance, we see Quinn switching between performing actions of his own, walking, feeling/liking and interactions with other people and objects, such as writing stories, speaking with an unknown man on the phone, and holding his son. Figure 8.4 thus displays a generalized event pattern but also presents a more abstract account of subject matters on these pages. These include Quinn's feelings as they relate to his interactions with others, including his son and the stranger he talks to on the phone.

In sum, this style of analysis shows how particular cues present within comic images can be abstracted to produce generic schemes of more prominent actions, roles within actions, and relations between actions. We could hypothesize that the patterns in Figure 8.4 are typical of the introductory sequences of strongly character-centered/subjective types of visual narratives, such as have been found, for instance, in our previous work on *film noir* (Tseng, "Analyzing Characters' Actions", 85–107). To examine whether this hypothesis can be supported or refuted for comics,

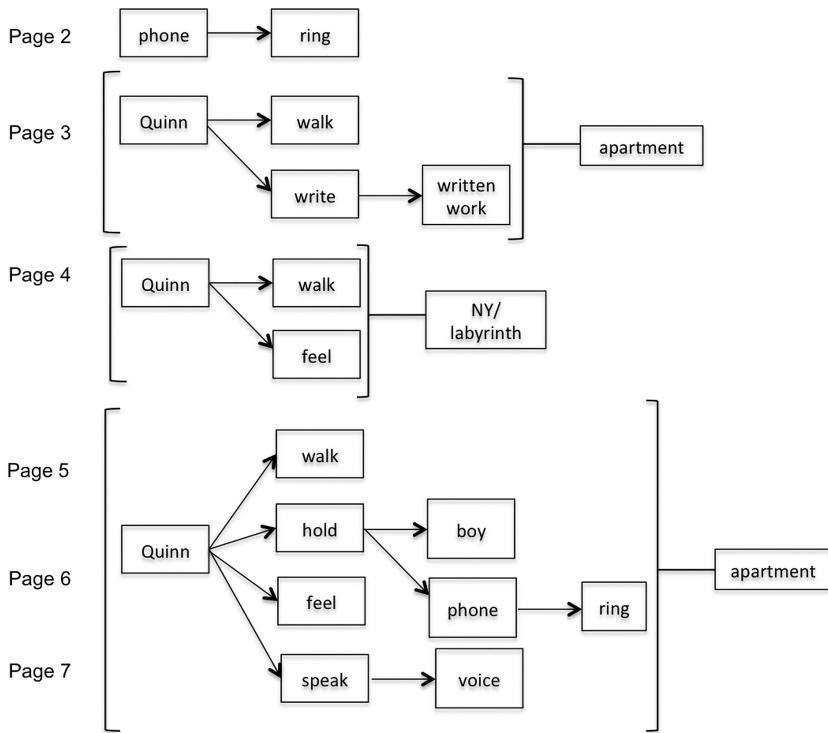


Figure 8.4 Schematic representation of action pattern and actor-activity relationships during the initial seven pages in *City of Glass*.

it will become necessary to apply the method to a larger sample in the future. Nevertheless, to further demonstrate the empirical potential of the method for a broader corpus study, the next section provides a comparative, qualitative analysis.

### 3. Application of the Scheme: Aesthetic Comparisons

In this section, we will apply our method to the early pages of the silent graphic novel, *Dead End* (2002) by Thomas Ott. The difference to our earlier example is that the comic is not only wordless but also a different genre, a thriller. Thus, we will see to what degree our event analysis reflects the mediatic, generic, and thematic differences from our analysis in the previous sections. *Dead End*'s first eight pages are displayed in Figure 8.5. The plot is rather straightforward—it begins with a man driving a car and crashing into a field. While he is dying, two other men discover him and run to the crash site. They discover a suitcase full of cash lying next to the dying man. Instead of rescuing the man, they let

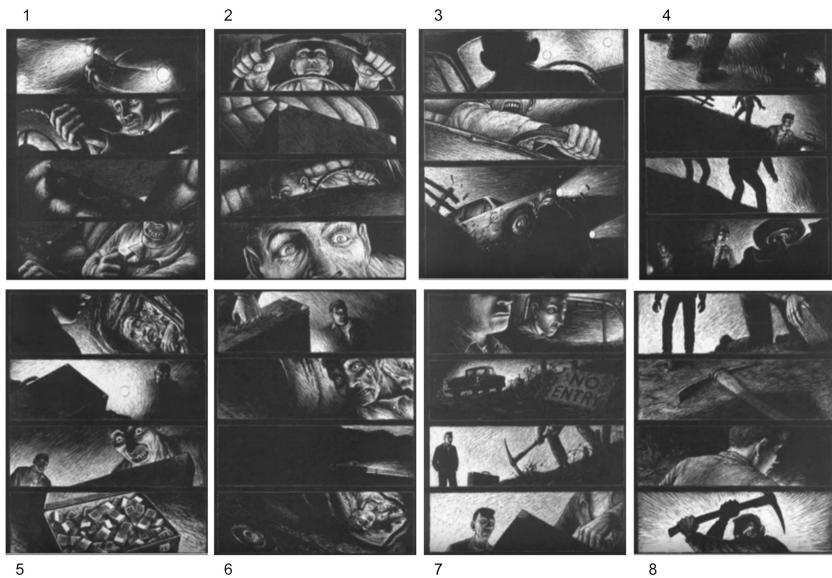


Figure 8.5 First eight pages of Thomas Ott's *Dead End* (2002).

Source: Figure details: reproduced/Ott (2002) *Dead End*, Fantagraphics Books, with permission of Edition Moderne.

him die, take the suitcase, and drive away. While one man tries to bury the suitcase, the other man kills him with a shovel.

Drawing on the analytical scheme delineated above, Figure 8.6 maps out a generalized event pattern of the eight pages by interlinking cohesive identity and actions chains.

From this event pattern, we can see that there are six highly salient people and objects in these pages: Man 1 (M1), his car, Man 2 (M2), Man 3 (M3), the suitcase full of cash and the shovel used by M2 and M3. There is no location element because no particular setting is specified. In contrast to the event pattern in *City of Glass* in Figure 8.4, the event structure in this thriller is substantially action-driven. These pages do not feature a clear protagonist with a narrative status comparable to Quinn in *City of Glass*, who is the only character evolving across the book's dramaturgical development and performing different kinds of action types. In contrast, there are at least three unnamed men in *Dead End*, who are all involved in different action types. Among them, we can see how Man 2 (M2) is engaged in most types of actions compared to Man 1 and Man 3. He is the one who looks at his friend while driving and later kills him with a shovel. More generally, we can say that the action element of looking is prominently linked to four out of six object/character elements. This feature could arguably support the main

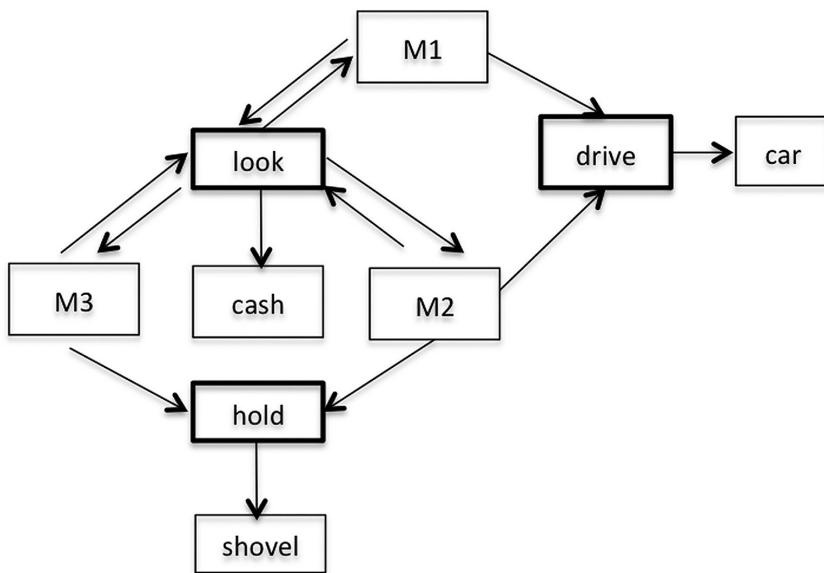


Figure 8.6 A generalized event pattern abstracted from the first eight pages of *Dead End*.

emotional representations of a silent thriller that consequently lacks verbal and audio cues.

Using our analytical scheme to systematically compare how characters are involved in interactions or actions supports higher-level narrative interpretation, such as power differences between characters. Tseng (“Analyzing Characters”, 126–143) analyzed power inequality in Alfred Hitchcock’s *North by Northwest* (1959) by examining the event patterns of the two main characters. Summarizing, we can say that the comparative analysis of the introductory sequences has shown how our analytical scheme reflects components of genre, aesthetic features, and media affordances, by drawing on the systematically generated bottom-up event patterns. The pattern in *City of Glass* shows a prominent character element initiating a variety of action types, ranging from dynamic engagement, behavior, interactions with other people and objects, as well as expressing feelings. By comparison, the generalized pattern of the silent graphic novel appears action-oriented, lacking prominent character development. Given the mediatic lack of verbal cues, the silent medium employs a focus on characters’ eyes and where and how they look to communicate narrative interpretation specific to the genre of thriller. The remainder of this chapter presents an exploratory empirical study of Quinn’s cross-modal cohesive chain in *City of Glass*.

## 4. Further Empirical Investigations: Eye-Tracking Experiments and Questionnaires

### 4.a Previous Studies, Rationale and Hypotheses

Previous empirical work on the perception of comics and graphic novels, especially in the fields of linguistics and cognitive psychology, has provided valuable insight into recipients' reading behavior. A relatively large number of studies has focused on attention (e.g., Omori et al.), and specifically participants' navigation strategies when presented with various types of comic page layouts (see, e.g., Cohn "Beyond Speech Balloons"; Cohn and Campbell). In addition, attempts have been made to chart the complexities of producing and comprehending comics in analogy to the structural constituents and functional relations characteristic of "the organization of a linguistic system" (Cohn, *The Visual Language*, 1; see also Cohn, "Navigating Comics"). Higher-level phenomena along the lines of visual narrative comprehension have not yet received much scholarly attention, but progress has recently been made to shift such questions into focus (e.g., Bateman and Wildfeuer; Foulsham et al.).

With the following empirical explorations, we aim to contribute to this emerging discussion. Given our particular interest in recipients' character tracking as part of the narrative comprehension process, we manipulated a set of character-based cohesion chains in *City of Glass* by removing any traces of visual representation, while keeping language-based cohesive ties intact. This was done to test for the effect that the presence of visual character cues has on narrative processing behavior and, hence, comprehension. We hypothesize that manipulating the cohesion chains in said way has an effect in this respect.

### 4.b Materials & Questionnaire

To test recipients' perception and comprehension of the character development in the graphic novel, we established two conditions by creating two distinct sets of stimuli: The first set, henceforth CoG<sub>orig</sub>, comprised an original version of the first eight double-pages of *City of Glass*. To establish the second set, henceforth CoG<sub>manip</sub>, we conducted manipulations on all cohesion chains of the graphic novel's protagonist Quinn; all manipulations were done using the masking, eraser and stamp tools of Adobe Photoshop CS 6. The cohesion structures of the characters Virginia Stillman and Peter Stillman were left intact. The manipulations performed on Quinn's cohesion chains followed three main strategies that all pursued the same goal: to remove any pictorial traces of Quinn from the panels in question:

As for manipulation type 1, any pictorial element representing Quinn was erased from the panels. This was possible in cases in which the

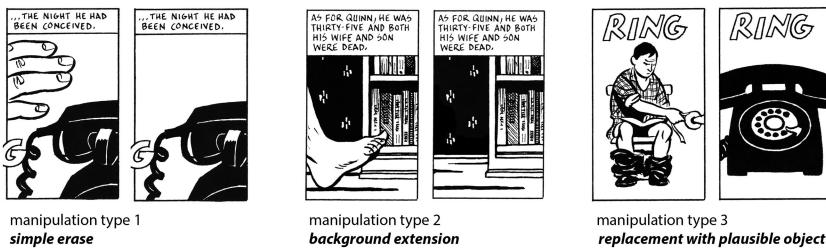


Figure 8.7 Examples of the three manipulation types as used in stimulus creation.  
Source: Figure details: *City of Glass* with permission from Carol Mann Literary.

panel background did not establish any particular setting or objects but merely was either black or white. Figure 8.7 includes an example. As for manipulation type 2, any pictorial traces of Quinn were removed by extending any elements of the setting established. In the example given in Figure 8.7, Quinn's foot was removed from the image by clone-stamping parts of the sheets, bed, and floor. As for manipulation type 3, any pictorial element that depicted Quinn was replaced with a contextually plausible object (but not character). In the example in Figure 8.7, Quinn was replaced by a telephone.

All manipulations were done with the intention of removing visual traces of the main character, while avoiding any changes that would attract recipients' attention. The decision for one or the other manipulation type was based on the particular panel design. If a panel showed a character in isolation, without featuring any depiction of background, then the third strategy was implemented (cf. Figure 8.7). In cases like this, the tails of speech bubbles were retained, whereas they were removed in all other cases following one of the three strategies. In addition to eye-tracking experiments, we used questionnaires to empirically test participants' character tracking as part of their narrative comprehension. Six multiple choice questions were formulated and grouped into two sets: The first question set (Q 1a–c) relates to Quinn and his visual presentations in panels. The second question set (Q 2a–c) refers to Virginia Stillman and Peter Stillman.

- Q 1a *What kind of hair does Quinn, the main character, have?*
- Q 1b *Is Quinn, the main character, shown naked?*
- Q 1c *Is Quinn, the main character, shown holding a telephone?*
- Q 2a *What kind of hair does Virginia Stillman, the female character, have? Q 2b Is Virginia Stillman, the female character, shown naked?*
- Q 2c *Is Peter Stillman shown holding a telephone?*

These six questions were implemented by a single-choice test with three answer choices each, namely ‘Yes,’ ‘No,’ and ‘I don’t know.’ We expected a high discrepancy in response correctness between readers of the original as opposed to the manipulated version for Q 1a–c, and equal responses to Q 2a–c in the manipulated compared to the original version due to the lack of visual information required to answer the questions about Quinn. Such response patterns could then be regarded as being indicative of an active cross-modal processing of character-based cohesion chains.

#### *4.c Equipment, Participants, and Procedure*

The experiment was set up using an SMI Red250Mobile eye-tracker, which was mounted onto the bottom part of a Lenovo ThinkVision L2251p 22" Wide Flat Panel LCD monitor. The monitor was placed on a desk, positioned at eye-level, and operated using its default resolution of 1680 × 1050. Participants were also provided with a keyboard to start the experiment, navigate between stimuli, and respond to the questionnaire. All components were connected to a laptop. Stimuli were presented using SMI Experiment Center. We conducted subsequent statistical analyses using R within R Studio.

The experiments were run in May 2017 at Bremen University. Sixty-two participants took part in the study: Sixty-one undergraduate students enrolled in introductory linguistics classes and one member of staff. Participants ranged in age between eighteen and forty-seven years, with an average age of 21.7 years. Before performing the experiments, all participants completed a questionnaire that collected data on age, gender, education, and potential problems of vision and reading. Moreover, their familiarity with comics and graphic novels based on the “visual language fluency index” was calculated (Cohn et al.; and see Bateman et al., this volume for further information on VFLI scores in the context of the experiments run in May 2017 at Bremen University). Given our hypothesis and the manipulations introduced above, we evenly and randomly distributed participants across two conditions: Thirty-one participants read the original version ( $\text{CoG}_{\text{orig}}$ ), while another thirty-one participants read the manipulated version ( $\text{CoG}_{\text{manip}}$ ). Before reading the pages, we introduced all participants to the general procedures of the experiment session and asked them to sit about 50–70 cm from the screen. After calibrating the tracker, participants took part in several short (randomly sequenced) experiments. Participants were informed that they would be shown “double pages from a graphic novel,” and asked to “look at them as you normally would.” They were also told that they could, by pressing <space>, “move to the next page” at their own pace (but after a maximum of 120 seconds) and would be asked a few short questions on what they had seen. In both test conditions,

the stimuli were sequenced as in the original. The questionnaire constituted the final part of each session: Both groups of participants were presented with the complete set of six three-answer single-choice questions (cf. Section 5.2), which were displayed in randomized order.

#### **4.d First Results and Objectives for Future Research**

##### *Eye-Tracking Data*

For the target panels indicated above, we analyzed total viewing times and number of fixations on pre-defined areas of interest (AOIs). These areas corresponded to the manipulated aspects or their corresponding area in the original version. We used linear mixed models (as implemented in the lmer and glmer functions in R package lme4, Bates et al.) to compare the effect of the manipulation (original vs. manipulated). Linear mixed models allow for simultaneous statistical control for individual differences between participants and between items, which are considered normally distributed random effects. We also adjusted for visual fluency individually by including a random slope of VLFI. As additional fixed effects predictors, we included the manipulation type ('simple erase' vs. 'background extension' vs. 'replacement by plausible object'), the interaction of manipulation and manipulation type, the order of the manipulation in the narrative chain, page number, panel number, and VLFI. Starting from this model, non-significant predictors were subsequently dropped until the Bayesian Information Criterion (BIC) no longer decreased. Only the final model for which a decrease in BIC was observed will be reported here. Since linear mixed models are sensitive to assumptions about the distribution of errors, we log-transformed viewing times and used a generalized mixed model for the count data in number of fixations. Significance tests are based on the Satterwaite correction to the degrees of freedom as implemented in the lmerTest package. All effects were tested at the conventional 0.05 significance level.

For log total viewing time on an AOI, the final mixed effects model included fixed effects for condition, manipulation type, and VLFI. We also included random effects of stimulus and participant, and random slopes for VLFI for each participant. Estimates for the random effects suggest that there is more variance due to material ( $sd = 0.304$ ) than due to participants ( $sd = 0.212$ , with a random slope for VLFI of  $sd = 0.015$  and a residual  $sd = 0.806$ ). The intercept was estimated at  $b = 6.07$ , corresponding to an average fixation duration of 43 ms in the manipulated condition with a simple erase-type of manipulation. Most importantly, the fixed effect of the manipulation was significant,  $b = 0.276$ ,  $t = 2.21$ ,  $p = 0.028$ . Viewing times in the original condition were, on average, 138 ms longer than in the edited condition. This suggests that readers invested time to keep track of visual character cues in the panels.

Another significant effect was observed for the type of manipulation: AOIs in which we had replaced Quinn by a plausible object were fixated longer than the other AOIs in which changes were made either by a simple erase of the character's visual identity or extending the background. However, this tendency was independent of the panel's manipulation; That is to say, it also occurred for the original version. It is likely that this is just a selection effect; somehow the panels that we chose for replacement by plausible objects might have been slightly more interesting than the panels chosen for the other manipulations.

In the Poisson generalized linear mixed model of the number of fixations, a very sparse model achieved the smallest BIC. Only the manipulation condition had a marginally significant effect,  $b = 0.131$ ,  $z = 1.95$ ,  $p = 0.052$ . There was a tendency for more fixations on the original AOIs than on the modified AOIs. For completeness, we also report the intercept ( $b = 0.437$ ) and the random effects. There was more variance in the number of fixations between participants ( $b = 0.167$ ) than between AOIs ( $b = 0.123$ ). The results show that our rather subtle manipulations influenced participants' fixation behavior. We obtained similar results from analyzing questionnaire data.

### *Questionnaire Data*

At the end of each experiment session, both CoG<sub>orig</sub> and CoG<sub>manip</sub>, we asked participants to respond to a questionnaire comprising six three-answer single-choice questions. Table 8.1 shows the absolute frequencies for each answer option in relation to each question, as well as the  $p$ -values using Pearson's chi-square test (and Fisher's exact test since we expected low values in some cells) to evaluate the statistical significance of the difference between sets of answers given by CoG<sub>orig</sub> and CoG<sub>manip</sub> participants.

The differences between both conditions were all significant at  $p < 0.05$  for the questions relating to Quinn. Q 1a–c, responses did not differ significantly between groups for any of the questions relating to other characters, Q 2a–c. These findings further support the assumption that the manipulations done to the visual representation of Quinn had a general effect on participants' narrative processing behavior as part of their narrative comprehension process.

### *Discussion*

Our exploratory analyses of the eye-tracking data showed that the differences between participants' gaze behavior in CoG<sub>orig</sub> and CoG<sub>manip</sub> conditions differed significantly in total viewing and showed a tendency for significance with respect to fixation numbers. Furthermore, an analysis of the questionnaire data revealed highly significant differences

*Table 8.1* Absolute frequencies per response category, chi-square values, degrees of freedom, and p-values for each of the six single-choice questions

Question	CoG <sub>orig</sub>	Group			<i>Chi-Square Test</i>	<i>Fisher's Exact Test</i>	
		CoG <sub>manip</sub>	$\chi^2$	df			
What kind of hair does Quinn, the main character, have?	Short	Long	Dummo	Short	Long	Dummo	2 <0.001 <0.001
Is Quinn, the main character, shown naked?	29	0	2	16	1	14	13.8 2 <0.001 <0.001
Is Quinn, the main character, shown holding a telephone?	5	1	1	26	4	38.2	2 <0.001 <0.001
What kind of hair does Virginia Stillman, the female character, have?	26	4	1	15	12	4	8.8 2 0.013 0.014
Is Virginia Stillman, the female character, shown naked?	18	6	7	14	11	6	2 2 0.359 0.438
Is Peter Stillman shown holding a telephone?	2	28	1	0	29	2	2.4 2 0.309 0.612

between both conditions. These results strongly suggest that whether a cross-modal cohesive chain is constructed or not has repercussions on participants' reading behavior. Participants seem to keep track of visual character cues in the panels when the visual character is saliently and cohesively linked to the text within the same cohesive chain. Thus, our findings provide some empirical grounding for the theory of cohesion and the character analysis we put forward in this chapter. However, additional analyses are needed to deepen our understanding of processes of narrative comprehension. These should include an investigation of patterns of cross-modal transition, i.e., eye movements from text to image to determine whether textual references to the character actually lead readers to a character's visual representation. Such analyses would require materials to be presented in a way that AOIs on single verbal cues are reasonably large so that eye-movements can be recorded reliably. Even though this likely means trading a more controlled experimental set-up for a rather authentic reading situation, such next steps will help to answer questions that were beyond the scope of this paper.

The tendency for longer fixations not only on CoG<sub>manip</sub> panels (in which Quinn was replaced by a contextually plausible object; manipulation type 3) but also with corresponding CoG<sub>orig</sub>-panels requires further empirical investigation. It seems plausible to assume that visual elements, be it people or objects, attract attention if they are saliently and cohesively contextualized into the overall narrative (as with type 3-manipulations). That the longer fixations also attested for the original versions, however, cannot yet be explained. Further analyses and comparisons to CoG<sub>orig</sub> materials (adapted by manipulation type 1 and 2) need to be carried out to reject this hypothesis and elicit factors that could have triggered the significant differences we found. Possible ways to determine such factors involve further scrutiny of the panels' compositional/structural and narrative/functional peculiarities, and, in particular, establishing the specific kinds of cohesive ties across visual and verbal elements as variables in a more controlled experimental set-up. Even though the results presented in this paper are promising, we are aware that our analyses remain exploratory. More investigations are needed to ground our hypotheses empirically.

## 5. Conclusion

This chapter proposed a systematic analytical scheme for analyzing the development of character actions and events. We elucidated the conceptual basis and implementation of the scheme and compared it to the established event-segmentation theory. We then related our analysis to higher-level cultural comparisons. Finally, we reported explorative empirical results that are meant to test lower-level configurations of visual and verbal elements and draw on the structures based on our scheme. In Section 2, we

exemplified the scheme by combining two intermediately applicable analytical methods: cohesion and event analysis. We used the first pages of *City of Glass* to show how the thematic and dramaturgical development of Quinn can be systematically highlighted through the cohesive event structures. In Section 3, we further employed the same method to compare cohesive event structures in the silent graphic novel *Dead End*. This example indicated that without verbal cues the developments of characters' action types may substantially differ from conventional graphic novels. In Section 4, we reported exploratory eye-tracking experiments on readers' character tracking as part of their narrative comprehension processes.

Our eye-tracking and questionnaire study of manipulated cohesion chains in *City of Glass* revealed significant differences between CoG<sub>orig</sub> and CoG<sub>manip</sub> participants' gaze behavior and between relevant parts of the questionnaire data. This suggests that the manipulation performed on the visual representation of the graphic novel's main character *Quinn* had an effect on the way participants interacted with the material. These findings have prompted further hypotheses with regard to the dominant status of verbal elements in reading behavior of graphic novels compared to visual elements. For instance, we could further ask to what degree cross-modal cohesion is a significant factor, and whether foregrounded visual stimuli trigger the largest amount of attention. All these questions require future investigation. Nevertheless, we hope to have shown that such empirical questions can be effectively addressed by drawing on analytical schemes such as the one proposed in this chapter.

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## Works Cited

- Auster, Paul. "City of Glass." *The New York Trilogy*, Faber and Faber, 1985, pp. 3–131.
- Bateman, John A. "Triangulating Transmediality: A Multimodal Semiotic Framework Relating Media, Modes and Genres." *Discourse, Context & Media*, vol. 20, 2017, pp. 160–174. ScienceDirect, doi:10.1016/j.dcm.2017.06.009.
- Bateman, John A., A. Beckmann, and Rocío Inés Varela. "From Empirical Studies to Visual Narrative Organization: Exploring Page Composition." *Empirical Comics Research: Digital, Multimodal, and Cognitive Methods*, edited by Alexander Dunst, Jochen Laubrock, and Janina Wildfeuer, Routledge, 2018, pp.

- Bateman, John A., and Janina Wildfeuer. "A Multimodal Discourse Theory of Visual Narrative." *Journal of Pragmatics*, vol. 74, 2014, pp. 180–208. ScienceDirect, doi:10.1016/j.pragma.2014.10.001.
- Bateman, John. A., Janina Wildfeuer, and Tuomo Hiippala. *Multimodality: Foundations, Research and Analysis. A Problem-Oriented Introduction*. De Gruyter, Berlin.
- Bateman, John A., and Karl-Heinrich Schmidt. *Multimodal Film Analysis: How Films Mean*. Routledge, 2012.
- Bates, Douglas, Martin Maechler, Ben Bolker, and Steve Walker. "Fitting Linear Mixed-Effects Models Using lme4." *Journal of Statistical Software*, vol. 67, no. 1, pp. 1–48. Jstatsoft.org, doi:10.18637/jss.v067.i01.
- Cohn, Neil. "The Architecture of Visual Narrative Comprehension: The Interaction of Narrative Structure and Page Layout in Understanding Comics." *Frontiers in Psychology*, vol. 5, 2014, p. 680. PMC, doi:10.3389/fpsyg.2014.00680.
- . "Beyond Speech Balloons and Thought Bubbles: The Integration of Text and Image." *Semiotica*, vol. 197, 2013, pp. 35–63.
- . "Navigating Comics: An Empirical and Theoretical Approach to Strategies of Reading Comic Page Layouts." *Frontiers in Psychology*, vol. 186, 2013, pp. 1–15. Frontiers, doi:10.3389/fpsyg.2013.00186.
- . *The Visual Language of Comics: Introduction to the Structure and Cognition of Sequential Images*. Bloomsbury, 2014.
- Cohn, Neil, and Hannah Campbell. "Navigating Comics II: Constraints on the Reading Order of Comic Page Layouts." *Applied Cognitive Psychology*, vol. 29, no. 2, 2015, pp. 193–199. Wiley, doi:10.1002/acp.3086.
- Cohn, Neil, Martin Paezynski, Ray Jackendoff, Phillip J. Holcomb, and Gina R. Kuperberg. "(Pea)nuts and Bolts of Visual Narrative: Structure and Meaning in Sequential Image Comprehension." *Cognitive Psychology*, vol. 65, no. 1, 2012, pp. 1–38.
- Cohn, Neil and Patrick Bender. "Drawing the Line between Constituent Structure and Coherence Relations in Visual Narratives." *Journal of Experimental Psychology: Learning, Memory and Cognition*, vol. 43, no. 2, 2017, pp. 289–301.
- Eder, Jens, Fotis Jannidis, and Ralf Schneider, editors. *Characters in Fictional Worlds: Understanding Imaginary Beings in Literature, Film and Other Media*. De Gruyter, 2010.
- Elleström, Lars. *Media Transformation: The Transfer of Media Characteristics among Media*. Palgrave, 2014.
- Foulsham, Tom, and Neil Cohn. "Reading without Words: Eye Movements in the Comprehension of Comic Strips." *Applied Cognitive Psychology*, vol. 30, no. 4, 2016, pp. 566–579.
- Halliday, Michael A. K., and Christian M. I. M. Matthiessen. *An Introduction to Functional Grammar*. 3rd ed., Hodder Arnold, 2004.
- Halliday, Michael A. K., and Ruqaiya Hasan. *Cohesion in English*. Longman, 1976.
- Kress, Gunther, and Theo van Leeuwen. *Multimodal Discourse: The Modes and Media of Contemporary Communication*. Arnold, 2001.
- . *Reading Images: The Grammar of Visual Design*. 2nd ed., Routledge, 2006.

- Lefevre, Pascal. "Narration in Comics." *Cognitive Narratology*, vol. 1, no. 1, 2000. Image & Narrative, [imageandnarrative.be/inarchive/narratology/pascallefevre.htm](http://imageandnarrative.be/inarchive/narratology/pascallefevre.htm). Accessed 12 Jan. 2018.
- McCloud, Scott. *Understanding Comics: The Invisible Art*. Harper Perennial, 1994.
- Mikkonen, Kai. "Presenting Minds in Graphic Narratives." *Partial Answers: Journal of Literature and the History of Ideas*, vol. 6, no. 2, 2008, pp. 301–321.
- Omori, Takahide, Takeharu Igaki, Taku Ishii, Keiko Kurata, and Naoe Masuda. "Eye Catchers in Comics: Controlling Eye Movements in Reading Pictorial and Textual Media." *28th International Congress of Psychology*, 8–13 July, 2004, Paris.
- Pratt, Henry John. "Narrative in Comics." *The Journal of Aesthetics and Art Criticism*, vol. 67, no. 1, 2009, pp. 107–117.
- Stainbrook, Eric. "A Little Cohesion between Friends; Or, We're Just Exploring Our Textuality: Reconciling Cohesion in Written Language and Visual Language." *The Visual Narrative Reader*, edited by Neil Cohn, Bloomsbury, 2016, pp. 130–153.
- Tseng, Chiao-I. "Analyzing Characters' Actions in Filmic Text: A Functional-Semiotic Approach." *Social Semiotics*, vol. 23, no. 5, 2013, pp. 587–605. Taylor & Francis, doi:10.1080/10350330.2012.752158.
- . "Beyond the Media Boundaries: Analysing How Dominant Genre Devices Shape Our Narrative Knowledge." *Discourse, Context and Media*, vol. 20, 2017, pp. 227–238.
- . *Cohesion in Film: Tracking Film Elements*. Palgrave, 2013.
- . "Cohesive Harmony in Filmic Text." *Multimodal Semiotics: Functional Analysis in Contexts of Education*, edited by Lens Unsworth, Continuum, 2008, pp. 87–104.
- . "Revisiting Dynamic Space in Film from a Semiotic Perspective." *Semiotica*, vol. 210, 2016, pp. 210–249.
- Tseng, Chiao-I., and John A. Bateman. "Cohesion in Comics and Graphic Novels: An Empirical Comparative Approach to Transmedia Adaptation in City of Glass." *Adaptation*, vol. 11, 2018. doi:10.1093/adaptation/apx027
- Wildfeuer, Janina. *Film Discourse Interpretation: Towards a New Paradigm for Multimodal Film Analysis*. Routledge, 2014.
- Zacks, Jeffrey M. "How We Organize Our Experience into Events." *Psychological Science Agenda*, vol. 24, no. 4, 2010.
- Zacks, Jeffrey M., and Barbara Tversky. "Event Structure in Perception and Conception." *Psychological Bulletin*, vol. 127, no. 1, 2001, pp. 3–21.