Influence of action cues on the internal compositional structure of comics

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Abstract

Comic composition can be depicted as both dynamic or static. Dynamic composition can bring vibrancy to a comic and give the suggestion of movement. However, little is known about dynamic comic composition in the field of research. Understanding how dynamic composition is constructed may better help understand the art of making comics. Therefore, this study aims to investigate whether action cues are an influence on the dynamic properties of the internal compositional structure (ICS) of comics compared to non-action cues. A total of 93 comic books were annotated from North America, Europe, and East Asia. The results of the study show that action cues are not a cause for a higher frequency of Dutch angles, low angles of view, and long shots compared to non-action cues. This means that comic authors do not tend to make comic panels with an action in them more dynamic by use of other compositional elements. This study also tried to determine whether North American and European comics had more dynamics ICS properties compared to East Asian comics. This study concluded that North American and European comics are not more dynamic than East Asian comics. Cross-cultural analysis showed that East Asian comics tend to have more Dutch angles than European comics, whilst remaining similar to North American comics. There was no difference for angle of view and shot scale between East Asian comics compared to North American and European comics.

Keywords: Dynamic composition, dynamicity, action cues, non-action cues, internal compositional structure (ICS)

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Introduction

Comics can convey scenes in both dynamic and non-dynamic ways. While dynamic composition is explored through theoretical insights, as a visual concept there is little quantitative analysis on how it can be applied to comics (Talon & Thompson, 2010). Considering that the creation of comics and visual storytelling is a difficult and creative endeavor, it is beneficial to create more understanding in this field (Akleman et al., 2023). A comic panel can be defined as a single frame within a sequence of frames that contains a combination of text and image through which the comic is depicted (Abbott, 1986). Comics can enhance the sense of motion by making the composition more dynamic within and between a comic panel. Composition determines the way in which the elements in a comic panel are arranged, which can give a sense of directionality and "flow" to the comics (Mercado, 2013). Flow refers to the sense of direction a comic panel. For instance, if a character within a comic panel looks to the left, it has a leftward flow direction.

By making a composition more dynamic, it gives more vibrancy and movement to a comic panel (Mercado, 2013). Since comic panels are static, it can be quite a difficult task to depict motion (Akleman et al., 2023; Talon & Thompson, 2010). For instance, diagonal composition is associated with dynamic readings (Kraft, 1987a). Composition within a comic panel is called the internal compositional structure (ICS). Directionality in the ICS can be achieved by using flow cues.

One method of implying directionality in a comic is by using action postures. For example, when a character leaps in the air, the reader can deduce that the character is in motion and performing an action as the character is either rising or falling (Talon & Thompson, 2010). Action postures in comics are often a prominent part of the ICS as transitions between panels in comics are mostly continuous, and changes between event states occur more often between panels than changes in scenes or characters (Klomberg et al., 2022, McCloud, 1993). The action cue can be described as how the action posture of the primary character or object on

a panel directs the flow on the panel. Non-action cues can direct the panel flow when there is no clear depiction of movement present. This can occur when the direction a character looks at directs the flow direction (static posture) or when the position of an object on the panel directs the flow direction (figure-to-frame). As dynamicity in static images often plays a significant role for the sequencing of events, this study aims to identify the influence of action cues on ICS of comics (Tasić & Stamenković, 2022). However, there is limited empirical evidence on how the ICS of a comic is affected by action cues. Therefore, the research question of this study is: How do action cues influence the internal compositional structure of comics?

In addition, as comics are produced around the world, does culture influence the dynamicity in the ICS? Therefore, a sub question in this study aims to answer: “How are dynamic ICS properties influenced by American and European comics compared to East Asian comics?”

Theoretical Framework

To keep a reader engaged in a comic, the dynamicity of panels often creates more interesting and pleasing images to the eye (Talon & Thompson, 2010). This can be used to guide the reader through a comic panel and even the page, which is what comics creators often refer to as “flow”. Dynamicity in comics are often related to the depiction of action or movement as the static nature of the medium requires a movement cue (Tasić & Stamenković, 2022). Visual narratives, such as comics, rely on the sequencing of events to progress the story (Talon & Thompson, 2010). Comics are sequential through the usage of panels to transition between events across a physical, spatial layout.

However, if the implication of motion is important, it should be discussed why static panels within comic books are still prevalent. Research by Klomberg et al. (2022) suggests that comics either use continuous or discontinuous forms of transitions. Discontinuous transitions may not imply motion, however they progress the story by introducing new scenes to give a better sense of location, and by adding dialogue through character transitions. Research suggests that the more discontinuous information is presented, the more concentration it requires from the viewing audience (Huff et al., 2014). Simultaneously, Huff et al. (2014) suggests that it also gives better memory about the specific point in time of the story. This suggests that static scenes may depict the progress of time and spatial location better through scene-to-scene transitions. While the implication of motion in the moment may be better depicted through dynamic action scenes. Therefore, the understanding of the effective use of continuity in comics is relevant.

Flow Cues

Dynamic and static panels can be categorized into two groups which both fall under the category of flow cues in this study. A flow cue indicates the flow direction of a panel’s composition. Dynamic flow cues consist of only action cues, while static flow cues consist of

affixes, static postures, perspective cues, graphics, and figure-to-frame. The flow cues will be described here briefly, and expanded upon in the upcoming paragraphs. An action cue can be defined when the action posture of the primary character or object on a panel directs the way in which the panel is read (visually). An affix is a graphic element characterized by being attached to another stem element, such as a character or object (Cohn, 2018). A static posture in a comic happens when the primary character or object's posture directs the panel flow (Cohn, 2023). A perspective cue in the ICS can create the panel flow in a comic by guiding the audience through the panel's perspective. A graphic can be described by how the flow cue of the panel is directed by an abstract shape or form. A "figure-to-frame" flow cue is guided by the positioning of the character or object in relation to the frame.

The dynamic flow cue of an action cue illustrated in Figure 1 is guided by the directional movement of the characters. In this comic panel, we look at it from left to right. The research by Baron-Cohen et al. (1992) suggests that people direct their attention to postural cues such as finger pointing. Similar cues can be seen in Figure 1, as the action postures of the crow (punch) and the bear (hand reaching) indicate a rightward motion which may orient our sense of viewing direction. Action cues can also consist of objects as long as it guides the direction of the panel. For instance, when a plane is flying, the direction the plane is going may guide the reader's reading direction. Action cues often play a significant role in guiding the reader's attention as the action in a panel is a way to progress the story forward.

Studies indicate that comics most often shift between actions across panels (Cohn et al. 2017; Klomberg et al. 2022; McCloud, 1993), meaning that comic panels more often shift between the panels of characters performing an action, compared to shifts between environments or scenes. The study by Ivyer et al. (2017) revealed that out of 250 randomly selected panels, 34.6% of the panels were connected by action-to-action transitions, 32.7% subject-to-subject, 17.7% by moment-to-moment, 0.39% moment-to-moment, and 13.8% scene-to-scene. This contextualizes the number of action cues than can exist in. In film theory,

the continuity of shots is important for the flow of the movie and to keep the movie coherent for the audience (Kraft, 1987a). This means that transitions between shots should be coherent, and actions should be represented clearly. Research by Huff et al. (2014) indicates that discontinuity may lead audiences to make less reliable predictions on what will happen next in a scene. Having continuity within dynamic panels by reserving these for action cues could seem intuitive for comic readers.

Figure 1

The action cue directs the panel flow towards the right. The arm of the crow pushing the bear is the action performed in this comic panel. This rightward movement dictates the way in which we visually read this comic panel going rightwards. Bob Morall & Teddy – Annar hluti (Hringsson, 2017)

Apart from the dynamic flow cue, static flow cues consist of affixes, static postures, perspective cues, figure-to-frame, and graphics. An affix is a graphic element characterized by being attached to another stem element, such as a character or object (Cohn, 2018). Affixes often appear as motion lines, which direct the motion of the object, and the path the object is going (Hacımusaoğlu & Cohn, 2022). In Figure 1, the motion lines attached to the crow and bear are affixes. As the characters move towards the right, the motion lines give the impression

of motion to the movement of the characters. Affixes tend to be accompanied by action cues as they are inherently reliant on a character or object. Comics use affixes to enhance motion since they cannot rely on moving images like in film.

A static posture (Figure 2) in a comic happens when the primary character or object's posture directs the panel flow (Cohn, 2023). In Figure 2, the character looks down towards the left, giving the sensation that the panel has a flow towards the down left direction. This can occur when a character's eye direction is an indicator of flow direction. Research suggests that eye gaze is central to the attention direction of others (Baron-Cohen et al., 1992; Perret et al., 1994). We look at the eyes of others to infer emotional states and to direct attention. These studies found that people retrieve information from the body, head, and eye gaze to direct their attention, mostly coming from the eyes. Considering that a static posture is not mostly focused on the eye's gaze, Langton et al. (2000) argues that head orientation plays a significant role in the attention of direction of other people. Overall, static postures use the position of the body and eye gaze to determine the flow direction. The lack of dynamicity in these types of panels tend to be related to their static postural cues.

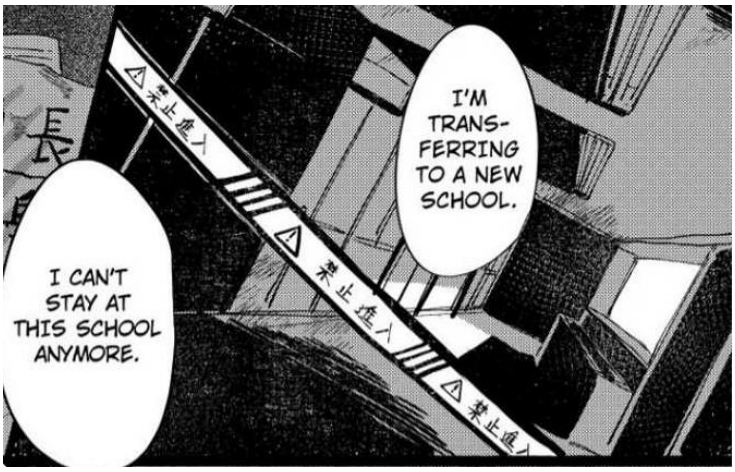
Figure 2

The static posture in this comic panel is directed by the gaze of the character who looks down towards the left. The reader follows where this character looks towards. *Forgiveness* (Xiao-He, 2020)

Perspective drawing can give the reader an idea of a three dimensional space existing in a comic panel (Haley, 2018). Perspective can be achieved by using one or more vanishing points where all the lines in a drawing converge towards, which creates depth. A perspective cue in the ICS can create the panel flow in a comic by guiding the audience through the panel's perspective (Figure 3). For instance, in Figure 3 the hallway is the vanishing point in which the directionality of the panel is moved towards. This perspective cue guides the reader's gaze inwards of the comic panel in this example.

Figure 3

The directionality of the panel is going towards the end of the hallway, guided by the perspective within the frame. Forgiveness (Xiao-He, 2020)



A graphic can be described by how the flow cue of the panel is directed by an abstract shape or form. This can occur when a character's emotion is being displayed through an abstract metaphor for example. A "figure-to-frame" flow cue is guided by the positioning of the character or object in relation to the frame (Figure 4). By the use of the rule of thirds, a character may harmonize better when placed at specific points in the frame (Maleš et al., 2012). The implementation of the rule of thirds can be seen in Figure 4, as the character is placed on the right side with the building in the background. The character placement gives more room in the comic panel for the building in the distance. Which can be important for comics as coherent visual storytelling is advised for comic panels (Akleman et al., 2023). The figure-to-frame cue may give a sense of importance or convey emotion through the position a character or object is placed in.

Figure 4

The direction of the panel is guided by the position of the character in the frame. Bob Morall & Teddy – Annar hluti (Hringsson, 2017)

Comic authors balance different techniques when composing the panel content. By applying these methods, different atmospheres and focal points in the panel can be created (Heiderich, 2012). It is often imperative to understand the meaning of the ICS properties to create an effective panel composition. Understanding panel composition can be done using constructs from film theory, as these can be used for static images like comic panels (Cutting, 2015; Kraft, 1987a; Mercado, 2013). Films often start as drawn storyboards before they are filmed to visualize the scenes and create a better look and feel. The process of drawing storyboards resembles the creation of comic books. This may indicate that films rhetorical strategies are applicable to the internal compositional structure of comic panels. Applying these concepts from film may explain inherent dynamic properties within comic panels. The following sections will describe multiple properties within the ICS: framing angle, angle of view and shot scale. The perspective is always taken from the reader who looks at the comic panels.

Framing angle

The framing angle consists of two categories: the first is a standard angle, where the orientation of the content within the panel is horizontal. This is a less dynamic panel and more

static, and normal representation of reality (Heiderich, 2012). The second category is the Dutch angle, where the orientation of the content within the panel is (slightly) tilted. Figure 3 illustrates the use of a ‘tilt’ as the hallway in the comic panel is oriented diagonally, to create imbalance and uncertainty in a panel (Heiderich, 2012; Kraft, 1987a). A Dutch angle can imply a sense of motion or movement by its diagonal composition as Kraft (1987a) describes a diagonal composition to be more dynamic. If the atmosphere needs to be altered then a Dutch Angle may benefit the comic panel more. The general assumption is that the standard angle is used most within comics panels. However, there have been no studies examining this empirically.

Angle of View

The Angle of view represents how the primary object within a panel relates to the way the reader sees it. This can be categorized as: Aerial, High Angle, Lateral, Low Angle, Ground up. An aerial view means the reader sees the comic panel from above the primary object or character, viewing from a 90° degrees angle. The high angle means that the reader sees the comic panel from a 45° degrees angle above the primary object or character within the panel. A high angle is exemplified in Figure 4, which overlooks most of the comic panel from above. A lateral view means that the primary object or character is on eye level with the reader. This is presented in Figure 1, where you see both characters from eye level. A low angle means that the reader sees the comic from a 45° degrees angle below the primary object or character within the panel. This can be seen in Figure 2, where we look at the character from below. A ground up view means that the reader sees the comic panel from a 90° degrees angle below the primary object or character as if the viewpoint was the ground.

Research by Kraft (1987b) suggests that the angle of view has a relation with how people view the world around them. A lower angle of view places the subject in a position of strength and authority as they are above the reader. A lateral view places the subject equal to the reader. A high angle of view places the subject below the reader which may signify inferiority

and weakness. This gives the reader a dominant outlook over the subject. Kraft (1987b) argues that the physical act of looking up or down at someone translates to the feeling of figuratively looking up or down at them. However, low angles and high angles are not that frequent. In the study by Cohn (2011) the lateral angle was most commonly used, followed by high and low angles. Aerial and ground up shots were rarely seen.

Shot Scale

Shot scale is defined by how much of the body of the primary character is visible within the panel. The shot scale uses a human as a reference for its shot scale. This is categorized as: extreme long shot, long shot, medium long shot, medium shot, medium close-up, close-up, and extreme close-up. For an extreme long shot, the entire character's body is visible and it shows a wide view of the entire scene. An extreme long shot can give the reader a sense of grandeur in a scene and help establish the location of the character. For a long shot, the entire body is visible in the frame. For a medium long shot, the character is only visible within the comic panel from the knees up. For a medium shot, the character is only visible within the comic panel from the waist up. For a medium close-up shot, the primary character is only visible within the comic panel from the chest up. For a close-up, the primary character is visible within the comic panel from the neck up. For an extreme close-up, only a part of the primary character's head is visible, or an equivalent of that. An extreme close-up might heighten the level of intensity in a scene if the camera focuses solely on the eye of the character (Heiderich, 2012).

The study by Cutting (2015) suggests that the shot scale in film has remained the same over time whilst the number of characters in a shot has decreased. These findings showed that the frame did not become smaller as there were less characters in the scene. Cutting & Ayse (2015) revealed that shot duration has decreased due to characters appearing larger in shots. These changes in shot scale are compelling to contrast with comics to see whether shot scale has changed over time in comics.

The study by Cohn (2011) discusses that action-to-action transitions are more frequent if they portray the whole scene. This may signify that action cues are more present when the shot scale is bigger. Furthermore, amorphic comic panels tend to have more long shots than panels with characters in them (Cohn et al., 2012). Amorphic panels are comic panels that show objects in the frame rather than people. This contrasts the idea that action cues have a longer shot scale, as amorphic panels are most likely static cues.

Dynamics in ICS

Within the three ICS properties (framing angle, angle of view, and shot scale) there are certain types of panel characteristics hypothesized to portray a higher level of dynamicity as suggested by film theory (Kraft, 1987a; Mercado, 2013). However, these topics have not been studied enough empirically to confidently address this question. A corpus analysis of 93 comics have been made to analyze the ICS properties for their dynamicity in relation to action cues. Therefore, the research question of this study is: ”How do action cues influence the internal compositional structure of comics?”

First, a principle for dynamic composition is diagonal movement, which is something that is inherent to the tilt of a Dutch angles (Kraft, 1987a). This indicates the likelihood that Dutch Angles give off a sense of action in the scene and would be more present during action panels. This leads to the following hypothesis:

H1: A*ction cues will have more Dutch Angles compared to non-action cues.*

Second, when looking at the angle of view, there are also elements that may indicate a more powerful scene when using composition. Talon & Thompson (2010) suggest that a lower angle of view elevates the level of power an action presents in a comic. As we see a character from below, we assume that they have a position of dominance or authority over us (Kraft, 1987b). An action cue seems to benefit from a powerful stance if it was displayed in a comic

panel. This would align the lower angle of view to the action cue. A higher angle of view of a character is often used to convey emotion and create sympathy for the character (Mercado, 2013). Seeing the character from above would further enhance their weakness towards the reader (Kraft, 1987b). This seems more likely to occur on a more static cue where the character is in an inactive state. This leads to the following hypothesis:

H2: A*ction cues will have more lower angles compared to non-action cues.*

Third, when looking at shot scale from the perspective of which shot scale type is more dynamic, there is an argument to be made for long shots. If the scene is shot from too up close, it may be difficult to infer the action as the action is not visible within the panel frame. Close ups are often used as a reactionary panel to portray emotion within a character (Heiderich, 2012). In the study by Neil (2011), American comics which had the most action-to-action transitions, also had more panels with multiple character's in the shot. This may be explained by multiple character's requiring longer shot to all be depicted in the frame. This does not mean that multiple characters require long shots. However it can be assumed that longer shots allow for more people that can present an action as a flow cue. Therefore the following hypothesis is:

H3: A*ction cues will have more long shots compared to non-action cues.*

The Dutch Angle, low angle of view, and long shot are the three ICS characteristics hypothesized to portray the most dynamic panel composition in comparison to the other ICS properties. This grouping will be referred to as dynamic cues within this study.

Cultural differences

It is also possible that flow cues may differ across cultures, given that there are a variety of factors that may influence the composition of comics. Prior work found that comics differ in various ways between those from America, East Asia, and Europe, and the following paragraphs will cover on how this occurred (Cohn, 2011; McCloud, 1993).

Previous research found that American and Japanese comic panels have different forms of directional attention (Cohn, 2011; Cohn et al., 2012). The research suggests that Japanese comics are more inclined to use single person shots. Compared to American comics that use more multiple person shots in a single frame (Cohn, 2011). The framing of a panel has similarities to shot scale as multiple people can also appear in a close up shot. However, it can be assumed that multiple people are better suited for a medium or a long shot.

The corpus study by Cohn (2011) further suggests that high angles are more common in Japanese manga than American comics. This may be due to cultural influence that manga have on Japanese children that they copy this drawing style to have more environmental panels and high angles. According to research by Klomberg et al. (2022), Asian comics place more emphasis on spatial continuity whereas American and European comics both employ more continuous types of panels with character continuity.

Research by Hacımusaoğlu and Cohn (2022) indicates that the type of language spoken by authors can influence the depiction of motion in a comic panel. The depictions reflect structures in the spoken languages of their authors. Additionally, the type of language may influence how comic authors tell stories (emphasis on depicting action on spatial location) and translate into other languages (Tversky & Chow, 2017). Given the differences between Asian and American comics found in previous research (Cohn, 2011; Cohn et al., 2012), this study seeks to determine whether culture may also exert influence on the dynamic properties within the ICS with the added factor of European comics. The previously discussed research is somewhat similar to ICS and flow cues, however direct comparison of flow cues and the ICS has mostly not been done. Therefore, this study also aims to answer the sub question: “How are dynamic ICS properties in comics influenced by American and European culture compared to East Asian culture?”

American and European comics tend to use more continuous panels than Asian comics, which may indicate a higher amount of action scenes (Klomberg et al., 2022). Action panels tend to have more of a diagonal flow and dynamicity, which may play a role in the number of Dutch angles present (Kraft, 1987; Mercado, 2013). The fourth hypothesis is:

H4: *American and European comics will each have more Dutch Angles in their comic panels compared to East Asian comics.*

Cohn (2011) found that East Asian (Japanese) comics tend to have more high angles compared to American comics. As Asian comics tend to focus more environmental panels compared to American and European comics, it is more likely that Asian comics will have a higher angle of view in their comic panels (Cohn, 2011; Heiderich, 2012 Klomberg et al., 2022;). This study tries to replicate this finding with the addition of European comics added to the analysis. The fifth hypothesis is:

H5: East *Asian comics will have a higher angle of view in their comic panels compared to both American and European comics.*

Based on the literature of Cohn et al. (2011), American and European comics tend to have more character's in each panel compared to Asian comics. And as previously mentioned, it can be assumed that longer shots allow for more people that can present an action as a flow cue. The sixth hypothesis is:

H6: *American and European comics will each have, on average, longer shots in their comic panels compared to East Asian comics.*

These findings will tell us whether American and European comics will each possess more dynamic ICS cues compared to East Asian comics or vice versa. This will not tell us that one region is more dynamic than the other, just that dynamic cues can be found in different regions

Methods

Materials

This study investigated the influence of action cues on the internal compositional structure across comics from various countries. The comics for this study were selected through the TINTIN Corpus (Cohn et al., 2023). In total, the corpus of this study consisted of 93 comics coming from 23 different countries with 26 East Asian comics, 28 North American comics and 41 European comics. Table 1 shows the number of comics from each region and total panels annotated.

Table 1

Total comic books annotated by global region, publication date, total books, and total panels

Global Region	Publication date	Total Books	Total Panels
East Asia	1985-2016	26	1188 (.336)
Europe	1980-2023	41	1230 (.347)
North America	1981-2021	26	1117 (.316)
Total		93	3535

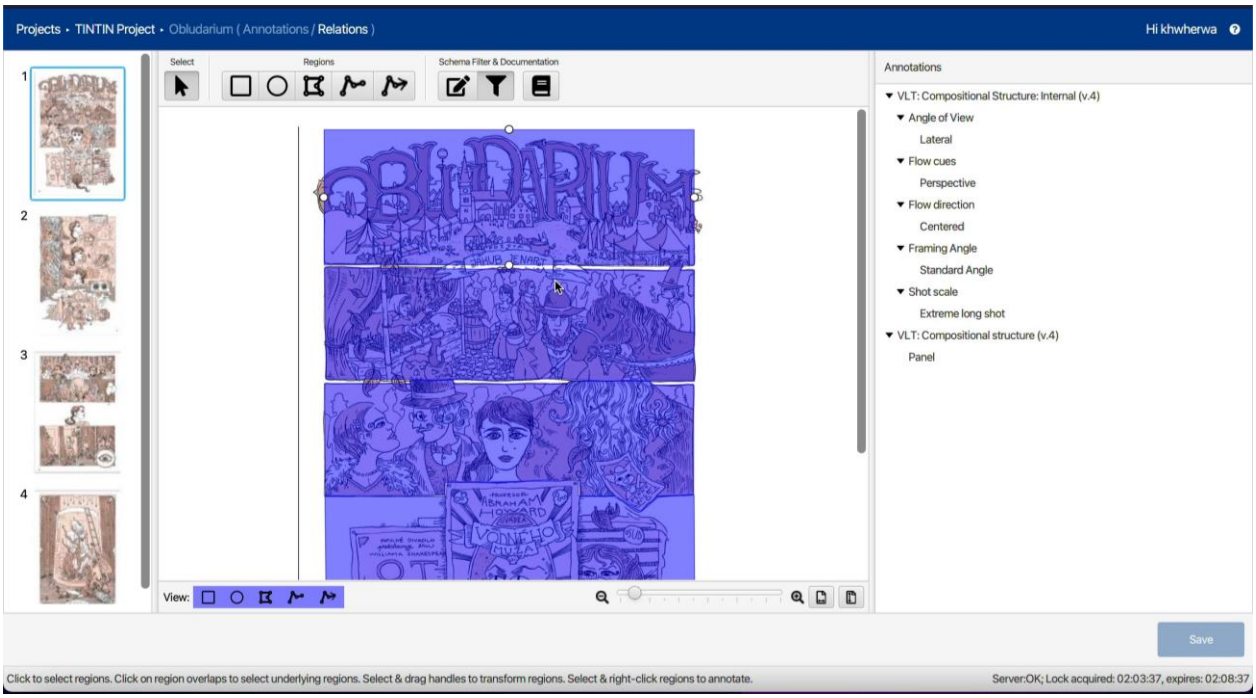
The mean comic book length was 38.01 panels with a standard deviation of 20.720. The mean publication date for the comics was 2006 with a stand deviation of 12. On average, East Asian comics came from the early 2000's (M = 2000, SD = 9.24), North American comics from the mid 2000's (M = 2006, SD = 11.12), and European comics came from the early 2010's (M = 2010, SD = 12.57). Only comics published after 1980 were used for this study.

Areas of analysis

Panels of each comic book that was examined were annotated using the ICS annotation scheme (Cohn, 2023). The annotation process was done using the Multimodal Annotation Software Tool (MAST) as can be seen in Figure 5 (Cardoso & Cohn, 2022). The ICS consists of the framing angle, angle of view, shot scale, flow cue, and flow direction. The process of annotation always started in the following order: framing angle, angle of view, shot scale, flow cues, and flow direction. The comics were annotated by three annotators who were trained in annotating the internal compositional structure and carried out practice annotations which were checked and discussed prior to annotating the actual corpus. Weekly evaluations of the annotations were held to keep the annotation quality consistent.

Figure 5

The comic panel is centered in the screen and is covered in blue. The blue panel above is selected. On the right side you can see the overview of the ICS properties. This panel is annotated as a (Framing angle) Standard angle, (Angle of view) Lateral view, (Shot scale) Extreme long shot, (Flow cue) perspective, (Flow direction) centered. Screenshot of the Internal Compositional Structure retrieved from MAST.



The framing angle was categorized as Dutch angle or Standard angle (Cohn, 2023). The default selection procedure would have been to choose the standard angle. The Dutch angle was selected whenever the panels horizontal layout was tilted.

The Angle of View was categorized as aerial, high Angle, lateral, low angle and ground up (Cohn, 2023).

The shot scale was categorized as extreme long shot, long shot, medium long shot, medium shot, medium close up, close up, and extreme close up (Cohn, 2023). When there are multiple characters in a scene both the foreground and background character will get their own shot scale. A comment was added with either “Foreground character” or “Background character”.

The flow cues were categorized as an action posture and non-action posture (affix, perspective, static posture, figure-to-frame, and graphics). A hierarchy was created for flow cues, which started in the following order: action posture, static posture, affix, graphics, figure-to-frame, perspective (Cohn, 2023). If affixes were directing the flow cue with figure-to-frame,

affixes would have been selected as the flow cue. In some cases, multiple flow cues were selected. For instance, if a character was running (action posture) in a panel and they had motion lines (affix) following him, then both could be selected.

Data Analysis

To analyze each ICS cue, the frequency ICS properties of action cues and non-action cues were calculated by dividing the total amount of a given cue out of the total number of panels in a book. To illustrate, by having divided the number of Dutch angles and standard angles present in action panels (and non-action panels) by the total number of panels per comic, an average number of Dutch angles and standard angles was created. Then, the number of Dutch angles action cues were compared to the number of Dutch angles in non-action cues. The same was done for the angle of view and the shot scale. As the variables Ground up and Aerial were so low number, Ground up was grouped with low angle as Angle of view_low, and Aerial was grouped with high angle as Angle of view_high. The lateral angle of view remained its own group. Similarly for shot scale, the variables Extreme close up and close up were grouped as Close up. Medium close up, medium shot, and medium long shot were grouped as Medium shot. Extreme long shot and long shot were grouped as Long Shot. This was done as some variables also occurred less frequent and the data was analyzed easier this way.

JASP version 0.18.1 was used to analyze the data (JASP Team, 2024). The dependent variables for this study were the frequency of framing angle, angle of view, and shot scale. The primary independent variables were the action cues versus non-action cues and cultural differences (American and European compared to East Asian). First, a 2x2 repeated measures ANOVA was conducted to examine whether action cues had more Dutch angles than non-action cues (H1). A second 2x3 repeated measures ANOVA was conducted to measure whether action cues had more low angles compared to non-action cues (H2). A third 2x3

repeated measures ANOVA was conducted to measure whether action cues had more close ups compared to non-action cues (H3).

The 2x2 repeated measures ANOVA for framing angle was reconducted with global regions as a between-subjects-factor to measure whether both European and North American comics individually had more Dutch angles than East Asian comics (H4). The 3x3 repeated measures ANOVA for angle of view was reconducted with global regions as a between-subjects-factor to measure whether East Asian comics would have a higher angle of view in their comic panels compared to both American and European comics (H5). The 3x3 repeated measures ANOVA for shot scale was reconducted with global regions as a between-subjects-factor to measure whether American and European comics will each have, on average, longer shots in their comic panels compared to East Asian comics (H6).

If Mauchly's test of sphericity was significant a Greenhouse Geisser test was used for all hypotheses. The Post hoc analysis using the Bonferroni correction was used to reveal differences in the interaction effect.

Afterwards, H4, H5, and H6 were reanalyzed using the k-means clustering analysis as a between-subjects factor instead of global regions. The k-means clustering analysis was performed in case global regions were not the most effective metric for the ICS. Perhaps certain components were too similar across regions and global regions was unable to capture differences in ICS properties. The k-means clustering analysis consisted of the ICS components used in this study: framing angle, angle of view, shot scale, and flow cue. The clusters were formed optimized according to the BIC values. These clusters were then used as a between-subjects factor instead of global regions to understand the characteristics of those clusters. The Post hoc analysis using the Bonferroni correction was used to reveal differences in the interaction effect.

Results

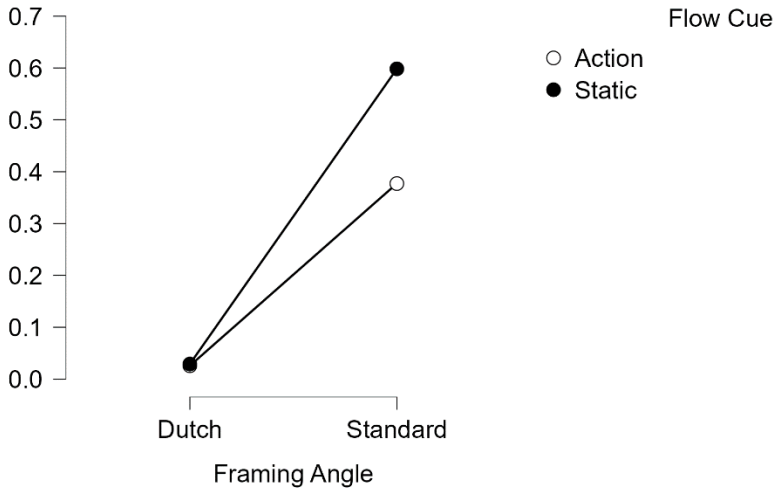
Framing angle

To test whether action cues will have more Dutch angles than non-action cues, a repeated measures ANOVA was performed. There was a main effect of flow cues F (1, 92) =36.840, p<.001, ω^2 = 0.272, which occurred since static cues (M = 0.616 SD = 0.181) are more common than action cues (M = 0.413 SD = 0.180). There was also a main effect for framing angles, F (1, 92) = 3047.537, p<.001, ω^2 = 0.966, which occurred because standard angles (M = 0.932 SD = 0.112) were more common than Dutch angles (M = 0.054 SD = 0.070).

There was also an interaction effect between framing angles and flow cues F (1, 92) = 39.854, p<.001, ω^2 = 0.287. As can be seen in Figure 6, Dutch angles in action panels were not more frequent than Dutch angles in static panels (mean difference = -.003, p = 1.000), while standard angles in action panels were less frequent than standard angles in static panels (mean difference = -0.221, p<.001). This means that the presence of action cues did not use more Dutch angles compared to non-action cues, going against the first hypothesis that "*action cues will have more Dutch Angles than static cues"*.

Figure 6

Mean comparisons for Dutch angles and Standard angles of Action cue (Action) versus non-action cue (Static).

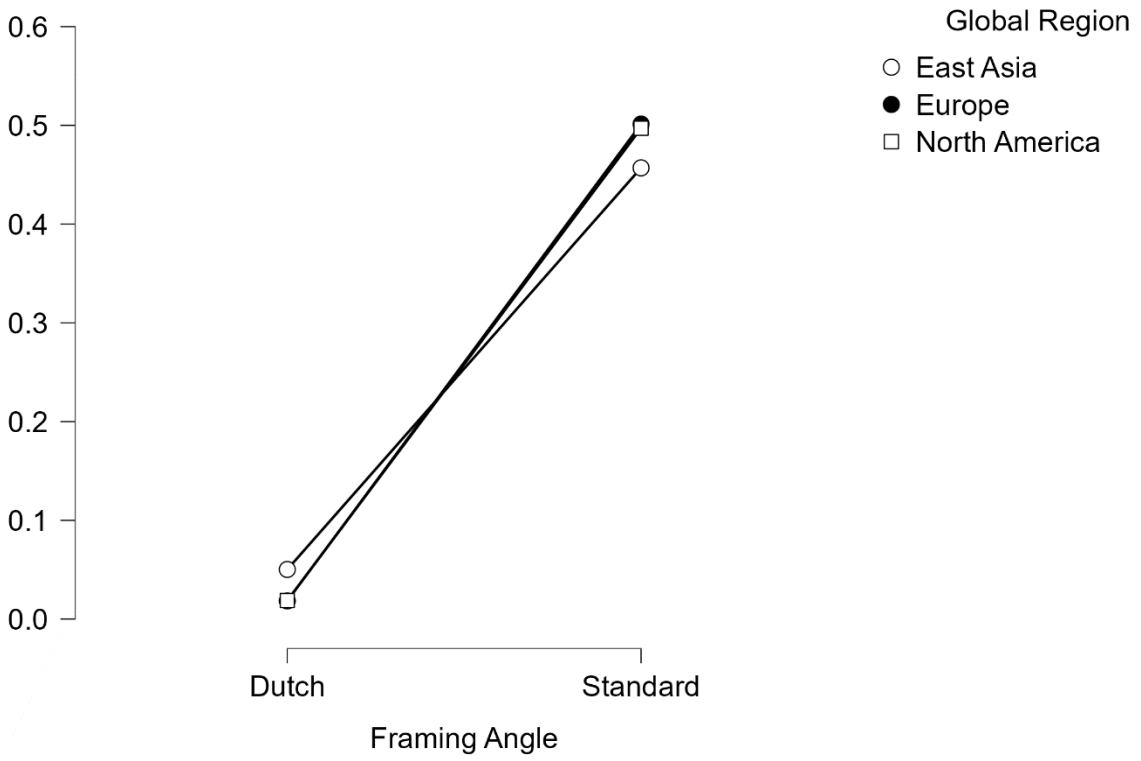


Following this analyses within the repeated measures ANOVA, the Global Regions were used as a between subject factor for the dynamic ICS properties. This was done to test whether American and European comics will each have more Dutch Angles in their comic panels compared to East Asian comics.

There was an interaction effect for framing angle, and global region $F(1, 90) = 37.303$, $p<.001$ $\omega^2 = 0.278$. As can be seen in Figure 7, East Asian comics had more Dutch angles than European comics (mean difference= 0.032, $p = .030$), while East Asian Dutch Angles were not more frequent from American comics (mean difference = 0.031, $p = .083$). This indicates that East Asian comics did not have less Dutch angles than American and European comics. Therefore, the fourth hypothesis "*American and European comics will each have more Dutch Angles in their comic panels compared to East Asian comics*" was not accepted.

Figure 7

Mean comparisons for Dutch angles and Standard angles by Global Regions



Angle of view

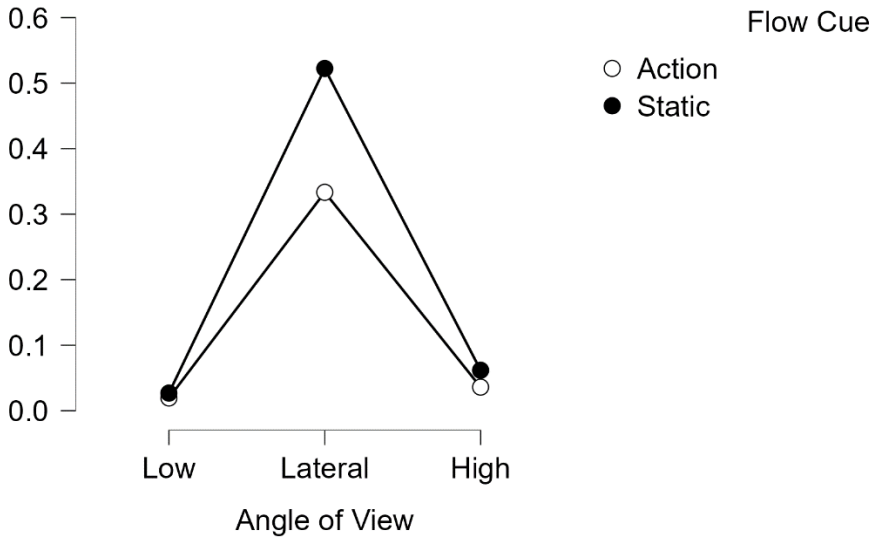
To test whether action cues will have more lower angles than non-action cues, a repeated measures ANOVA was performed. ~~A~~ main effect was found for flow cues F (1, 92) =33.102, p<.001, ω^2 = 0.206. This occurred since static cues (M = 0.616 SD = 0.181) appeared more frequently than action cues (M = 0.413 SD = 0.180). There was also a main effect for angle of view F (1.274, 102.236) =987.658, p<.001, ω^2 = 0.884. This occurred as lateral angles (M = 0.839 SD = 0.126) are more common than low angles (M = 0.048 SD = 0.052) and high angles (M = 0.095 SD = 0.076).

There was also an interaction effect for angle of view and flow cues F (1.111, 102.236) =29.300, p<.001, ω^2 = 0.197. As can be seen in Figure 8, low angles in action panels were not more frequent than low angles in static panels (mean difference=-.007, p=1.000), and high angles in action panels also were not more frequent than high angles in static panels (mean difference =-0.026, p=1.000). This means that the presence of action cues is not indicative that

it will generate more low angles compared to static cues, and static cues will not produce more high angles than action cues. Therefore, the second hypothesis "*action cues will have more lower angles than non-action cues*" is not accepted.

Figure 8

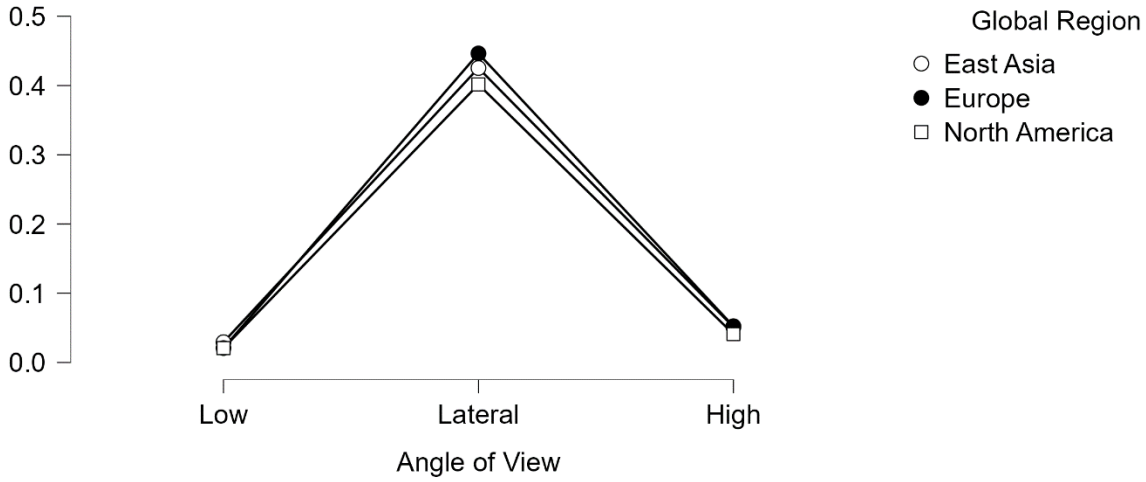
Mean comparisons for angle of view by Action cues (Action) and non-action cues (Static)



Following this, the next hypothesis was to test whether East Asian comics will have a higher angle of view in their comic panels compared to both American and European comics. There was no interaction effect for angle of view, and global region $F(2.548, 114.649) = 0.958$, $p=.404$ $\omega^2 = 0.000$. This indicates that the amount of high angles of view is not influenced by the global region. Therefore, the fifth hypothesis "East *Asian comics will have a higher angle of view in their comic panels compared to both American and European comics"* is not accepted.

Figure 9

Mean comparisons for angle of view by Global Regions

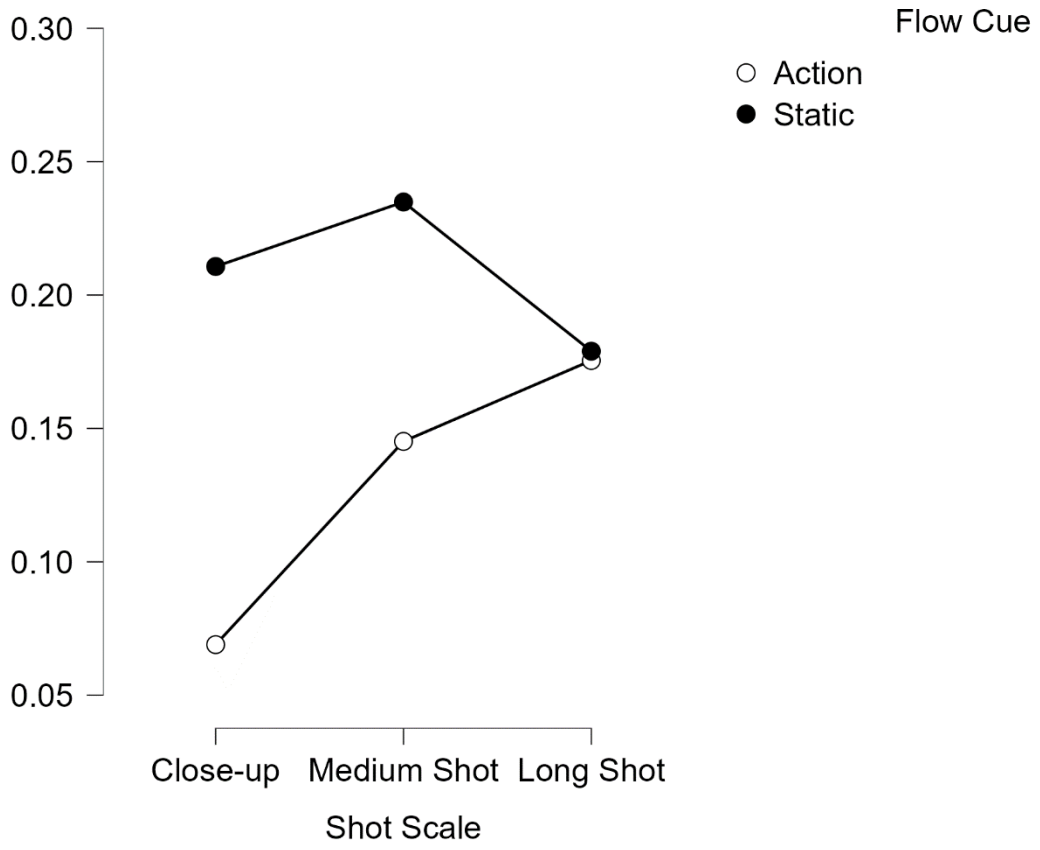


Shot scale

To test whether action cues will have more long shots than non-action cues, a repeated measures ANOVA was performed. There was a main effect found for flow cues F (1, 92) =29.931, p<.001, ω^2 = 0.184. This occurred since static cues (M = 0.616 SD = 0.181) are more frequent than action cues (M = 0.413 SD = 0.180). There was also a main effect for shot scale, F (1.936, 162.998) =5.596, p=.005, ω^2 = 0.038, because close ups (M = 0.267 SD = 0.142) are less frequent than medium shots (M = 0.416 SD = 0.154) and long shots (M = 0.355 SD = 0.169). An interaction occurred between shot scale and flow cues F (1.772, 162.998) =18.622, p<.001, ω^2 = 0.116. As can be seen in Figure 10, long shots in action panels did not differ from long shots in static panels (mean difference =-0.003, p=1.000), while close ups in action panels were less frequent than close ups in static panels (mean difference=-0.142, p<.001). This means that static cues are depicted the same number of time for long shots compared to action cues, and close ups are depicted less with action cues compared to static cues. Therefore, the hypothesis "*action cues will have more long shots than non-action cues*" is not accepted.

Figure 10

Mean comparisons for shot scale by Action cues (Action) and non-action cues (Static)



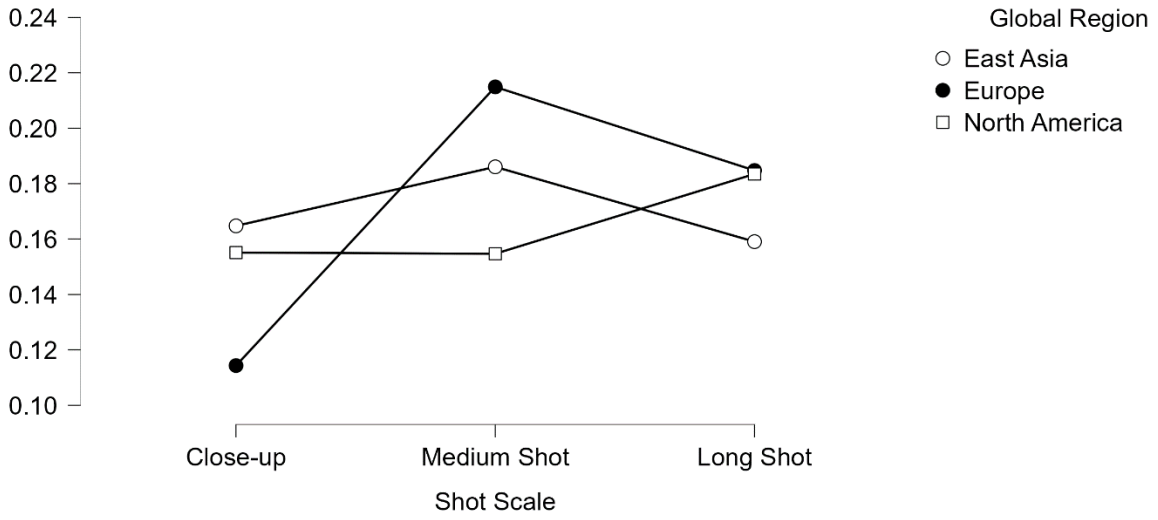
Following this, the next hypothesis was to test whether American and European comics will have, on average, longer shots in their comic panels compared East Asian comics.

There was a significant interaction effect for shot scale, and global region $F(3.820, 171.896) = 2.675$, $p=.036$ $\omega^2 = 0.016$. As can be seen in Figure 11, East Asian comics did not have less long shots compared to European comics (mean difference = -.026 $p = 1.000$) and American comics (mean difference = -.024 $p = 1.000$).

Therefore, the sixth hypothesis "*American and European comics will each have, on average, longer shots in their comic panels compared East Asian comics*" was not accepted.

Figure 11

Mean comparisons for shot scale by Global Regions.



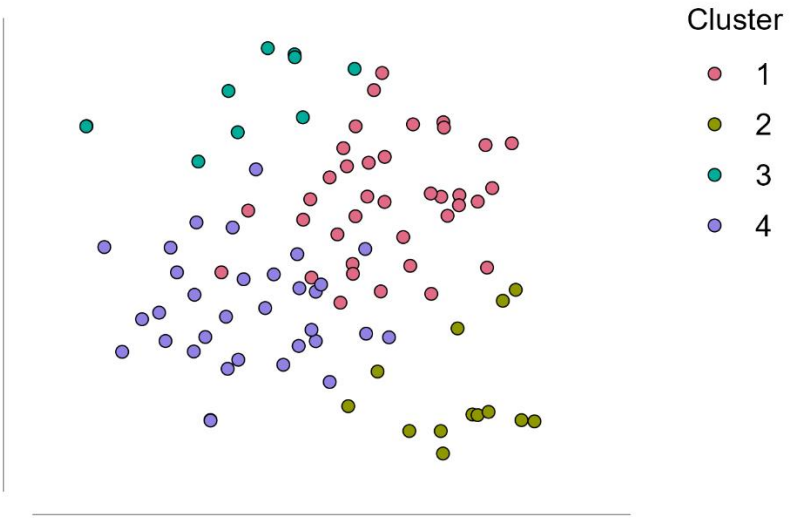
K-means clustering analysis

There was no significant interaction effect for the global regions of both Angle of View and Shot Scale. And the hypothesis for Framing angle was not accepted based on their global regions. Therefore, a k-means clustering analysis was performed to use clusters as a between-groups variable to see whether clustering may provide different results for the interaction effects instead of global regions. In Figure 12, a t-SNE cluster plot shows the overall distribution of the different clusters that were formed

Figure 12

A t-SNE Cluster Plot, that shows the overall distribution of clusters formed from the entire corpus that was used in this study.

t-SNE Cluster Plot



In Figure 13 a contingency table was made based on the clusters that were formed sorted by Global Region. Group 1 is mostly East Asian comics, with some European and American comics. Group 2 is a small combination of all global regions. Group 3 is mostly European and North American, which may indicate the likeness of European and American comics in terms of ICS properties. And Group 4 is only European comics. In Table 2, the descriptive statistics for action cues and non-action cues are presented for the different clusters.

Figure 13

Contingency table of clusters based on global region showing quantities and proportions (in parentheses)

Contingency Tables

	Global Region			
Cluster	**East Asia**	**Europe**	**North America**	**Total**
Group 1	17 (.65)	6 (.15)	4 (.15)	27 (.29)
Group 2	3 (.12)	4 (.1)	3 (.12)	10 (.11)

Contingency Tables

	Global Region			
Cluster	**East Asia**	**Europe**	**North America**	**Total**
Group 3	6 (.23)	18 (.44)	19 (.73)	43 (.46)
Group 4	0 (.00)	13 (.32)	0 (.00)	13 (.14)
Total	26	41	26	93

Table 2

Mean, standard deviation, Minimum, and Maximum descriptive statistics for k-means clustering action cues and non-action cues

	Action cues				**Non-action cues**			
	Group 1	**Group 2**	**Group 3**	**Group 4**	**Group 1**	**Group 2**	**Group 3**	**Group 4**
Valid	27	10	43	13	27	10	43	13
Missing	0	0	0	0	0	0	0	0
Mean	0.300	0.436	0.534	0.231	0.714	0.566	0.503	0.826
Std. Deviation	0.136	0.208	0.113	0.111	0.145	0.191	0.126	0.073
Minimum	0.056	0.129	0.200	0.000	0.441	0.282	0.270	0.611
Maximum	0.559	0.718	0.811	0.389	1.037	0.871	0.800	0.926

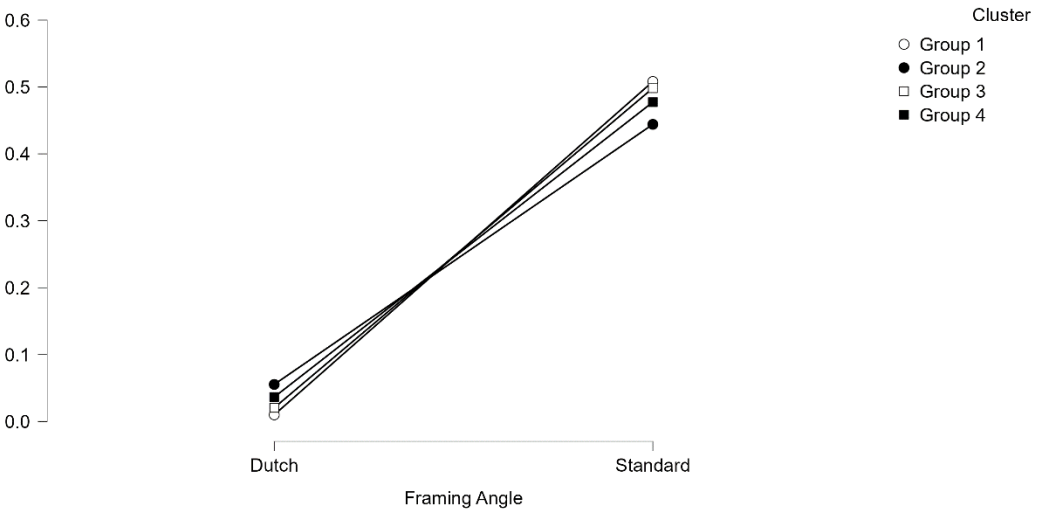
The first reanalyzed hypothesis was to test whether American and European comics each had more Dutch angles than East Asian comics. To test whether Group 3, which consists mostly of European and American comics had more Dutch angles than Group 1, which consists of mostly East Asian comics, a repeated measures ANOVA was performed. A second test was

done whether Group 4, which consists of only European comics, had more Dutch angles than Group 1.

There was an interaction effect for framing angle, and clusters $F(3, 89) = 5.500$, $p = .002$ $\omega^2 = 0.070$. Comics from Group 1 did not have less Dutch angles compared to Group 3 (mean difference = -0.011, $p = 1.000$), and comics from Group 4 (mean difference = -0.027 $p = 1.000$). As could be seen in Figure 14, there were no differences in Dutch angles for all groups in the k-means clustering analysis, which indicates that all groups from the k-means had somewhat similar amounts of Dutch angles. The hypothesis to test whether American and European comics each had more Dutch angles than East Asian comics could find no further support.

Figure 14

Mean comparisons for Framing angle by Clusters. There were no significant differences.

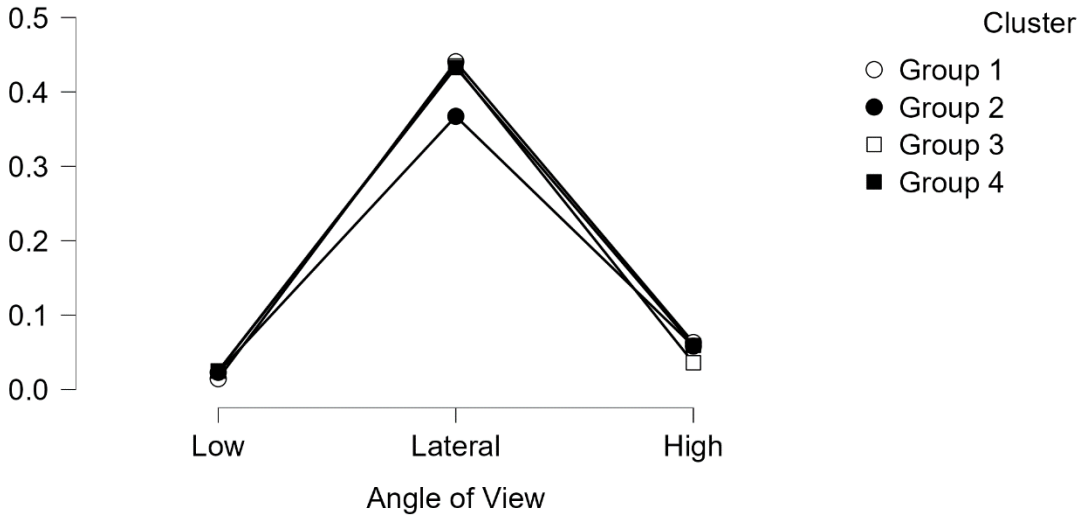


The second reanalyzed hypothesis was to test whether East Asian comics had more higher angles of view compared to European and American comics. To test whether Group 1, had more high angles than Group 3, and Group 4, a repeated measures ANOVA was performed.

There was no interaction between angle of view and clusters, $F(3.794, 112.562) = 1.528$, $p = .201$ $\omega^2 = 0.005$. Figure 15 showed the results of the interaction effect. This did not give support to the hypothesis whether East Asian comics had more high angles of view compared to European and American comics.

Figure 15

Mean comparisons for Angle of View by Clusters. There were no significant differences.

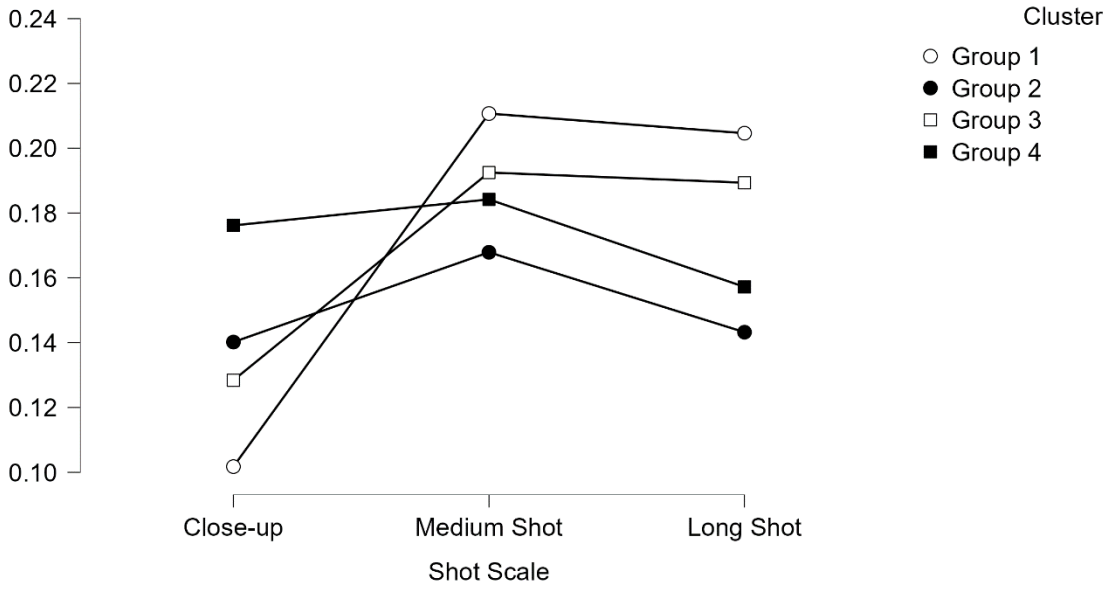


The final reanalyzed hypothesis was to test whether American and European comics, on average, each had more long shots than East Asian comics.

There was no interaction between shot scale and clusters, $F(5.839, 173.225) = 1.472$, $p = .192$ $\omega^2 = 0.005$. Figure 16 showed the results of the interaction effect. This did not give support to the hypothesis whether American and European comics, on average, each had more long shots than East Asian comics.

Figure 16

Mean comparisons for Shot Scale by Clusters. There were no significant differences.


0.24
0.22
0.20
0.18
0.16
0.14
0.12
0.10
Close-up
Medium Shot
Long Shot
Shot Scale
Cluster
Group 1
Group 2
Group 3
Group 4

Discussion

This study sought to determine whether action cues had more dynamic ICS properties than non-action cues. Although action cues could appear to portray dynamic properties, this study found that action cues did not have more dynamic ICS properties compared to non-action cues. Dutch angles, low angles of view, and long shots were not significant in their relation with action cues compared to non-action cues. Action cues themselves may not be “dynamic” and inhibit static properties. Perhaps, both action and non-action cues can be considered dynamic depending on the ICS properties they use.

This study found that the standard angle, as presumed, is the most occurring framing angle in comics. This could mean that Dutch angles are reserved for specific scenarios to display events of unease or discomfort, while the standard angle seems more versatile as it is the normal viewing orientation (Heiderich, 2012).

Dutch angles within action panels were not more frequent than Dutch angles within non-action panels (H1). A cause for this occurrence can be that Dutch Angles are not necessarily meant to be dynamic. There are comparisons to the inherent diagonal composition within Dutch angles (Kraft, 1987a). However, Dutch angles are often meant to represent an emotion or idea of uncertainty (Heiderich, 2012; Kraft 1987a). The display of emotion may give a relation between Dutch angles and non-action cues. As a comparison, the display of emotion for the high angle of view is often related to an inactive state as it can be perceived as a weak stature (Mercado, 2013; Kraft, 1987b). This inactive state is related to non-action cues and the display of emotion. Dutch angles may depict similar tendencies of emotional display.

The research by Cohn (2011) indicates that lateral cues are the most common cue type, which was confirmed in this study. In this study, 4.8% of all panels were low angles of view, 9.5% were high angles of view, and 83.9% were lateral. As we view the world from a lateral perspective we are more accustomed to drawing laterally.

Action cues were also not more frequent for low angles compared to non-action cues (H2). According to Kraft (1987b) the low angle is a way to indicate a powerful scene. Especially for a character, as there is a psychological element of power and dominance to a character that stands above the reader. This however did not translate into action cues not having more low angles. First, according to Talon & Thompson (2010), a comic should follow certain beats that creates a rhythm within the comic. Action sequences are a tool at the disposal of the artist. If stretched out for too long it may disrupt the quality of the story. Low angles may provide a powerful scene for action cues, however if it is used too frequently the power of the low angle may lose its meaning. A second possible explanation for action panels not having many low angles is that it is a difficult perspective to draw (Akleman, 2023). A limitation in an artist's skill may influence their ability to draw from higher or lower perspectives (Duncan et al., 2015). This raises the question whether there is an incentive to draw from more dynamically challenging angles compared to lateral if it does not garner the desired effect. Perhaps, diverging from lateral shot types confuses the reader if it is not coherently presented (Huff et al., 2014; Kraft, 1987a).

Medium shots were the most frequent characteristic of shot scale with 41.6%, long shots occurred 35.5%, and close ups occurred 26.7%. This distribution is more varied compared to framing angle and angle of view as most shot scales types can serve a distinct function for certain emotional beats in a story (Heiderich, 2012). Long shots can be used to establish scenes, medium shots to segment actions, and close ups to enhance emotional portrayal (Heiderich, 2012). The intent of depiction of shot scale may vary to the context of the story (McCloud, 1993; Talon & Thompson, 2010).

Action cues were also not more frequent in long shots compared to non-action cues (H3). The assumption that action panels require the full scene to be displayed is not necessarily wrong. However, there may be some instances for non-action cues to also display more long shots. Amorphic panels may have increased the number of non-action cues present in long shots

(Cohn et al., 2012). As amorphic panels are unable to show the action of a person, it is likely that these types of panels are non-action cues. These could be environmental panels such as establishing shots of buildings or cityscapes for instance. Furthermore, it may be that perspective cues require longer shots to depict an accurate perspective in a drawing. This may explain why non-action cues have a similar amount of long shots compared to action cues. The research by Cohn (2015) on narrative structure may also explain the depiction of close ups for action cues. As action cues are split up into multiple actions to display sequential events, the shot scale may be closer to portray each action individually. The continuity of action cues may indicate a higher number of close ups (Klomberg et al., 2022)

This study also tried to understand whether Global Regions influence the dynamic properties within the ICS for North America, Europe, and East Asia. This study concluded that North American and European comics are not more dynamic than East Asian comics. The post hoc analyses gave some opportunities to look more in depth at the individual levels of East Asian comics compared to European comics and East Asian comics compared to American comics. This revealed that East Asian comics tend to have more Dutch angles than European comics, while having similar Dutch angles compared to American comics (H4). This is an interesting observation as it was hypothesized that European and American comics would both have more Dutch angles than East Asian comics. Perhaps the different styles of drawing may have influenced East Asian comics to have more Dutch angles than European comics. American and Japanese comics artists are said to draw inspiration from each other's styles (Cohn, 2011). This could explain their similarities in results. The reason for Dutch angles being more present in East Asian comics could be explained as they have more environmental panels and spatial continuity within their comics (Klomberg et al., 2022; McCloud, 1993). As Japanese manga artists tend to draw environments of buildings or cities, their drawings become rigid in their perspective. To add more dynamicity to cities and buildings the Dutch angle may benefit these structures.

The hypothesis that East Asian comics would have more high angles present compared to European and American comics was not accepted (H5). This contrasts the findings of the study by Neil (2011) where Japanese (East Asian) comics had more high angles than American comics. This occurred as there was no interaction effect found for angle of view and global region. It can be possible that comics from different global regions have become more similar in this aspect over time as it has become more accessible to read all types and styles of comics.

Whilst there was a significant interaction effect found between shot scale and global region, the frequency of long shots was not higher for American and European comics compared to East Asian comics. Previous research indicates that American comics tend to use more characters in their comics than Japanese manga (Cohn, 2011; Cohn et al., 2012). This could have elevated the level of medium shots and long shots being action postures for American comics. However, the study of Cutting (2015) found that as there were less people in film shots over time, this did not influence the shot scale's size. Additionally, the number of amorphic and environmental panels could have been sufficient enough for East Asian comics to have similar levels of long shots and extreme long shots (Cohn et al., 2012).

Apart from the results of the framing angle, global regions may not be the most accurate predictor for finding differences in the ICS. Therefore, a k-means clustering analysis was conducted. This was split up in four groups. Group 1 was mostly East Asian with some European and American, Group 2 was a small combination of all regions, Group 3 was the largest overlap of European and American comics with some East Asian, and Group 4 consisted of only European comics. These groups tell us that the ICS characteristics generally overlap European and American together. This gives some validity to the groupings of the hypothesis. However, they still appear different as Group 4 consists of only European comics. An explanation for this can be that Group 4 has the lowest number of action cues (23.1%) of all groups as can be seen in Table 2. While group 3 has the most action cues (53.4%) out of all the groups.

The k-means clustering analysis only found support for the interaction effect of framing angle and clusters. However, there was no significant difference for frequency of Dutch angles between groups. Apart from this interaction, there was no other significant interaction effect. This means that the k-means clustering analysis was not able to provide different results based on these groupings compared to global regions. However, in Table 2, the k-means does show differences in flow cues across the groupings that have been made.

Limitations and Future Directions

There are limitations in this study. Although the comics for East Asian (33.6%), American (31.6%), and European (34.7%) had a similar amount of panels annotated, the European comics had significantly more books annotated. As these books may have slight variations across countries within its global region, the higher number of different books from Europe could have given a more varied result compared to the East Asian and American books. This study did not look at comic style, which could have been analyzed further instead of global regions. This could have been an compelling added analysis to see whether there is overlap for East Asian manga and American superhero comics in regards to the findings of Dutch angles. Unfortunately, most of the American books were not given a style when added to the MAST software, which resulted in this analysis not being possible.

Future research on the Dutch angles can elaborate its focus on the relation between Dutch angles and character emotion, as Dutch angles tend to be used to creating the feeling of uneasiness or a certain emotion (Heiderich, 2012). Would panels with character's present portray higher levels of arousal by the presence of Dutch angles, could be a field of research that may require more empirical evidence. This could also be a viable cross-cultural analysis to see if there are differences in how character emotion is depicted between global regions within Dutch angles.

As there was no support found for the frequency of action cues and angle of view, future research on the angle of view and the effectiveness of low angles on the perceived dominance of action cues. This would ask the question whether low angles are effective in communicating dominance in action cues and should they be more common practice in comics or used sparingly.

A future research direction for long shots would to be to compare the shot scale of standalone action cues compared to sequential action cues (Cohn, 2015). As shots are portrayed sequentially it may be that they are split up into closer frames. This can be compared to standalone action cues with no action-to-action transitions which does not require to be split up into more frames (McCloud, 1993). Standalone action panels may be an interesting topic to observe overall.

Conclusion

In conclusion, this study tried to determine whether action cues had an influence on the ICS of comics and whether cross-cultural differences may influence the ICS. These findings showed no significant differences between action cues and non-action cues in regards of their effects on the dynamic properties within the ICS. The flow cue for action cue in comic panels was not able to cause a higher frequency of Dutch angles, lower angles of view, and long shots compared to the flow cues for non-action cues. This means that comic authors do not have a tendency to make a comic panel more ‘dynamic’ based on whether an action cue is present.

This study also tried to determine whether American and European comics had more dynamics ICS properties compared to East Asian comics. This study concluded that North American and European comics are not more dynamic than East Asian comics. Cross-cultural analysis showed that East Asian comics tend to have more Dutch angles than European comics, whilst remaining similar to American comics. There was no difference for angle of view and shot scale between East Asian comics compared to American and European comics. The

East Asian style of comics may lean a bit more towards the dynamic side as they use more Dutch angles. Their style of comics may inhibit more environmental drawings with rigid structures such as buildings and cities, which require Dutch angles to increase dynamicity. The k-means clustering analysis provided an interaction effect only for framing angle. This effect however, found no further differences between groups in the post hoc analysis. The k-means clustering analysis was not effective in determining dynamicity for framing angle, angle of view, and shot scale.

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