The framing of comics: A cross-cultural analysis of attentional types and panel types used in comics

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Abstract

Framing techniques are an important aspect of visual narratives. Framing is the technique of presenting information and choosing what to show or not to show within a frame. Framing in comics consists of both attentional types (i.e., how much a panel depicts active information) and panel types (i.e., how information is presented relative to surrounding panels). Although prior research has looked at cross-cultural differences in the use of attentional types in comics, aspects of panel types have not been empirically examined. This study seeks to contribute to the understanding of framing in comics by conducting a corpus analysis of 60 comic books originating from the United States, Russia, Nigeria, Spain, China and Japan. This study examines 1) the way attentional types operate across cultures, 2) the way panel types operate across cultures, 3) the way attentional types and panel types interact with each other across cultures and 4) the way attentional types and physical panel size interact with each other across cultures. Overall, the results show that comics in the style of American superhero comics (Spain, USA and Nigeria) tend to use more macro panels showing full scenes whereas Japanese manga-like comics (Japan, China and Russia) tend to show parts of scenes by using more mono panels. Furthermore, this research shows relationships between the attentional type of a panel and its physical panel size in a way that the larger the panel, the greater the framing complexity. Altogether, this study suggests that there is a tension between systematic cross-cultural differences and universal patterns in the framing of comics.

Keywords: visual language, framing, cross-cultural differences, panel types, attentional types

Framing of comics across cultures

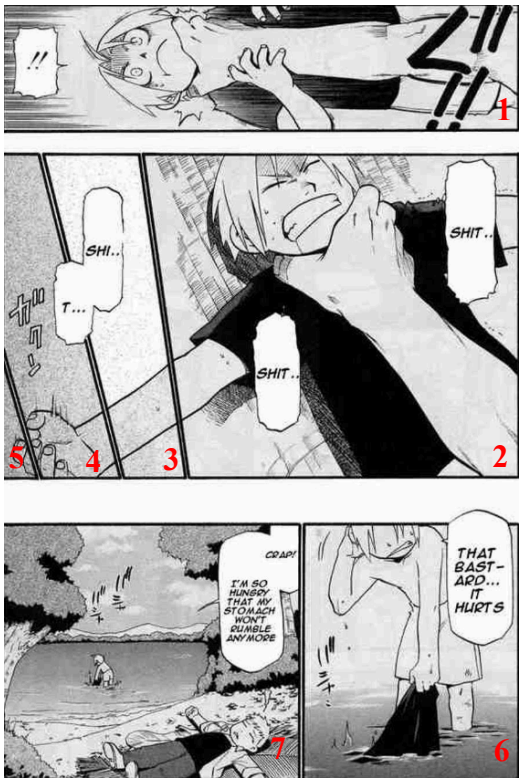
Framing techniques are an important aspect of visual narratives such as movies or comics. Framing is the way an author presents information and chooses what to show or not to show within a frame (Cohn, 2020). Framing is one of the structures in the system people use to create graphic images. This system can be called 'visual language', and distinct visual languages are found in comics and other visual narratives (Cohn, 2014). Though graphics often depict things like they look, framing is a part of visual language that departs from daily perception, since content can be modulated by contrasts between showing full events or close-up viewpoints (Cohn & Foulsham, 2020; Foulsham & Cohn, 2020).

Individual panels frame the amount of information that is portrayed in a scene. In other words, panel borders form a "window of attention" for framing the information that the author wants the reader to comprehend (Cohn, 2014). Panels thus act as attention units and can frame the amount of information that they contain in various ways, and can direct the attention of a reader through framing techniques (Cohn, Taylor-Weiner & Grossman, 2012). Content that is left out of this panel can be inferred or is not important. Hence, the author can use framing techniques to guide readers through an event structure, potentially in such a way that replicates the perceptual experience of directing their attention to various parts of a scene (Cohn & Foulsham, 2020).

In comics, these framing techniques involve both attentional types and panel types. First, attentional types are based on how much active information is depicted in a panel (Cohn, 2020). For instance, some panels on a page depict multiple active characters, whereas others depict only one active character or even no active entities at all. As can be seen in Figure 1, panel 1, 2 and 7 include multiple characters, but in panel 6 there is only one person depicted. Secondly, panel types are based on how a panel's information might be presented relative to the frame itself and to surrounding panels (Cohn, 2020). For example, some panels simply stand by themselves whereas others share visual features with other panels. As shown in Figure 1, panel 2, 3, 4 and 5 share visual features and a connected background with each other, whereas panel 1, 6 and 7 have no visual features connected to the other panels.

Figure 1

Example of a comic page (Cardoso & Cohn, in preparation)



Note. This Japanese comic is designed to be read from right to left.

Corpus analyses are a useful tool to analyze framing of panel content in visual narratives, where such data can be used to compare across cultures (Cohn, Taylor & Pederson, 2017). Previous research has in fact shown that framing differs systematically in comics from countries in Europe, North-America and Asia (Cohn, 2020; Cohn & Foulsham, 2020). However, prior corpus research was limited in its methods by only comparing the frequency of attentional types of panels, while important aspects of framing have not yet been empirically researched. Prior corpus research included no analysis of physical dimensions of panels, nor of different panel types. Furthermore, cross-cultural analyses have remained limited, and have never included comics from Africa, for example. The current research thus seeks to address these limitations by further analyzing framing techniques across cultures with a corpus analysis to address the following research question:

RQ: To what extent does framing in comics operate differently across different cultures?

This research thus builds on the existing literature related to framing and visual narratives while adding additional dimensions of analysis related to panel types, examining comics from cultures yet discussed in the literature, and by analyzing the physical properties of comics (i.e., panel size on a page). Thus, this thesis aims to offer a more full analysis of framing in comics, and thus contribute to the academic literature related to framing, visual narratives and visual language in general.

Through this empirical analysis, these results can also inform the broader use of comics in society. Growing research agrees that sequential images in comics combined with text form an effective tool for communicating and educating beyond being just a form of entertainment (Nakazawa, 2005; Nalu & Bliss, 2011; Short et al., 2013 as cited in, Cohn, 2014, p1). Only recently, scientists have focused on investigating how readers comprehend complex sequential images in comics. Several framing techniques play an important role in how readers understand and comprehend comics (Cohn, Taylor-Weiner & Grossman, 2012). If comics from around the world differ systematically, it implies that readers of those comics might have different cognitive habits for comprehending those comics. If comics are used in educational or communicative formats, then it is important to know how people might differ in their comprehension depending on the comics they have read (Cohn, 2020).

2 Theoretical Framework

This theoretical framework will discuss and explain previous research related to the topic of framing and cross-cultural differences. First, background information about attentional framing will be discussed (section 2.1). Secondly, section 2.2. will explain panel types and it will introduce the attentional framing matrix as developed by Cohn (2014). Then, previous research related to attentional research and visual narratives will be discussed (section 2.3). Furthermore, section 2.4 will discuss earlier found cross-cultural framing differences in comics. Finally, in this section the hypotheses will be presented.

2.1. Attentional types and framing

In comics, panel framing involves both attentional types and panel types (Cohn, 2020). First, attentional types have to do with how much a panel depicts active information. Within a

narrative sequence, a scene can have two types of meaningful elements; active and inactive entities. Active entities refer to the entities that repeat across panels and engage in the events and actions of the story (Cohn, Taylor-Weiner & Grossman, 2012). On the other hand, inactive entities are elements in the background. Active entities often repeat and change across panels whereas inactive entities do not. An entity does not per se have to be a singular person or thing. Rather, one entity could also refer to a group, object or substance (Cohn, Taylor-Weiner & Grossman, 2012). What composes an entity depends on the context of the narrative sequence and which role the entity plays in this sequence (Cohn, Taylor-Weiner & Grossman, 2012).

There are several different attentional types which can be assigned to a panel based on how much active information it contains (Cohn, Taylor & Pederson, 2017). A *macro panel* refers to a panel with multiple active entities. For example, Figure 2a shows two active entities in a fight with each other. Secondly, a *mono panel* refers to a panel with only one active entity, like in Figure 2b where only one character is shown. A *micro panel* refers to a panel with less than one active entity (like any body part, or anything less than the whole face of a character). For example, Figure 2c shows only a part of the face of a character, which is considered a micro. Then, an *amorphic panel* is a panel that has no active entities. For instance, Figure 2d shows only the environment or scene in which the narrative sequence takes place, but no active entities or characters are portrayed in this panel. Furthermore, a panel with no depicted meaningful information is called a *null panel*. This is often just a black or white panel, as in Figure 2e. Finally, an *affixing panel* refers to a panel with only a morphological affix (and no stem). An example is shown in Figure 2f, where the morphological affix “kaboom” belongs to an active entity, but this active entity is not shown in the panel.

Figure 2

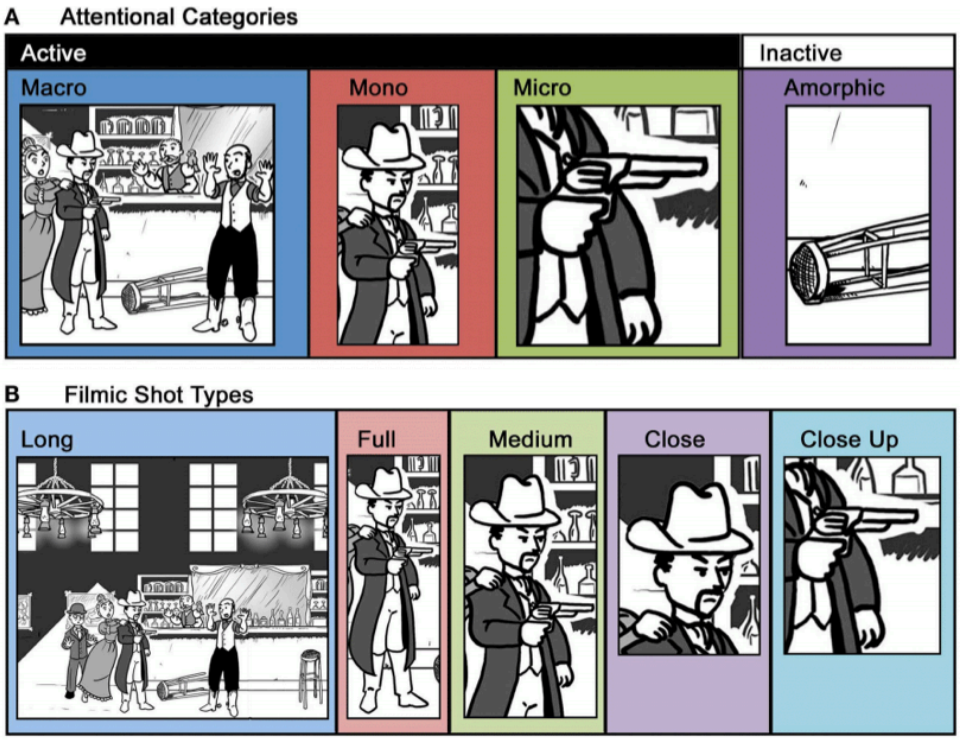
Attentional Types (Cardoso & Cohn, in preparation)

a) MACRO b) MONO c) MICRO d) AMORPHIC e) NULL f) AFFIXING

This way of highlighting information is similar to different types of shot scales in film, like the differences between long shots, medium shots or close ups (Cutting, 2014; Cutting & Candan, 2015). However, attentional framing also differs from filmic shots in important ways (Cohn, Taylor-Weiner & Grossman, 2012). The most important difference between the classification of film shots and attentional categories is that attentional categories are about the framing of the amount of meaningful active entities of a scene whereas shot scales in movies describe the way in which those meaningful elements are presented (Cohn, Taylor-Weiner & Grossman, 2012). As can be seen in Figure 3, macro panels might align with the filmic notion of "long shot" and micros with "close up", but these do not fit perfectly (Cohn, Taylor-Weiner & Grossman, 2012). Similarly, a mono shot with only one active entity could potentially take a long, medium and close shot. In comics, the attentional types measure the number of active entities per panel instead of the overall framing of a scene. This means that a macro panel (having more than one active entity) could potentially still be a close-up film shot (Cohn, Taylor-Weiner & Grossman, 2012). Because of this distinction, amorphic panels have no equivalent filmic category, since they show inactive elements of the narrative sequence (Cohn, Taylor-Weiner & Grossman, 2012), and affixing panels have no shot scale at all, since they largely show conventionalized graphic information (like a bubble or action star).

Figure 3

Attentional categories and filmic shot types (Cohn, Taylor-Weiner & Grossman, 2012).



2.2 Panel types and framing

Framing and the way panels act as attention units is not only based on attentional types, but also on the use of different panel types (Cohn, 2020). Panel types are classified by their visual features connected to other panels. These panel types can be portrayed by an "attentional framing matrix" (see Figure 4). First, *base framing* refers to framing where the panel stands by itself and has no visual features connected to other panels. Secondly, *divisional framing* refers to framing where a panel looks like a part of a bigger image formed by multiple different panels. In such a divisional panel, the bigger picture can be recognized because of image constancy (Cohn, 2014). However, the component elements individuate certain entities (Cohn, 2014). Furthermore, a *dominant panel* refers to a panel that contains an enclosed *"inset" panel* in which the inner panel shows part of the scene of the dominant panel. Such an inset panel can be used to focus attention on the element depicted in the inset. Finally, one panel type is not portrayed in the attentional framing matrix in Figure 4. Comic artists can also use *collage framing* (see Figure 5).

A *collage panel* refers to a panel in which borders are vague and the panels may appear as fading into each other (Cohn, 2020).

Figure 4

Attentional framing matrix (Cohn, 2014).

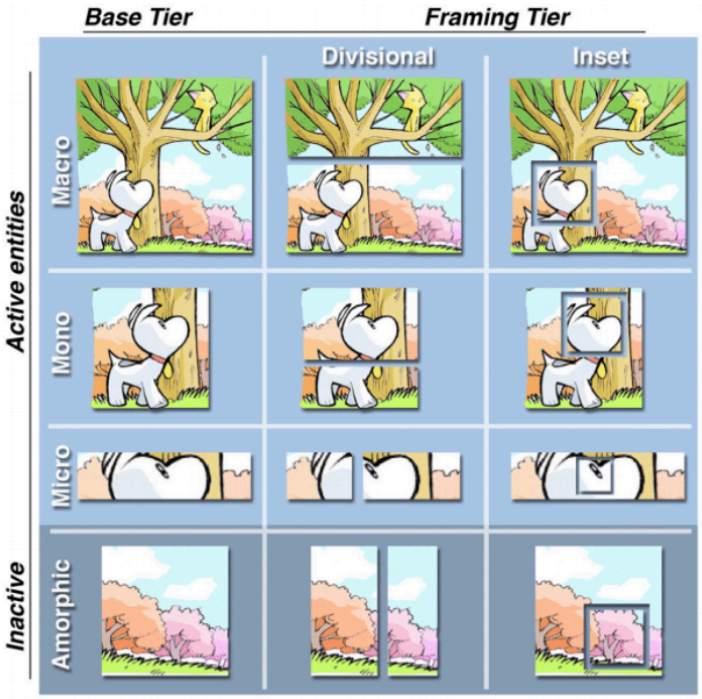


Figure 5

Examples of collage panels (Cardoso & Cohn, in preparation)

2.3. Attentional research and visual narratives

Visual narratives carry meanings via sequences of images. Each panel in a comic is created to carry meaning in the context of surrounding events, rather than being perceived in isolation (Cohn & Foulsham, 2020). Earlier research has focused on what people attend to within a frame and how this affects comprehension. For instance, Cohn & Foulsham (2020) looked at readers' viewing times of zoomed-in and inset panels to get a better understanding of the process of paying attention to certain elements in a narrative sequence. The results showed that altering the framing of a panel makes a reliable difference in how people view and comprehend the comic.

Comic artists can thus focus a viewer's attention by making use of these framing techniques in particular ways. They can design visual narratives to show full, "wide angle" scenes with multiple characters, but they can also focus viewers' attention by zooming in on key regions and details to tell the story (Cohn & Foulsham, 2020). Particular content in a panel is not only highlighted by zooming-in, it can also be highlighted by using an inset in a dominant panel. In some cases, changes in framing lead to cognitive consequences. For example, when two entities at the same state are portrayed in separate panels rather than all in a single panel, additional cognitive processing may be needed (Cohn, Taylor-Weiner & Grossman, 2012). In this case, the viewer needs to perform an additional cognitive operation to fuse the entities together to both belong to a common environment (Cohn, Taylor-Weiner & Grossman, 2012). Thus, the way comic panels simulate attention across a scene might have effects on their comprehension (Cohn, 2013; Cohn, 2020; Cohn & Foulsham, 2020).

These findings about the framing of comic panels and directing attention are in line with findings in filmic and even gaming research. Chang and Hsieh (2018) for example studied filmic framing in video games and analyzed screen space design in relation to attention. They showed that screen space design can be used by game makers to simulate attention (Chang & Hsieh, 2018). Similar findings were posited in relation to films, that often begin as drawn storyboards. Filmmakers can direct the attention of the viewer by using different shot distances or shot scales (Smith, Levin, & Cutting, 2012).

2.4. Cross-cultural framing differences

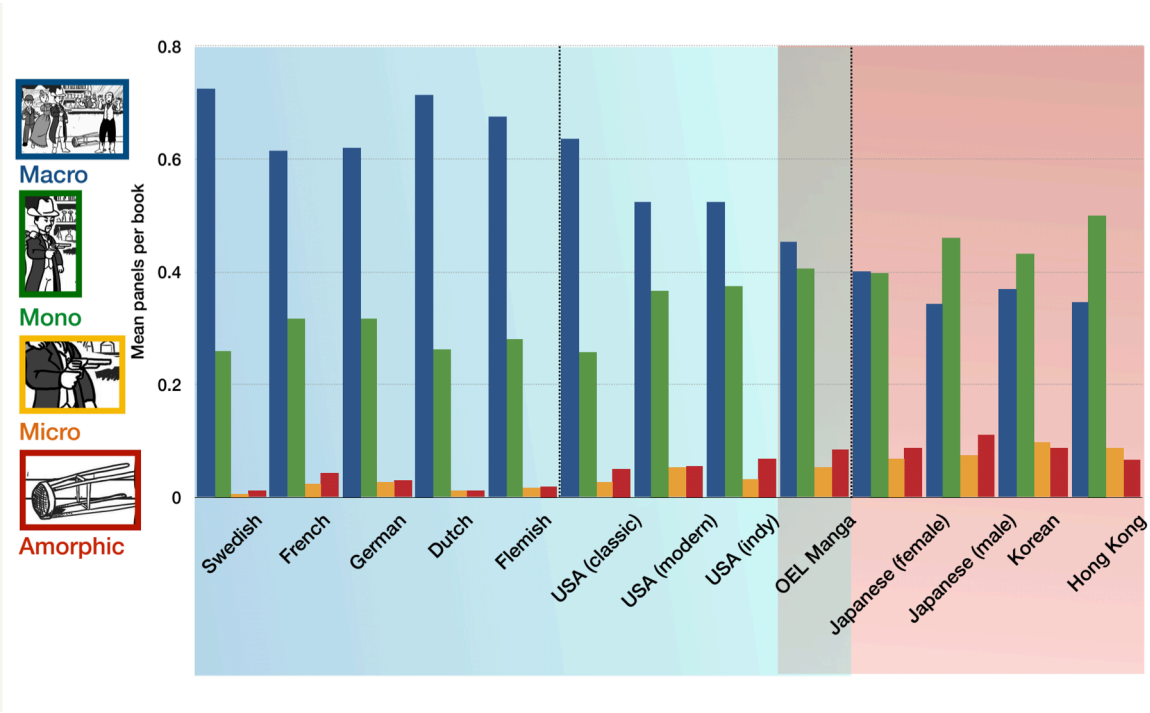
Previous studies have found that comics differ in their framing depending on where they come from. Cohn (2011) found that Japanese manga and American comics differ in various dimensions of framing. American comics show full scenes in macro panels far more often than showing parts of scenes (monos, micros), while Japanese manga used fewer macro panels and far more mono and micro panels. In Japanese manga, by focusing on smaller parts instead of showing the bigger picture, the elements of the environment have greater specificity instead of just being part of an overall scene (Cohn, 2011). This in turn pushes the audience to construct the full scene and environment in their own minds (Cohn, 2011). Additional research further supported these findings about the differences in framing between Japanese manga and American superhero comics (Cohn, 2011; Cohn, Taylor-Weiner & Grossman, 2012; Cohn, 2015).

McCloud (1993) reasoned that Japanese manga is likely to allow a reader to take a more subjective viewpoint on a narrative sequence compared to American superhero comics. In other words, Japanese manga uses certain techniques that provide an immersive experience for the audience as if the story is perceived through their own viewpoints (Cohn, Taylor-Weiner & Grossman, 2012). Since panels form windows of attention in comics, the focal framing in manga using monos and micros (Cohn, 2011; Cohn, Taylor-Weiner & Grossman, 2012) takes on a more subjective point of view of the audience. McCloud (1993; 1996) suggests that manga-panels use more subjective viewpoints, showing the perspective of a certain character in the story and this was tested by a corpus analysis done by Cohn (2011). Cohn (2011) also found that Japanese manga uses more subjective viewpoints through mono and micro panels compared to American superhero comics which supports McCloud's (1993) theory.

Subsequent research extended these types of analyses beyond Japanese manga and American comics and found that European comics from various countries use even more macro panels than American comics, while Chinese and Korean comics maintained similar framing as those of Japan (Cohn, 2020, see Figure 6). These results suggest that comics from different parts of the world display typical conventionalized framing patterns which differ systematically from each other, and may form distinct 'visual languages' with their own conventionalized patterns.

Figure 6

Cross-cultural differences in attentional types (Cohn, 2020)



Although some research has been done on attentional types in relation to perception and attention across cultures, several elements about framing have not been empirically researched. Thus far only a limited selection of cultures has been analyzed. Previous research looked at comics from countries in Europe, North-America and Asia, but has never looked at any from Africa, for example. In addition, prior research looked at comics from the United States that were inspired by Japanese manga (OEL Manga, in Figure 6), but fewer comparisons have been made with books inspired by American superhero comics published outside the United States. Therefore, the current research will include and compare African and Russian comics as well. The African comics compared here largely use the style of American superhero comics, while the Russian comics follow the visual language used in Japanese manga. Hence, the current research will look at differences in attentional types beyond distinctions between Western and Asian comics, which brings us to the first sub-question:

> Q1: Do attentional types differ across countries (beyond distinctions between Western and Asian comics)?

Based on earlier findings by Cohn (2020) and Cohn (2011), we expect to find cross-cultural differences in attentional types, meaning that there is a relationship between countries and their attentional types. In particular, we expect that Asian comics tend to use more mono and micro panels whereas European and American comics tend to show more full scenes by using mostly macro panels. Since most of the African comics fall into the superhero genre, this study expects that, similar to the American superhero comics, those will mainly use macro panels. On the other hand, since most of the Russian comics fall into the manga genre, this study expects that, similar to the Asian manga, those will mainly have a lower complexity of attentional framing (more mono and micro panels). This brings us to the following hypotheses:

H1: Attentional types will differ on the whole. Specifically, macro and mono panels will be more frequent compared to the other attentional types.

H2: Attentional types will differ across countries. Specifically, Western and African comics will use more macro panels, whereas Asian and Russian comics will use more mono and micro panels.

Moreover, whereas some research has analyzed attentional types across different cultures, no empirical research has yet looked at panel types. That is why the current research will compare comics from different countries on panel types as well:

Q2: Do panel types differ from each other and between countries?

Since earlier studies found cross-cultural differences in attentional types, this study expects to find similar differences in the use of different panel types (Cohn 2011; Cohn, 2020). Since panel types are characterized by the visual features of a panel connected to other panels (Cohn, 2020), and since manga is characterized by more flexible styles of panels and page layout as compared to the more rigid and grid-based lay-out of Western comics (Cao, Chan & Lau, 2012), panel types that have visual features connected to other panels (divisional, inset, dominant and collage) are predicted to be more present in manga-style comics compared to American superhero-style comics. That brings us to the following hypotheses:

H3: Panel types will differ on the whole. Specifically, base framing will be more frequent than the other panel types.

H4: Panel types will differ across countries, with Asian and Russian comics predicted to use more divisional, inset, dominant and collage panels compared to Western and African comics.

Given the gap about panel types, this research further aims to examine the relationship between panel types and attentional types. For example, do certain panel types happen more often with certain attentional types? That is the aim of the third sub-question:

Q3: How do attentional types differ in their panel types?

Based on the fact that divisional panels, inset panels, dominant panels and collage panels have visual connections to other panels (Cohn, 2020) and hence, form a bigger image with multiple panels, this research expects that those individual panels show parts of bigger scenes. Therefore, divisional, dominant, inset and collage panels are predicted to occur most with mono or micro panels. On the other hand, base framing panels stand by themselves and do not have visual connections to other panels. Therefore, we expect that those panels are likely to show full scenes and hence, mostly be macro panels. That brings us to the following hypothesis:

H5: There will be a relationship between panel types and attentional types. Specifically, base framing will occur most with macro panels, whereas divisional, dominant, inset and collage framing will occur most with mono or micro panels.

Finally, prior corpus research was limited by its methods in only tabulating the frequency of occurrence for different types of panels, but with no analysis of their physical dimensions. No empirical work has thus looked at the relationship between the physical size of a panel and the attentional framing type. For example, more complex framing (ex. macros) might take up more physical space on a page as compared to less complex framing (ex. micros). This research thus asks whether attentional framing might have a relationship with the physical size of panels:

Q4: Is there a relation between the size of the panel and the attentional type?

Since macro panels are panels with more complex framing (more active entities), this research expects that those panels will mostly have larger panel sizes. In contrast, less complex framing (mono and micro panels) will have smaller panel sizes. That brings us to the last hypothesis:

H6: The size of the panel will have a relationship to the complexity of the panel, such that the larger the panel, the greater the framing complexity.

Since no empirical research has been done yet on the relation between attentional types and physical panel size, it is not known whether such a relation would differ per country. That is why this research has the following two competing hypotheses:

H6a: Size and framing complexity will have a universal relationship and thus will not differ across cultures.

H6b: Complexity in manga-type panels will differ in size from American superhero-type books, because manga-type panels will have bigger focal panels (micro) because they play a more focal role in the narrative than in American superhero-type comics.

3 Methods

3.1 Materials

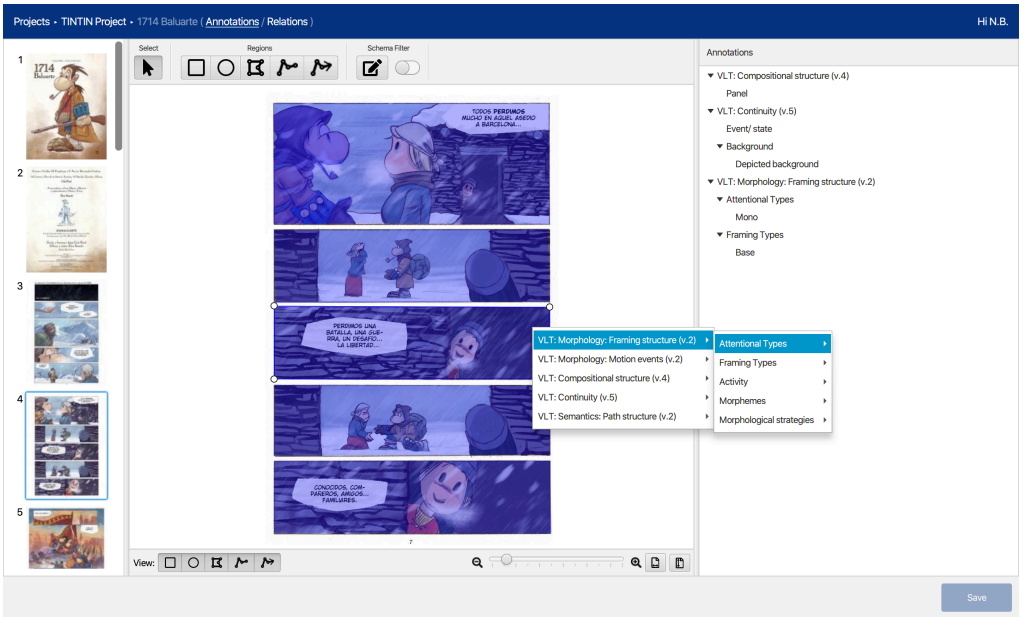
This research compared the framing of comics across different cultures using a corpus analysis. A corpus analysis is useful to investigate certain aspects of visual narratives like the framing of panel content and to compare this across cultures (Cohn, Taylor & Pederson, 2017). This research compared six different countries, with ten books per country. Hence, 60 comics in total were included in the study through convenience sampling. The countries where the comics originated from were Japan, the United States, Spain, Nigeria, China and Russia. The selection of comics covered a variety of genres ranging from mainstream superhero, science fiction, manga to fantasy. The books are listed in full in Appendix A.

Data was gathered and analyzed using the Multimodal Annotation Software Tool (MAST) (Cardoso & Cohn, in preparation). All comics were uploaded into MAST, and were annotated within the visual annotation interface. In the Annotation Editor, each individual panel

was selected by drawing a region around it, as can be seen in Figure 7. 4105 regions corresponding to panels were drawn in total on 875 pages. Then, each region designating a panel was annotated in terms of its attentional type (macro, mono, micro, amorphic, null and affixing) and its panel type (base, divisional, dominant, inset and collage) using the dropdown menu as shown in Figure 7. Annotations were made using the annotation scheme "VLT: Morphology: Framing Structure (v.2)" within MAST.

Figure 7

The Multimodal Annotation Software Tool (MAST) (Cardoso & Cohn, in preparation)



An additional annotation recorded the number of characters per panel. For mono, micro and amorphic panels it was clear how many active entities such a panel contains since that is what defines them. However, for macro panels the number of active entities was counted and recorded in the notes field for macro annotations.

3.2 Areas of Analysis

Each book was coded across four different dimensions; country of origin, attentional type, panel type and panel size. Attentional type was defined by how much active information a panel contained. Panel size was defined by the visual features that connect a panel to another panel. The books were coded by one coder, but were checked by various other coders in order to

remain consistent. Annotation of the corpus was only done by annotators who had sufficient proficiency in practice annotations.

The analysis of attentional types followed the attentional framing matrix depicted in Figure 4 (Cohn 2014). For this independent variable, each individual panel was annotated with one of six annotations: macro, mono, micro, amorphic, null or affixing. These annotations had to do with the number of active entities depicted in each individual panel. If a panel included multiple active entities, this panel was annotated as a macro panel. If a panel included only one active entity, this panel was annotated as a mono panel. If a panel included less than one active entity (anything less than the whole face of a character), this panel was annotated as a micro panel. If a panel included no active entities at all, this panel was annotated as an amorphic panel. If a panel depicted no meaningful information at all (e.g., just a black or white panel), this panel was annotated as a null panel. Finally, if a panel only depicted a morphological affix (and no stem), this panel was annotated as an affixing panel. For annotating the number of active entities in the macro panels, a character or object was considered "active" when it was clearly relevant to the narrative sequence and when it repeated and changed across panels (Cohn, Taylor & Pederson, 2017).

Secondly, analysis of the panel types followed the attentional framing matrix, as in Figure 4. For this independent variable, each individual panel was given one of five annotations: base, divisional, inset, dominant or collage. The criterium for annotating these labels had to do with the visual features connected to other panels. If a panel completely stood by itself and had no visual features connected to other panels, this panel was annotated as base framing. If a panel looked like part of a bigger image formed by multiple different panels, this panel was annotated as divisional framing. If a panel contained an enclosed panel in which the inner panel showed part of the scene of the bigger panel, the bigger panel was annotated as dominant framing and the inner panel was annotated as an inset. Finally, if panel borders were vague and as they faded into other panels, these panels were annotated as collage panels.

3.3 Data Analysis

For the analysis of frequencies, the mean rate of each primary category was calculated per panel per book, out of all panels in that book. This was done for each different comic, meaning that the mean proportions for each comic were compared. Categories were then

compared using repeated measures Mixed Model ANOVAs with panel type and/or attentional type as within-group factors, and country of origin as between-group factor. In instances of violation of sphericity, the Greenhouse-Geisser correction was used, and the corrected p-values were reported along with corrected degrees of freedom rounded to the nearest whole number.

Panel size was compared by calculating the proportion of a panel's area on a page, as recorded automatically by the MAST software. For each book we calculated the mean panel size for each attentional category (i.e., the size of macros, monos, micros, etc.). These sizes were then compared across books using a repeated measures ANOVA with attentional type as within-group factor. Finally, for the number of characters per panel, a Pearson's correlation was performed between characters per panel for macro panels and their panel size.

4 Results

4.1 Attentional types and cross-cultural differences

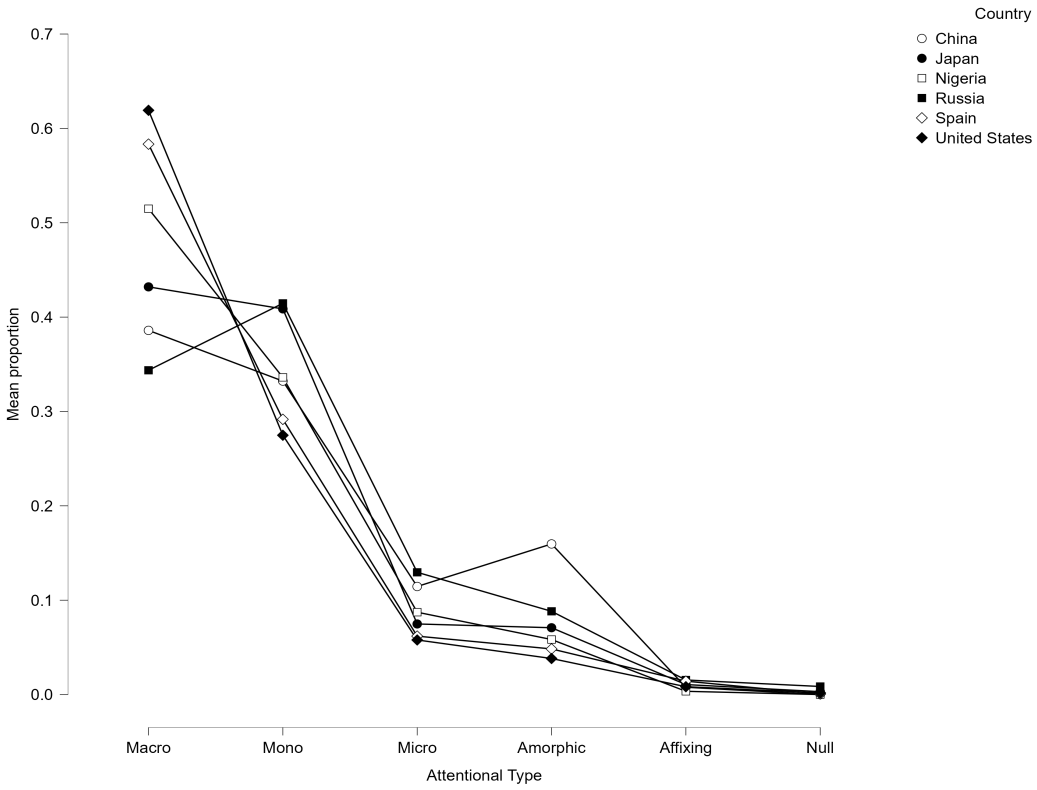
The first analysis examined attentional types of panels across countries. To examine whether attentional types differ on the whole (H1) and whether countries differ in their attentional categories (H2), a 6 (attentional type) x 6 (country) repeated measures Mixed model ANOVA set attentional type as the within-subjects effect and country as the between-subjects effect. Because of a violation of sphericity, the results were corrected using Greenhouse-Geisser correction. A main effect was found of attentional types, $F(2,88)= 318.05$, $p<.001$. A post hoc analysis found that macro panels were used more than all other attentional types (all t's ≥ 8.74, all p's $<.001$). Mono panels were used more than micro panels ($t= 16.31$, $p<.001$) and amorphic panels ($t= 16.97$, $p<.001$). The frequency of micro panels did not differ from the frequency of amorphic panels ($t= 0.66$, $p=1.000$). Amorphic and micro panels were used more than affixing and null panels (all t's ≥ 4.30, all p's $<.001$). Finally, the frequency of affixing and null panels did not differ ($t= 0.49$, $p=1.000$).

Furthermore, an interaction was found between attentional types and countries, $F(8,88) = 5.06$, $p<.001$. Figure 8 represents the means for coding of attentional types per country. For all countries, simple main effects found differences across framing types (all F's ≥ 43.57, all p's$<.001$). The results of the post hoc test for this interaction showed that comics from the United States had more macro panels compared to comics from China ($t =-3.68$, $p=.007$), Japan ($t=$

-2.95, p=.050) and Russia (t=-4.45, p<.001). Comics from Spain had more macro panels compared to comics from China (t=-3.12, p=.033) and Russia (t=-3.87, p=.004). Furthermore, mono panels only differed between comics from Russia and the United States, with Russia having a higher frequency of mono panels (t=3.05, p=.039). Japan was close to having more mono panels compared to the United States (t=2.86, p=0.063). Micro panels were more frequent in Russian comics compared to those from Spain (t=3.10, p=.034) and the United States (t=3.29, p=.021). Amorphic panels were more frequent in Chinese comics compared to those from Japan (t=3.45, p=.013), Nigeria (t=3.93, p=.003), Spain (t=4.32, p<.001) and the United States (t=4.71, p<.001). The frequencies of null and affixing panels did not differ between countries.

Figure 8

Attentional types per country



For all framing types, simple main effects found differences across countries (all F's ≥ 3.17, all p's < .014). In Chinese manga (Figure 9a), there were no differences in the frequencies of macro and mono panels (t=0.73, p=1.000), but both macro and mono panels were more frequent than micro, amorphic, affixing and null panels (all t's ≥ 4.09, all p's<.039). Amorphic

panels were more frequent than both affixing panels (t=3.93, p=.033) and null panels (t= 4.13, p=.015), but not micro panels (t=-1.17, p=1.000).

In Japanese manga (Figure 9b), no differences were found between the frequencies of macro and mono panels (t=0.60, p=1.000), but both macro and mono panels were more frequent than micro, amorphic, affixing and null panels (all t's ≥8.64, all p's<.001). Micro, amorphic, affixing and null panels did not differ from each other (all p's=1.000).

Nigerian comics (Figure 9c) used macro panels more than all other attentional types (all t's ≥ 4.62, all p's <.002). Mono panels were more frequent than micros, amorphic panels, affixing panels and null panels (all t's ≥ 6.44, all p's <.001). Micro, amorphic, affixing and null panels did not differ from each other (all p's = 1.000).

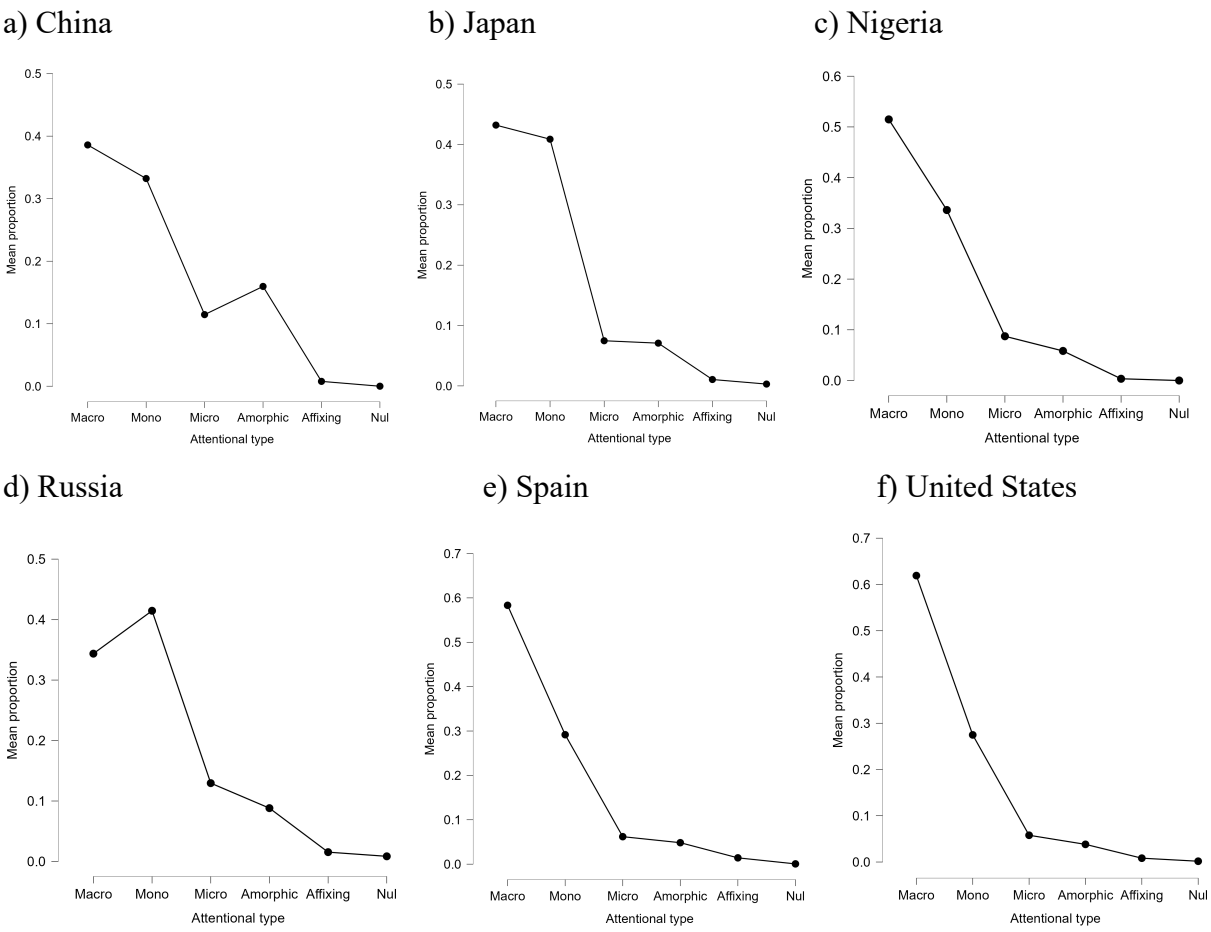
In comics from Russia (Figure 9d), more mono panels were used than macro panels, but this difference was not significant (p=1.000). Macro panels were more frequent than micro, amorphic, affixing and null panels (all t's ≥ 5.81, all p's <.001). Micro, amorphic, affixing and null panels did not differ from each other (all p's = 1.000).

Spanish comics (Figure 9e) used macro panels more frequently than all other attentional types (all t's ≥ 7.55, all p's <.001). Mono panels were more frequent than micros, amorphic panels, affixing panels and null panels (all t's ≥ 5.96, all p's <.001). The frequencies of micros, amorphics, affixing panels and null panels did not differ from each other (all p's=1.000).

Finally, for comics from the United States (Figure 9f), macro panels were more frequent than all other attentional types (all t's ≥ 8.91, all p's <.001). Mono panels were more frequent than micros, amorphic panels, affixing panels and null panels (all t's ≥ 5.61, all p's <.001). The frequencies of micros, amorphics, affixing panels and null panels did not differ from each other (all p's = 1.000).

Figure 9

Attentional categories across each country



4.2 Panel types and cross-cultural differences

Next, panel types were compared across cultures. To examine whether panel types differ from each other (H3) and across countries (H4), a 5 (panel type) x 6 (country) repeated measures Mixed model ANOVA set panel type as the within-subjects effect and country as the between-subjects effect. Because of a violation of sphericity, the results were corrected using Greenhouse-Geisser correction. A main effect was found for panel types, $F(1,74)= 16466.26$, $p<.001$. A post hoc test found that, as depicted in Figure 10, base panels were by far more frequent than all the other panel types (all t's ≥ 201.63, all p's $<.001$). All other panel types did not differ from each other ($p= 1.000$).

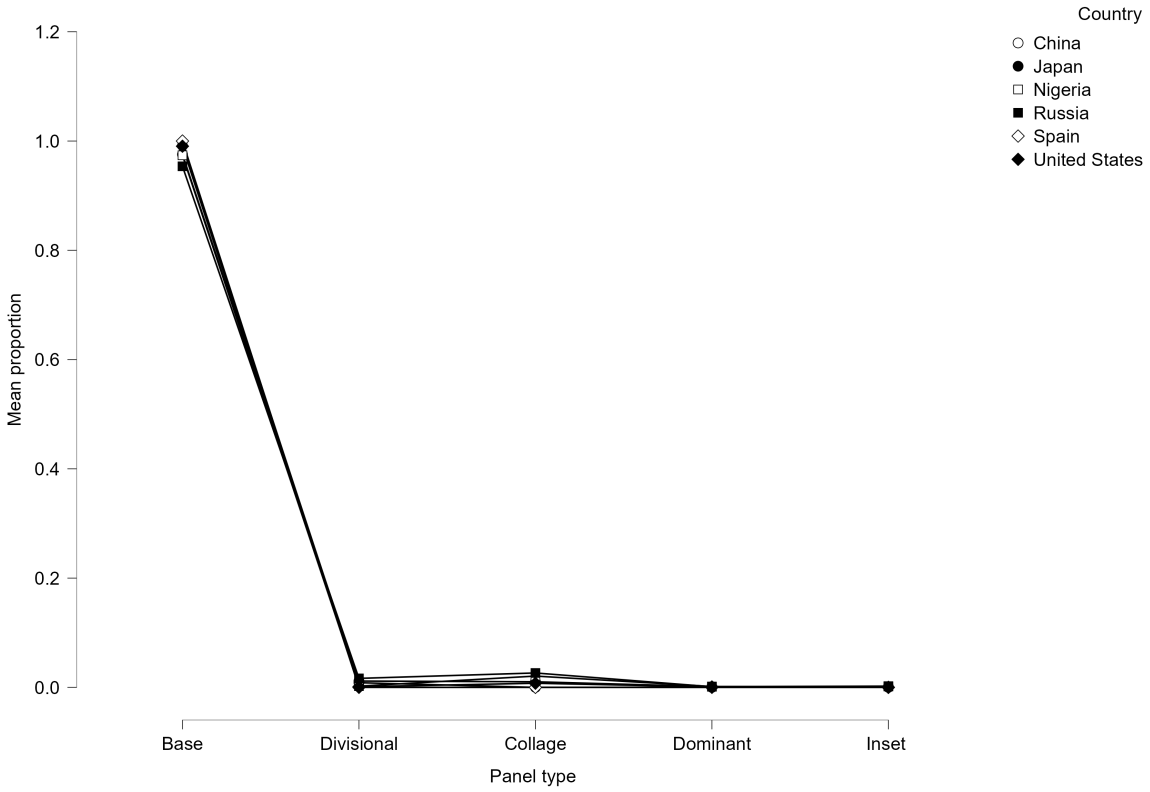
Since the frequencies of base panels overruled all other panel types in the corpus, a follow-up test was done excluding base panels in order to see whether there were differences

between the other panel types. This follow-up test showed a main effect for panel types $F(1,70)= 3.62$, $p=.014$. The results of the post hoc tests showed that collage panels were more frequent than dominant and inset panels ($t \geq 2.75$, $p=.038$).

In addition, there was no interaction found between panel types and countries, $F(7,74)= 1.63$, $p =.142$. Because of the huge number of base panels in the corpus, the interaction between panel types and countries was also analyzed with excluding base panels. However, even when base panels were excluded there was no interaction, $F(6,70)=0.80$, $p=.577$. Figure 10 represents the means for coding of panel types per country.

Figure 10

Panel types per country



4.3 Attentional types and panel types

The next analysis looked at the panel types across attentional types. To examine whether there is a relationship between attentional types and panel types (H5), a 6 (attentional type) x 5 (panel type) x 6 (country) repeated measures Mixed Model ANOVA set attentional type and

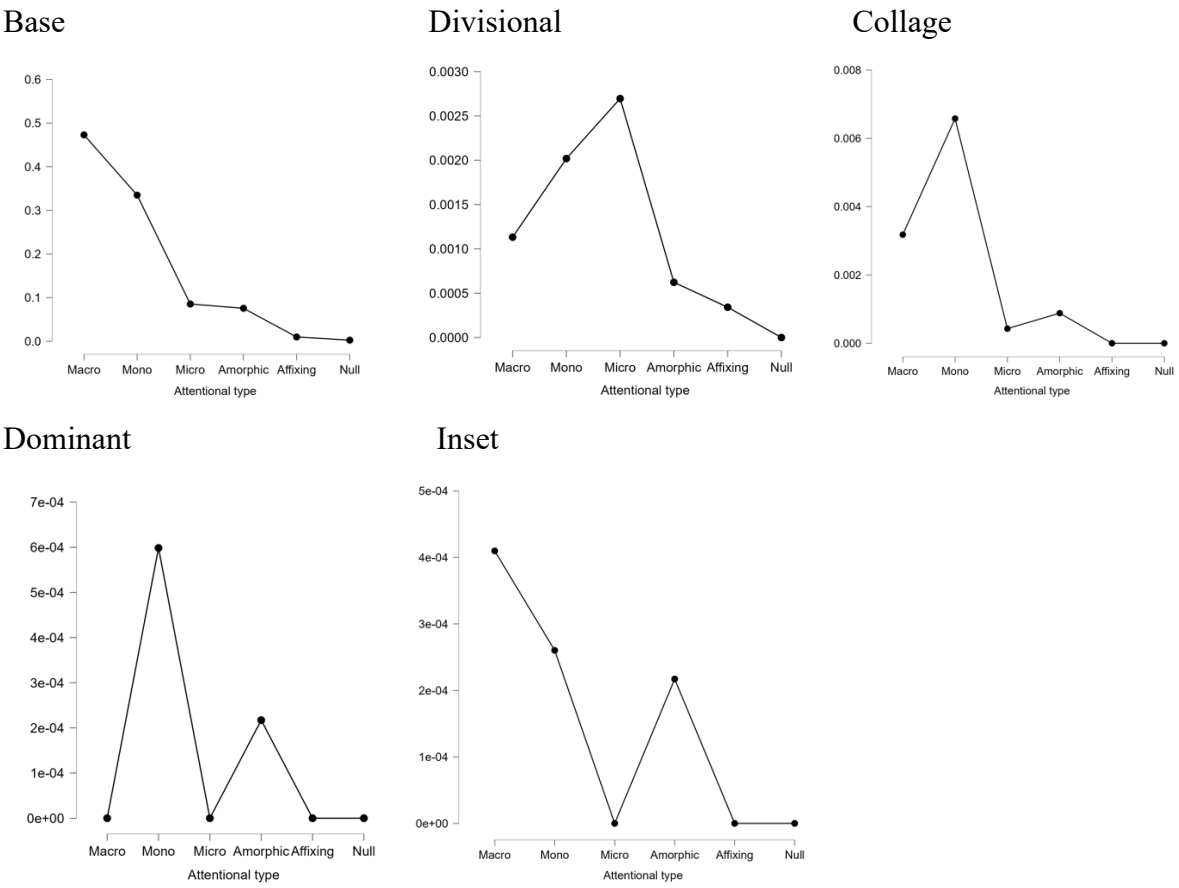
panel type as the within-subjects effects and country as the between-subjects effect. First, a main effect was found of attentional types, $F(5,275)= 318.05$, $p<.001$, because macros were used more than monos, which were more than micros and amorphics, which were used more than affixing and null panels. Secondly, a main effect was found of panel types, $F(4,220)= 16466.26$, $p<.001$, because base panels were by far used more than all other panel types. These findings reflect the same results as in the prior analyses above.

An interaction effect was found between attentional types and panel types, $F(20,1100)= 316.00$, $p<.001$, as depicted in Figure 11. This interaction effect occurred because of the large proportion of base framing in the corpus, which made macro-base, mono-base, micro-base and amorphic-base occur more frequently than all the other combinations (all t's ≥ 10.79, all p's $<.001$). However, all the other combinations did not differ from each other (all p's=1.000). Since the frequencies of base panels overruled all other panel types in the corpus, a follow-up test was done excluding base panels in order to see whether there were differences in attentional types for the other panel types. This follow-up analysis showed only significant findings for collage panels. Collage–mono panels were more frequent compared to collage-micro, collage-amorphic, collage-affixing and collage-null panels (all t's ≥ 5.32, all p's $<.001$). Collage-mono panels were also more frequent than collage-macro panels, but this difference was not significant ($t= -3.28$, $p=.269$).

Furthermore, an interaction effect was found between attentional types, panel types and countries, $F(100,1100)= 5.28$, $p<.001$. Post hoc tests showed similar results as for the previous interaction effect. The interaction effect between attentional types, panel types and countries occurred because of the large frequency of base panels in the corpus, which made the combinations macro-base, mono-base, micro-base and amorphic-base occur more frequently than combinations including other panel types for all countries (all t's ≥ 20.95, all p's $<.001$). However, for all countries, the other combinations including the other panel types did not differ from each other (all p's = 1.000). When excluding base panels, there was no interaction effect found between attentional types, panel types and countries, $F(75,825)=0.88$, $p=.762$.

Figure 11

Panel type per attentional type.



Note. Differences in scale across the y-axes.

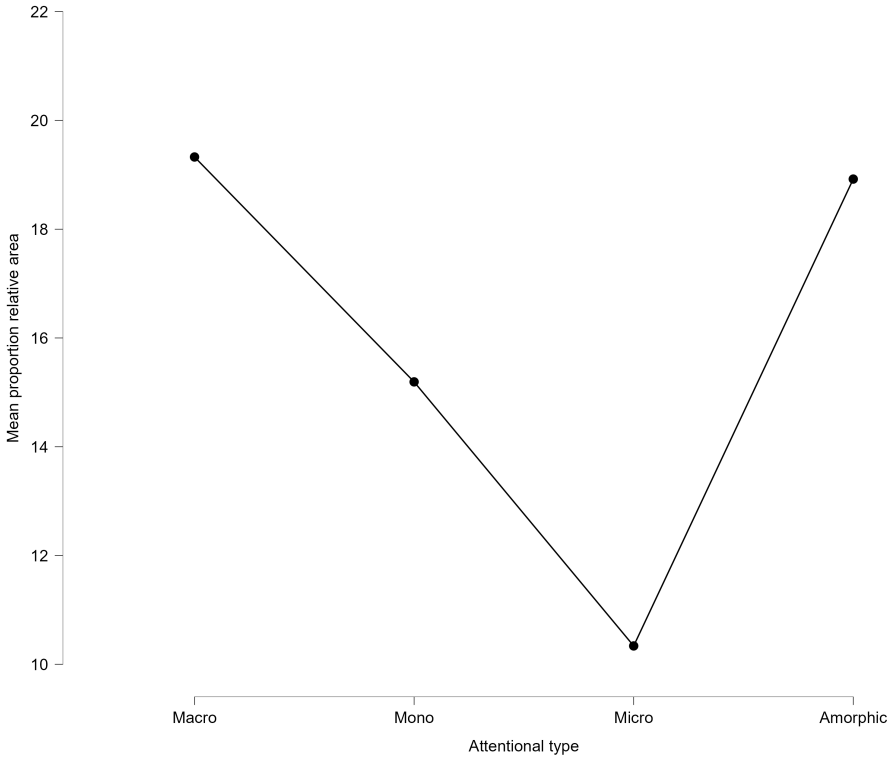
4.4 Attentional types and physical panel size

Attentional types were then compared against the physical sizes of panels. The mean size for each attentional category (i.e., the size of macros, monos, micros etc.) was calculated as the proportion of a panel's relative area on a page. To examine whether there is a relation between the size of a panel and its attentional type (H6), the sizes were compared across books using a repeated measures ANOVA with a within-group factor of attentional type and a between-group factor of country. Because of a violation of sphericity, the results were corrected using Greenhouse-Geisser correction. A main effect was found between the relative areas per attentional type, $F(2,83)=24.18$, $p<.001$, and these differences are depicted in Figure 12. A post hoc test showed that macro panels were bigger than mono panels ($t = 3.48$, $p=.002$) and micro

panels (t = 7.50, p<.001), but not amorphic panels (t= 0.37, p=.712). Mono panels were bigger than micro panels (t= 4.01, p<.001) and smaller than amorphic panels (t = - 3.11, p=.004). However, there was no interaction found between the relative areas of attentional types and countries, F(8,83)= 0.87, p=.550. Because of the large physical panel size of amorphic panels, a follow-up test was done to see whether amorphic panels across panel size would differ per country. However, the results of this follow-up test showed that there was no interaction between the relative area of amorphic panels and countries, F(5,51)=1.76, p=.138.

Figure 12

Relative area per attentional type



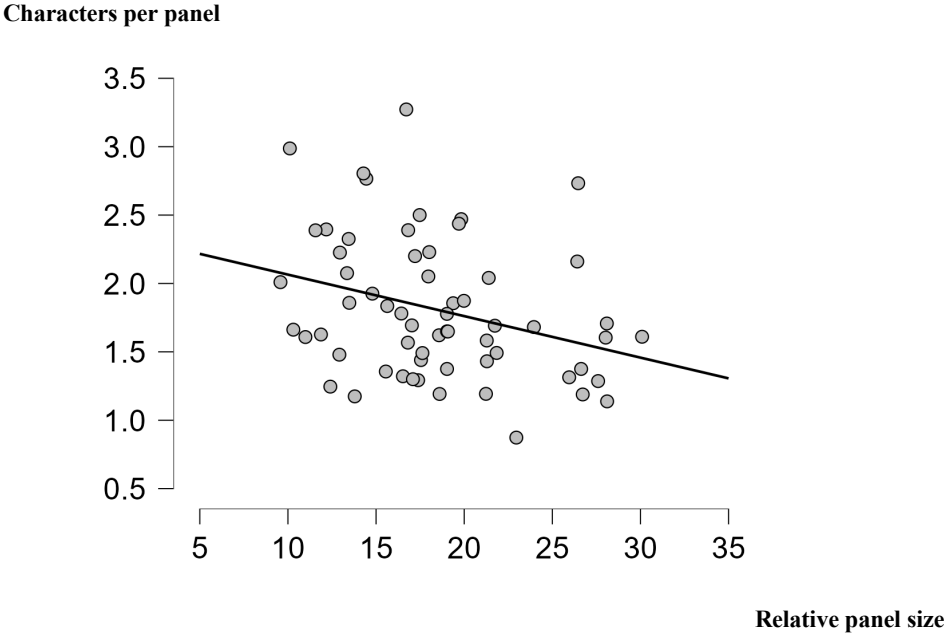
Note. Null and affixing panels were excluded from this analysis because of the few numbers of these panels in the corpus.

One possible reason for the change in panel size across macros, monos, and micros could be based on the number of characters they contain. Since only macro panels vary in their number of characters (with monos only having one character, or micros having less than one), a Pearson's correlation was performed between characters per panel for macro panels and their

panel size. A small negative correlation was found between characters per panel and panel sizing of macro panels, r(59) = -0.32, p = .013. After plotting this correlation, two outliers were identified with exceedingly large macro panels including only few characters. Hence, an additional correlation was performed again after excluding these outliers. A small negative correlation persisted, r(59)=-0.31, p=.016, suggesting indeed that the amount of characters had a relationship with panel size, as in Figure 13, but in the opposite direction than expected.

Figure 13

Negative correlation between characters per panel and panel size of macro panels



5 Discussion and conclusion

This study examined to what extent framing in comics operates differently across different cultures. In order to answer this research question, this study conducted a corpus analysis of 60 different comics originating from 6 different countries and investigated their panels' framing by coding attentional types, panel types and physical panel size.

To summarize the findings overall, attentional types differed from each other on the whole and there was an interaction between attentional types and countries, supporting H1 and H2. For panel types, base panels formed the vast majority for all countries, supporting H3, but

did not differ across countries, meaning that no support was found for H4. This extended into a relationship between panel types and attentional types, but only because of the large number of base panels in the corpus. As no differences arose across attentional types for non-base panel types, no support was found for H5. Finally, attentional types had a relationship with physical panel sizes, such that the larger the panel, the greater the framing complexity (macros), supporting H6. This relation did not differ across countries and therefore H6a was accepted, supporting that panel size and framing complexity have a universal relationship. These findings and their implications will be elaborated on below.

5.1. Attentional types and cross-cultural differences

The primary goal of this study was to find out whether attentional types differ across countries. The results showed that attentional types differed from each other, supporting H1, and they systematically differed between countries, supporting H2. Comics from Spain, Nigeria and the United States used more macro panels showing full scenes compared to showing parts of scenes with mono panels. In contrast, Japanese and Chinese comics had similar amounts of mono panels and macro panels and Russian comics had even more mono panels than macro panels.

These findings are consistent with prior work finding that countries differed systematically in their attentional types of panels. Earlier studies found that Japanese and Chinese comics are more likely to direct attention to details in the scenes through mono, micro and amorphic panels (Cohn, 2011; Cohn, Taylor-Weiner & Grossman, 2012; Cohn, 2015). This was explained by the manga-style of Japanese and Chinese comics. Manga is known for a more subjective nature focusing the attention of a reader on important parts of a scene rather than the whole scene more often (Cohn, 2011; Cohn, Taylor-Weiner & Grossman, 2012; McCloud, 1993). Similar to this initial research, the current study found that Japanese and Chinese comics used more mono panels showing parts of scenes as compared to comics from the United States, Spain and Nigeria. Moreover, the current study also added comics from Russia to the already existing literature. The Russian comics in this corpus were also drawn in manga style and showed similar patterns in the use of attentional types as Japanese and Chinese manga. The Russian comics used even more mono panels showing parts of scenes compared to macro panels showing full scenes. This is in line with initial research explaining that manga is more likely to direct attention towards details in the scenes through mono panels (Cohn, 2011).

Furthermore, similar to earlier findings, the current research found that comics from the United States used more macro panels showing full scenes compared to showing parts of scenes with mono or micro panels. Initial research found that comics from the United States in the style of American superhero have a higher proportion of macro panels showing an entire scene through which readers will naturally pick out central characters of a narrative sequence (Cohn, Taylor-Weiner & Grossman, 2012). Moreover, the current research also added comics from Nigeria to the already existing literature. The Nigerian comics in this corpus were drawn in the style of American superhero and showed similar patterns in the use of attentional types as comics from the United States using mostly macros.

Finally, this study looked at comics from Spain. Earlier research found that European comics from various countries use even more macro panels than American comics, but showed a similar pattern including more macro panels showing full scenes compared to showing parts of scenes through mono panels (Cohn, 2020). The current study found that Spanish comics had the same pattern as the American comics including macro panels far more often. The distribution of attentional types in the Spanish comics was very much similar to German and French comics analyzed by prior research (Cohn, 2020).

These findings suggest that attentional types differ across countries beyond distinctions between Western and Asian comics. An interpretation can be provided considering the different graphic systems used in these comics as different visual languages established in the minds of comic creators (Cohn, 2011). Besides the different graphic styles in which the comics are drawn, comics in the style of manga (Japan, China and Russia) used more mono panels showing details in scenes as compared to comics in the style of American superhero (the United States and Nigeria) and European comics which used more macro panels showing full scenes. Thus, most of the differences found can be explained by the manga-style versus the American superhero-style of comics. These results suggest that comics from different parts of the world display typical conventionalized framing patterns which differ systematically from each other, and may form distinct ‘visual languages’ with their own conventionalized patterns.

5.2. Panel types

Besides attentional types, the current research looked at whether panel types operate differently across different cultures. We expected to find systematic differences in the use of

panel types across countries. The results showed that panel types differed from each other, which is in line with H3, but not across countries, going against H4.

Since previous studies found that panels from American superhero comics and manga reflect cross-cultural differences in visual attention (Cohn, 2011; Cohn, Taylor-Weiner & Grossman, 2012), we expected to find differences in panel types as well. It was expected that manga-like comics would make use of more divisional, collage, inset and dominant panels given the subjective nature of manga (McCloud, 1993; 1996). We expected that authors of manga would use more of these panel types to highlight component parts of an environment or a scene in a different way through which readers would need to inferentially comprehend these parts into a coherent whole. However, no difference was found between the countries, going against H4. The fact that no difference was found can possibly be explained by the very small number of divisional, collage, inset and dominant panels in the corpus. Apparently, these panel types appear only very limited and hence a much larger corpus of comics is needed to see if there would be a difference between countries in their use of panel types.

Furthermore, this research also looked at the relation between panel types and attentional types. Based on the fact that divisional, collage, inset and dominant panels form a bigger image with multiple panels, these panels were expected to occur mostly with mono or micro panels showing parts of scenes. On the other hand, since base framing panels stand by themselves and do not have visual connections to other panels, we expected that those panels would mostly be macro panels showing full scenes.

The results showed an interaction caused by the fact that base panels indeed happened mostly with macro panels. However, a possible explanation for this is that the base panels had a vast majority in the corpus. Only a small amount of the panels was non-base. In the corpus, macros were also most frequent. Therefore, it is logical that base happened most with macro in this corpus. Because of the huge number of base panels, this study also looked at the interaction between attentional types and panel types with exclusion of base panels. It was found that collage panels happened most with mono panels. This would be in line with what this study predicted. However, for divisional, inset and dominant panels there was no difference found. Therefore, H5 was not supported. As previously mentioned, a possible explanation for this is the small number of non-base panels in the corpus. Therefore, the current study does not exclude a possible relation between panel types and attentional types and suggests that future research

having a bigger corpus including more non-base panels is needed to further examine this relation.

5.3. Attentional types and panel size

Finally, the current research investigated the relation between physical panel sizes and attentional types, where a relate was found. Macro panels (having the highest framing complexity) took up more physical space on a page than mono panels, which took up more physical space than micro panels (having lower framing complexity), supporting H6.

However, an interesting finding that was not in line with this hypothesis was that amorphic panels had a physical panel size as large as macro panels, even though amorphic panels have no active entities and hence, have a low framing complexity. This finding can possibly be explained by the function that amorphic panels often fulfill within a narrative sequence. Amorphic panels are often used to set the scene within a narrative sequence, by, for example, showing the environment or location where a narrative sequence takes place (Cohn, 2020). Related to filmic theory, large amorphic panels might play the role of "establishing shots", providing or setting up the context of a scene which helps the audience to orient themselves (Cohn, Taylor-Weiner & Grossman, 2012). Similar to macro panels, in this case a full scene is shown instead of just details of a scene in the case of monos and micros. This function within the narrative sequence could possibly explain the large physical size of the amorphic panels in this corpus.

Furthermore, an additional question was whether panel sizes might further vary between panels that all had multiple characters (i.e., macro panels). Might more characters in a panel relate to a larger physical panel size? Although this study expected to find that more active characters in a macro panel would be relative to a larger panel size of a macro panel, the opposite was found, since the current study found a small negative correlation between these two variables. A possible explanation for this could be that full scenes including only the main characters of the stories will be bigger in sizing, because these characters play a more focal role in the narrative sequence as compared to many active characters that play a more supporting role in the narrative sequence. Furthermore, this negative correlation between characters per panel and the size of macro panels suggests that the larger size of macro panels in comparison to monos and micros cannot be explained by how many active characters are portrayed. Rather, this

difference can be explained by the function of macro panels of portraying a full scene rather than mere details of a scene, like with mono or micro panels.

Finally, it is noteworthy that there was no interaction between attentional types across panel size and countries, supporting H6a and going against H6b. This lack of an interaction implies that the relationship between framing complexity and panel size may be a universal feature of visual narrative storytelling. These results are interesting because of the noticeable difference in the distribution of attentional types between Western and Asian comics. Although micro and mono panels play a more focal role in manga, they are not bigger in size as compared to American superhero comics. For manga, where more focal attentional types are more prevalent (monos, micros), attentional types including more active information take up more physical space on a page. Thus, even though frequencies of attentional types may differ across cultures, the relative sizing of these framing techniques follows trends that extend beyond these cultural differences. This hints towards a tension between cross-cultural differences and universal patterns related to the framing in comics.

5.4. Limitations and suggestions for future research

A limitation of this study has to do with the analysis of panel types. The findings of this study show that for each country in the corpus, all comics had a huge number of base panels and only very few divisional, collage, dominant and inset panels. Therefore, the corpus was too small to perform a thorough analysis of whether divisional, collage, dominant and inset panels happen more often with a certain attentional type. This interaction between panel types and attentional types should be analyzed by future studies including a bigger corpus through which a larger number of divisional, collage, dominant and inset panels is present in the corpus. In this way, it can be better analyzed whether there is a relation between attentional types and panel types and whether this relation differs per country or style.

Furthermore, the current study contributed to earlier findings about attentional types across cultures by also including Russia and Nigeria into the corpus. However, comics from many places around the world have not yet been analyzed, for example, more comics from across Africa, and those from South America, South and Southeast Asia, or Australia. Hence, future research can further expand the scope of the comics under analysis. Still a lot of comic

styles and areas are not empirically researched in relation to framing and therefore, future research is needed to increase understanding about framing and visual language.

Finally, this study found a relationship between physical panel sizes and attentional types. Furthermore, this study investigated the number of characters per panel as a reason for this difference in size. However, there might be other reasons that could explain this difference in panel size, like background information or the text of balloons. For example, more characters in a panel could potentially mean more people talking, meaning more text which could relate to a bigger panel. However, at the same time, this research found amorphic panels to be as big as macro panels, which could indicate that certain background information might play a role in the difference in panel size. Future research should investigate the relation between panel sizing and other aspects of what is portrayed in a panel besides the number of characters. In this way, future research could get a better understanding of the reasons for the size difference of attentional types.

5.5. Conclusion

This study examined to what extent the framing of content in the panels of visual narratives operates differently across comics from different cultures, and thus framing was investigated by coding attentional types, panel types and comparing their physical panel size. In line with prior studies, this study showed further differences in attentional types between different cultures, again supporting systematic differences between visual languages. Furthermore, little variation in panel types was found between different cultures. Finally, the current study found that panel sizing relates to framing complexity in a way that is not sensitive to differences between cultures. Hence, there is a tension between cross-cultural differences and universal patterns related to the framing in comics.

The systematic way in which attentional types differ across countries indicates different cognitive patterns entrenched in the minds of comic creators while making comics. American superhero-like comics and manga use different systems with their own characteristics, indicating different visual languages. This cross-cultural variation implies potential differences in the cognition used to create and comprehend these comic books. The more subjective nature of manga highlighting parts of a scene suggests that readers have to inferentially comprehend these parts into a coherent whole, whereas in the visual language system of American superhero

comics, macro panels often show an entire scene suggesting that readers direct their own attentional spotlight to pick out the important elements.

This leaves us with two distinct visual languages, each with their own characteristics. However, this study also showed the presence of stable, universal patterns that extend beyond cultural differences, such as the relation between physical panel size and framing complexity. This would hint towards stable and universal processes in the cognition that comic creators use while making comics. This study thereby marks a starting point for future studies to compare the universalities and differences between different visual languages.

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Appendix A

List of comics

	Title	Author	Country
1	El Capitán Coraje 11 El fin de un esbirro	G. Iranzo	Spain
2	El violeta	Juan Sepúlveda Sanchis, Antonio Mercero	Spain
3	El faro	Paco Roca	Spain
4	Ardalén	Miguelanxo Prado	Spain
5	La casa de los susurros	David Muñoz, Tirso Cons	Spain
6	1714 Baluarte	Cels Piñol and Àlex Santaló	Spain
7	Ken Games 1 Piedra	José Robledo y Marical Toledano	Spain
8	El arte de Volar	Antonio Altarriba	Spain
9	Islamundo – Primera Temporada	Dapz (David Pérez Gutiérrez), Jotadé (Jesús Daniel Fernández)	Spain
10	Caminantes	Pedro Lobato	Spain
11	Real	Inoue Takehiko	Japan
12	Ranma 1/2	Rumiko Takahashi	Japan
13	Naruto	Masashi Kishimoto	Japan
14	Missing Piece	Hisaya Nakayo	Japan
15	Ghost in the Shell	Masamune Shirow	Japan
16	Fullmetal Alchemist	Hiromu Arakawe	Japan
17	Akira	Otomo Katsuhrio	Japan
18	Anne Freaks	Yua Kotegawa	Japan
19	Drifting Classroom	Kazuo Umezu	Japan
20	Eden: It's an Endless World!	Hiroki Endo	Japan
21	Amazing Tek Kids	Alexander "Rudeworks" Ighoja (Creator: Peter Daniel)	Nigeria
22	Avonome – The Realm Within	Mr Xavier Ighorodje (Creator/artist: Stanley Stanch Obende)	Nigeria
23	Black Sage – The Rising	Bill Bidiaque (Creator: Sola Adebayo)	Nigeria
24	Chayoma (Curse of the Jangura)	Peter Chizoba Daniel, Isaiah Ovie Gibson (illustrators: Jimmy King, Ape Ekene Polycap)	Nigeria
25	Di Iche - Naija Anomaly	Peter Chizoba Daniel (artist: Nwankwor Newman)	Nigeria
26	Eru (Pestillence of the Night)	Tobe "Max" Ezeogu (Artist: Ozo Ezeogu)	Nigeria
27	Hero Kekere (Prime Edishun)	Cassandra Mark (Artist: Kelechi Isaac)	Nigeria

28	Chronicles of the Newborn – Rise of Mlezi	Adeniji Jr (Creator/Art: Peter Daniel)	Nigeria
29	ShowDown – Chaos Rising	Alexander “Rudeworks” Ighoja	Nigeria
30	Tatashe	Cassandra Mark, Tobe Max Ezeogu	Nigeria
31	Princess Frog	Ksenia M Belka	Russia
32	Pirozhki (Grandmother’s pies)	Sideburn004	Russia
33	The Gift of Goddess Ai	Lina & Yu	Russia
34	First one	Amito Arai	Russia
35	Once upon a tale	Sideburn004	Russia
36	Yakutia	Bogdan Fedotov	Russia
37	Bonding	Lumarin, Marina Priv	Russia
38	Anime Nyash	Alexey Kuryatnikov	Russia
39	Inspiration	Dzikawa	Russia
40	Path to the Future paved with memoria gems	Hetiru, Semkul	Russia
41	Night Bus	Zuo Ma	China
42	Cuisine Chinoise	Zoa Dao	China
43	A Restaurant Nearby	Yao Ren	China
44	14 days in the desert	Liu Tuo, Xu Zi Ran, Senyu Studio	China
45	Legend of Tianma	Chu Mi	China
46	Evolution: The Epic of Earth	Lv Bo	China
47	Raven Forest	Lu Yizhou, Amber Ma	China
48	Chinese Queer/ Echo in Hai men	Seven	China
49	Fly+ The song of frogs	Zhang Xiao Yu	China
50	The Night of Ghosts	Qian Yu	China
51	Danger Girl	Jeff Campbell	United States
52	Doc Savage	Doug Moench, John Buscema & Tony DeZuniga	United States
53	Savage Dragon	Erik Larsen	United States
54	Spawn	Todd McFarlane	United States
55	Star Wars Annual	Chris Claremont, Mike Vosburs & Steve Leialola	United States
56	Strange Adventures: War with the Giant Frogs	Gardner Fox & Sid Greene	United States
57	Strange Adventures: The Invisible Space-Dog	Gil Kane	United States
58	Strange Adventures: The Toy Solider War	Carmine Infantino	United States
59	Way of the Rat	Chuck Dixon & Jeff Johnson	United States
60	Emperor Doom	David Michelinie & Bob Hall	United States