Iconicity of quantity in comics: More motion lines means more speed

A well-known type of linguistic iconicity is the iconicity of quantity, where the quantity in form corresponds to quantity in meaning, such as reduplication used for plurality or intensity (Kiyomi, 1995). In this talk, we study the iconicity of quantity in the morphological marking of motion in the visual language of comics (Cohn, 2013) by focusing on lines trailing behind figures or objects (movers) to indicate motion. Experimental research on this topic has established that the higher quantity of motion lines in visual representation is perceived as indicating higher speed (Carello et al., 1986; Gillan & Sapp, 2005). In this paper, we test the conclusions of these studies further by conducting an experiment that expands the scope of previous approaches and we additionally analyze a corpus of 325 comics, which represent a naturalistic use of motion lines.

While Carello et al. (1986) found that running figures with lines were perceived by children as faster than without lines, they did not take into account that running figures encode speed information by default which might modulate the effect of motion lines alone on speed. In our subjective speed rating experiment, we tested moving objects without any postural information, in order to avoid its potential influence on participants' speed ratings when motion lines are present. We compared the presence of regular motion lines and several motion lines against the baseline of zero lines (object-only condition), as shown in Figure 1. Our results indicate that the presence of lines led to higher speed ratings than object-only condition and several motion lines were rated as conveying more speed than regular motion lines, see Figure 1. These results indicate that the quantity of lines in form facilitated the conveyed meaning of higher speed.

One possible shortcoming of experimental approaches is that they cannot tell us if the observed trends are valid for figures occurring in a naturalistic way in comics. We addressed this by conducting a corpus study of running and walking figures in 325 comics. The comics were annotated with the Multimodal Annotation Software Tool (MAST) (Cardoso & Cohn, 2022). We annotated the manner of movement of every character instance, including walking and running, as well as whether they have motion lines. We found that runners have more lines on average (8,2%) than walkers (1,1%), see Figure 2. This difference is highly significant ($p < 0.05$, 95% C.L.) and confirms our hypothesis that more formal marking of motion, or more lines in this case, corresponds to more perceived motion, that is the higher speed of the moving figure.

The results of our experiment and our corpus study show that the higher quantity of motion lines as formal marking in comics leads to the meaning of higher speed. Thus, parallel to spoken language, the iconicity of quantity also plays a role in the visual language of comics.

References

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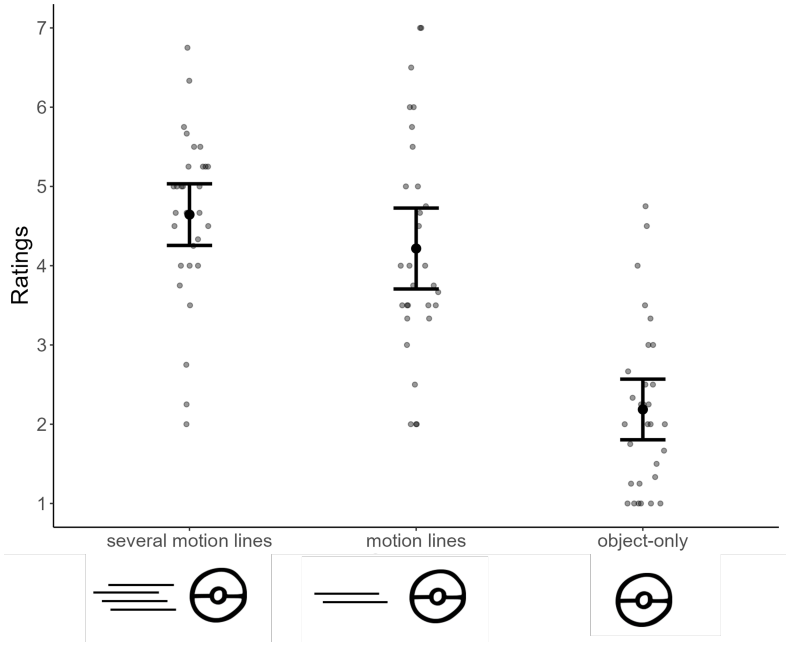

Figure 1: Subjective speed ratings given from a scale of 1 (extremely slow) to 7 (extremely fast) to three conditions (several motion lines, regular motion lines and object-only without any cue).

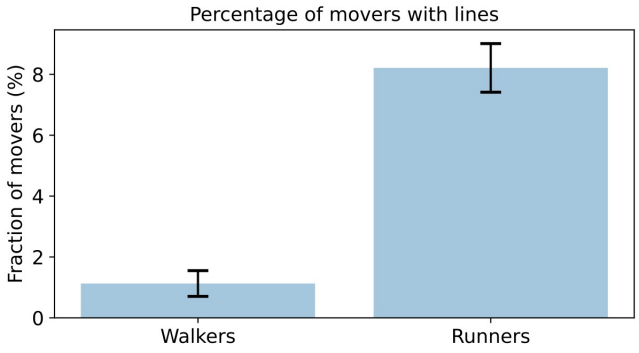

Figure 2: Percentage of walking and running figures with motion lines in our corpus (walkers N=2127, runners N=889)