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Image Schemas and Conceptual Metaphor in Action Comics
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Introduction

Comics is cinema without motion or sound. Like films, comics tell stories through a sequence of images. And like film, they incorporate sound effects, spoken dialogue, and voice-over narration, all rendered as text so that the sound emerges in the reader's mind rather than from sound waves impinging on the ear. Unlike film, comics present images simultaneously, in durable form, rather than in rapid succession to produce the illusion of moving images. This means that the comics reader must add motion and dynamics to the story conceptually, mentally animating the narrated events. The static, soundless nature of comics poses problems of representation for the comics artist and of interpretation for the comics reader. These problems are acute in the popular genre of superhero comics — Superman, Batman, Wonder Woman, Spider-Man, Green Lantern, Captain America, Iron Man, X-Men, and so on — where complex, fast-paced action is central to the story. How do the static images of action comics become dynamic events in the mind of the reader? What representational conventions prompt these interpretations, and what is the conceptual basis for these representations and their functions? The present chapter addresses these questions of depiction and meaning-making from the perspective of cognitive linguistics. Specifically, it draws upon studies of image schemas and conceptual metaphors to explain the conceptual basis for several key conventions for representing dynamic action in contemporary superhero comics, and it illustrates how these conventions function together through detailed analysis of a single comic panel depicting complex action.

From Static Images to Dynamic Events

Visual media such as photography and painting, when employed representationally, depict individual moments in time. Skilled photographers and artists capture precisely those key moments that, together with visual cues for context, imply whole events that are part of a larger narrative. Comics gain narrative power by presenting depicted moments in a visual array, where the reader's habituated strategy of reading (viewing) the images from left to right produces a succession of moments, and bridging inferences link these moments into a coherent story. In this way, comics substitute space for time (McCloud 2000: 2). Within that space, artists can manipulate the size, shape, and juxtaposition of panels to affect the consideration a reader gives to each part of the page, guiding the reader's selective attention to each depicted moment and generating a sense of pacing for the action. This level of dynamics suffices for simple drama or for the four-panel jokes that populate the comics page of daily newspapers, but for action comics like those of the superhero genre, this panel-to-panel pacing is too slow to render the experience of rapid, often simultaneous action, impacts and collisions, and other complex events. For action comics, motion and force are vital to the story and to the storyteller's art, and the artist must overcome the constraints of the medium to show movement and impact in the work, even and especially within the constraints of individual panels. While depiction of movement was

rudimentary in early comics history, comics art has progressed over the last half-century to render motion and force with greater vividness, maximizing the impact of panels that portray action. The composition of such panels will be our primary focus.

Comics tell stories through the juxtaposition of images and text for speech and sounds, but as Will Eisner observes in *Graphic Storytelling and Visual Narrative* (1996), 'the major dependence for description and narration is on universally understood images' (1-2). To be universally understood (or nearly so), comics images employ conventions of representation that are readily interpretable by the reader and that prompt for the construction of particular meanings. In this respect, the images function somewhat like language. With respect to language, Talmy (2000) has argued that 'the basic function of grammatical forms is to structure conception while that of lexical forms is to provide conceptual content' (24). Similarly, in comics images, the visual representational conventions structure conception while the rendered characters, objects, and settings provide conceptual content. Like grammatical forms, the visual conventions have a schematic quality and conceptual structuring function. There are some notable differences, of course. Language is sequential, segmented, and hierarchically structured, and it must use words (and gestures in spoken discourse) to prompt for the spatial composition of scenes as well as for their dynamic qualities. Because comics images directly depict the visual composition of scenes (albeit in two dimensions, using artistic conventions for representing visual perspective that are not the primary focus here), the grammar of comics consists not of patterned constructions for speaking but of an inventory of stylized symbols, a kind of 'visual shorthand' (Wolk 2007: 120) for depicting qualities of experience such as emotions and processes (changing relations through time). Comics artists draw from a collective pool of visual symbols (McCloud 1994: 128), symbols that rely on the reader's 'stored memory of experience' and that 'require readers to participate in the acting out of the story' (Eisner 1996: 17, 57). Readers use conceptual structure derived from embodied, cultural, and linguistic experience to construct the meaning of each panel of comics art, while they rely upon pragmatic abilities, such as bridging inferences, to string these panels together into a story.

In this chapter we explore the conceptual basis for three stylized symbols commonly used in action comics to represent the dynamics of events: ribbon paths, motion lines, and impact flashes. Ribbon paths indicate movement within a comic panel from one location to another, emphasizing the path traveled by the character or object that moves; the reader views this action from an observer's (a hidden spectator's) perspective. In the years since the creation of modern comics, artists have experimented with different ways of representing movement within a single panel, and ribbon paths are a modern stylization from earlier techniques. Motion lines emphasize motion without regard to path (to starting and ending locations) and are used to place the reader in the center of action as if moving with the characters, providing a participant's perspective to heighten the drama. Impact flashes represent the application or exchange of forces: sites where movements are initiated or terminated and, in particular, collisions between characters or objects in motion. In action comics today, these symbols are widespread — nearly universal — and readers understand them without explanation or study. To understand how, we need to examine the conceptual structures that readers employ to make meaning. Our analysis will focus on two aspects of meaning construction that have been the subject of extensive study in cognitive linguistics: image schemas and conceptual metaphors.

Image Schemas and Conceptual Metaphors

An image schema is a mental representation of a pattern we encounter frequently in our experience as embodied beings in a physical world. As originally defined by Johnson (1987), an image schema is 'a recurring dynamic pattern of our perceptual interactions and motor programs that gives coherence and structure to our experience' (xiv). Common examples are PART-WHOLE, CENTER-PERIPHERY, SUPPORT, BALANCE, PROXIMITY, and CONTAINMENT. Image schemas related to motion include ANIMATE (or SELF-) MOTION, CAUSED MOTION, and PATH (SOURCE-PATH-GOAL), while those related to force include COMPULSION, ATTRACTION, RESTRAINT, BLOCKAGE, and DIVERSION, among others. As the examples show, a specific image schema, such as SUPPORT or CAUSED MOTION, can integrate aspects of spatial organization with force or motion dynamics as these occur as patterned gestalts in our experience.

In her introduction to a 2005 volume on image schema research, Hampe provides a succinct summary of the characteristics of image schemas as originally described by Johnson (1987) and Lakoff (1987):

– Image schemas are *directly meaningful* ('experiential'/'embodied'), *preconceptual* structures, which arise from, or are grounded in, human recurrent bodily movements through space, perceptual interactions, and ways of manipulating objects.

– Image schemas are highly *schematic* gestalts which capture the structural *contours* of sensory-motor experience, integrating information from multiple modalities.

– Image schemas exist as *continuous* and *analogue* patterns *beneath* conscious awareness, prior to and independently of other concepts.

– As gestalts, image schemas are both *internally structured*, i.e., made up of very few related parts, and highly *flexible*. This flexibility becomes manifest in the numerous transformations they undergo in various experiential contexts, all of which are closely related to perceptual (gestalt) principles. (1-2, emphasis in original)

The 'image' portion of the term 'image schema' refers not just to visual perception but to 'all types of sensory-perceptual experience' (Evans & Green 2006: 179), including visual, auditory, haptic (touch), and vestibular (balance/movement), all of which generate what psychologists call 'images' in the mind. The 'schema' portion of the term is meant to distinguish image schemas from rich visual images: what an image schema describes is not a picture in the mind's eye but a schematized pattern that recurs in such images and that gives them their meaningful (relational/processual) structure. Image schemas are an embodied, emergent alternative to an innate mental calculus, language of thought, or other source of propositional structure rooted in disembodied logic or universal rationality.

An example that illustrates this point is the UP-DOWN schema described by Johnson (1987) and discussed in Evans and Green (2006: 178). From a purely logical point of view, UP and DOWN are merely opposite directions along a vertical axis, but from an embodied point of view, they are experienced quite differently. Unsupported objects fall downward while stationary objects require support to maintain their elevation and rising objects must be propelled upward by an applied force. For embodied beings in a world with gravity, space and force are entwined, so that we experience the vertical axis as functionally asymmetric. This asymmetry

structures the way we perceive and conceptualize motion events, eliciting surprise when something appears to be inconsistent with this pattern. The example of UP-DOWN shows how image schemas become associated with 'broad classes of concepts or experiences' (Grady 2005: 36), providing what cognitive linguists consider to be the embodied foundation for the human conceptual system.

The functional asymmetry of UP-DOWN inheres in other conceptual domains via conceptual metaphor, a fixed set of correspondences or 'mappings' across domains that enables us to 'conceptualize one mental domain in terms of another' (Lakoff 1993: 203). A common example is the conceptual metaphor MORE IS UP. In everyday experience, adding items to a pile makes the pile higher and adding liquid to a container makes the level rise; these directly perceived correspondences are the basis for a mapping that can be exploited in non-spatial domains of experience, such as economics, in which we can say 'prices are rising' or 'wages are falling' though no actual motion is present. Here we conceptualize increases or decreases in quantity as movements upward or downward along a vertical axis, an axis on which things fall naturally unless supported or boosted upward by an applied force. As human beings, we stand and walk upright, with our head at the top, and we maintain this posture through alertness, wellness, and effort. These experiential associations provide the basis for a series of metaphors that exploit the asymmetry of the vertical axis, including HAPPY IS UP ('My spirits rose' / 'I'm feeling down'), CONSCIOUS IS UP ('I'm waking up' / 'He sank into a coma'), HEALTH AND LIFE ARE UP ('He rose from the dead' / 'He fell ill'), and CONTROL IS UP ('I'm on top of the situation' / 'It's under [my] control'). Other metaphors that derive from the orientation of the human body and positive associations with verticality include STATUS IS UP ('She rose to the top' / 'He fell from power'), VIRTUE IS UP ('She has high standards' / 'That was a low thing to do'), and, quite generally, GOOD IS UP ('Things are looking up' / 'Things are at an all-time low'), among others described in Lakoff and Johnson (1980: 14-17). The systematicity of these metaphors is no accident: all incorporate the functional asymmetry of the UP-DOWN image schema with mappings (patterns of correspondences or neural connections) across domains of experience. These mappings preserve image-schematic structure (Lakoff 1993: 215), equipping us to conceptualize abstract domains like economics in terms of concrete experiences like objects rising or falling. The combination of image-schematic structure and conceptual metaphor makes it possible for the entire conceptual system to be grounded, directly or indirectly, in embodied experience.

Cross-domain mappings link not only the abstract with the concrete; they also link different domains of sensory experience (Kogan, Connor, Gross & Fava 1980: 1). Some metaphors conflate the senses through a kind of synesthesia, equating one sense with another, so that a person can 'look sharp' or wear a 'loud shirt', a musical note can 'sound flat', and a food can 'taste dull'. These metaphorical expressions characterize sensations cross-modally, providing apt descriptions where words might otherwise fail us. Comics use visual cues in a similar way, exploiting synesthetic mappings in the conceptual system to make visual symbols stand for other sense perceptions. In a medium that can portray only pictorial or textual information, the ability to map one type of sensory perception onto another is invaluable. Artists may use bright colors in onomatopoeic sound effects and large bold letters for loud noises or shouting, where the shape and scale of letters on the page represents the quality and magnitude of the sound as it would be perceived by the auditory system. This metaphor based on conflated sensory perceptions has a wide range of applicability in the world of comics (McCloud 1994: 128). In action comics, visual representations of collisions combine sensory conflation (a

primary form of metaphor) with image-schematic structure to render the images interpretable as dynamic happenings in the mind of the reader.

The example of representing sound magnitude by letter scale illustrates another key feature of metaphor in comics: its multimodality. While Lakoff and Johnson (1980) identified conceptual metaphors based on patterns in language, metaphorical expressions in comics — the means through which conceptual metaphors are expressed — can consist of words, images, or (especially) both in combination. The multimodality of conceptual metaphor has been noted by comics artists as well as by metaphor researchers. In *The Language of Comics* (2001), Varnum and Gibbons write: 'In comics, words take on some of the properties of pictures, and conversely, pictures take on some of the properties of words.... Comics is a system of signification in which words and pictures are perceived in much the same way' (xi). McCloud makes a similar observation in *Understanding Comics* (1994): 'Not really a picture anymore, these lines are more a visual metaphor—a symbol. And symbols are the basis of language!' (128). In a recent academic volume on multimodal metaphor, Yus (2009) argues that the interpretation of visual metaphor 'does not differ substantially' from the interpretation of verbal metaphor: the initial perception delivers information concerning a subject which the reader must subsequently interpret through encyclopedic knowledge of the subject or through the subject's associated metonymic relationships (167-168). From a cognitive linguistic point of view, meaning is conceptualization, so language, gesture, image, and social action all engage common conceptual structures and operations in the act of meaning creation — which is not to deny differences in the format, patterns, affordances, and apprehension of these different modes of expression and the roles they play (see, for example, the contrasts between linguistic and imagistic realizations of metaphor described by Forceville [2008]).

With regard to motion events, early evidence of the metaphorical nature of motion representations in comics comes from experiments by Kennedy (1982) on the interpretation of speed lines, which are parallel black lines drawn behind moving figures to represent movement at different speeds. As with sound effects, we find again a conceptual metaphor linking size to magnitude: longer lines represent faster motion. Kennedy found that hearing children, who have greater exposure to metaphor in language, more readily understand speed lines as symbolic of motion than do deaf children. Kennedy argues that the children's exposure to metaphor correlates with their understanding of the visual motion symbols because those symbols are metaphorical in nature (Kennedy 1982: 593). From a cognitive linguistics point of view, we argue that metaphor resides primarily in thought — in conceptualizing one domain in terms of another — but that experience with metaphorical expressions, primarily linguistic but also pictorial, facilitates the interpretation of symbols that rely upon metaphorical mappings for their intended meaning.

With this brief introduction to some fundamental concepts in cognitive linguistics, we turn now to analyzing specific conventions in action comics for visually representing motion and force events: ribbon paths, motion lines, and impact flashes. Our focus here is on representing action within a single panel — a static image — such that the reader can interpret the dynamics of the depicted event. Once these conventions have been explicated, we examine how they function together, with time and pacing, to render the larger-than-life action familiar to fans of superhero comics.

Ribbon Paths for Movement

The rapid pace and drama of action comics demands that action events unfold in a single panel or short series of panels. This presents an immediate problem of depicting characters' movements as they interact. Comics artists have experimented with various ways of exhibiting movement since the medium's rise in popularity (McCloud 1994: 110). A character's movement through the space of the panel could be depicted by a series of drawings showing the character in different poses reflecting its changing configuration as it moves; this would create an effect reminiscent of Marcel Duchamp's famous painting *Nude Descending a Staircase*. While comics artists occasionally use this technique to depict high-speed actions in rapid sequence (for Superman or the Flash, for example), the technique fails as a general means of depicting motion because of its inefficiency (due to repeated drawing) and because it clutters the panel, obscuring the other contents of the scene. A more economical approach is to distill the visual representation of motion to its essential elements: those that depict the basic image-schematic structure of the motion event with just enough visual perspective to add three-dimensionality to the interpretation of motion.

The elegant solution to be described below is a nearly direct depiction of SOURCE-PATH-GOAL image-schematic structure. The SOURCE-PATH-GOAL image schema is the basic conceptual structure of a motion event: a moving object (which cognitive linguists call the 'trajector') begins its motion at one location (the source), travels through a series of contiguous locations in space (the path), and ends its motion at another location (the goal). At any given moment, the trajector occupies some position along the path from source to goal. In our everyday experience, we frequently travel along real physical paths, such as sidewalks, as we travel to a destination. Real, visible paths can also be formed by our movements through the world, as when a boat leaves behind a wake or a vehicle leaves ruts in the mud (Kennedy 1982: 592). Conceptually, we form a path whenever we move through space, even when no physical trace of the path remains; we can, for example, retrace our steps across a room despite the fact that there is no discernible difference between the parts of the floor we crossed and those we did not. We can visualize the path because it is conceptually real: it is the route we traveled between two locations. In their landmark book on conceptual metaphor, Lakoff and Johnson (1980) argue that, conceptually, A JOURNEY DEFINES A PATH and THE PATH OF A JOURNEY IS A SURFACE. In their words, 'paths are conceived of as surfaces (think of a carpet unrolling as you go along, thus creating a path behind you)' (90). This elemental structure of a journey along a path is the basis for many conceptual metaphors, including LIFE IS A JOURNEY, A CAREER IS A JOURNEY, A RELATIONSHIP IS A SHARED JOURNEY, and so on, which are reflected in the typical ways we talk about these phenomena.

For our purposes, the issue is not so much metaphorical paths as how to depict the basic conceptual structure of literal, though fictional, movement events in still images. Here the answer is to reify the SOURCE-PATH-GOAL image-schematic structure in the visual representation — in other words, to draw the path defined by the journey of the object in motion. One of the most recognizable examples of this approach is the dotted-line path used repeatedly by Bill Keane in *Family Circus* to depict young Billy's circuitous route of travel through a complex visual scene; a sample comic panel is shown in Figure 1. Here Billy is the trajector, and viewers have no trouble interpreting the dotted line as Billy's path of travel from his starting point (the source, marked here by an 'x') and his present position. In this example the shape of the dotted line path also depicts certain aspects of the manner of motion, as Billy has apparently jumped on or over many objects (a bed, a trashcan, a football, and so on), circumnavigated others (a potted plant), and even climbed a tree—all in contrast with his mother's request for direct, goal-directed

action, thereby producing the humor of the scene. The image is static; it gains significance from the reader visually tracing the line of Billy's path and interpreting the various events that appear to have happened along the way. While this provides a pleasant diversion in a Sunday comic, the tracing of a dotted line path proceeds at far too slow a pace for the high-speed action of superhero comics.
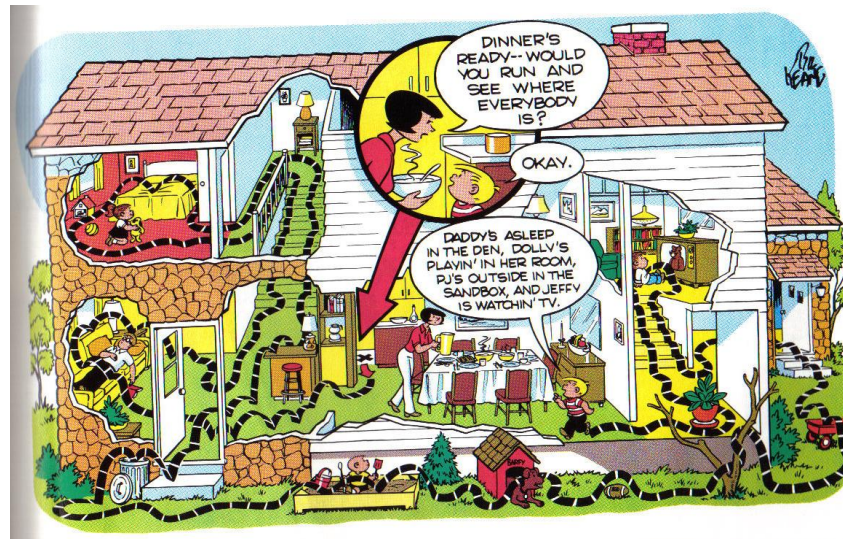

Figure 1. Billy's dotted-line path in Bill Keane's *Family Circus*.
(From Bill Keane, *The Family Circus Memories*, Ballantine Books, 1989. Used with permission.)

In action comics, the preferred way to depict source-path-goal image-schematic structure is to draw a ribbon path behind the object in motion, as shown by the example in Figure 2. A ribbon path is a swath of light color (white, yellow, or the predominant color of the moving object) edged by lines that diverge or converge, taking advantage of visual perspective to add apparent depth to the depicted motion. The drawn path looks like a segment of ribbon oriented horizontally (or sometimes tipped to align with the long axis of the trajector), depicting precisely the extended flat surface identified by Lakoff and Johnson as the path defined by a journey. Unlike Billy's dotted line path on the ground, ribbon paths commonly depict objects swinging or flying through the air, so the path appears as a strand of ribbon arcing through space where no path would normally be visible. Readers have no trouble interpreting a ribbon path drawn 'in empty air, rather than on an actual surface' as standing for the virtual or conceptual path traversed by the drawn object (Kennedy 1982: 593). In particular, readers understand that the ribbon indicates the path the object has already traversed (past tense) because the SOURCE-PATH-GOAL schema implies that the depicted object, drawn in its present position, must 'already have been at the source and path locations' (Dodge & Lakoff 2005: 59). The juncture of space, motion, and time — elements which are inseparable in the physical world — helps the artist introduce an impression of the passage of time into the comics panel (a topic explored in a later section). The thin lines and continuous swath of color also provide a sense of smooth, rapid motion — fast, fluid visual scanning — that gives speed to the action of the scene. The conceptual path left behind by a moving object is represented by a ribbon path in order to create

the illusion of movement, as though the panel were a moment frozen in time, a snapshot of an object in motion. The drawn path represents a concrete, visible form of the idea that there is motion in such images. Simply by drawing a visual representation of a path, the artist tricks the reader into concluding that time passed as the character 'moved' through the conceptualized space.

Figure 2. Example of a ribbon path.
(From *Green Lantern 80-Page Giant #2*, DC Comics, 1999. Used with permission.)

Artists who create action comics draw a traveled path as a visible surface — a ribbon path — in depictions of environments that would not ordinarily exhibit such paths, directly portraying this essential but invisible aspect of motion. This might seem like a self-evident way to depict movement, but that is only because we as human beings with bodily experience in the physical world of moving objects have the necessary patterns in our minds — the image schemas that structure our conceptualization — to enable us to look at a stripe of color drawn on paper and interpret it as an object's journey through space and time.

Motion Lines for Participant Viewpoint

Every comics panel depicts its scene from a particular vantage point. The reader is typically positioned as a viewer outside the action, viewing it as a kind of hidden spectator, whether near or far. Occasionally, the reader is positioned inside the action for startling effect, viewing it as if somehow a co-participant. Comics artists manipulate point of view to shape the reader's experience of the events and degree of emotional engagement. While the outside perspective (hidden spectator viewpoint) is pervasive in all comics, the inside perspective (participant

viewpoint) appears in action comics at dramatic moments, drawing the viewer into the action. In these situations, comics artists use motion lines, thin lines radiating from a central point that is the source (or goal) of movement, to simulate the effect of optic flow: the expansion or contraction of the visual scene as the observer moves toward or away from the focal center. Figure 3 provides an example of how motion lines create the effect of a character oriented directly toward the reader and moving with the reader through the space, which flows inward toward the source of motion. For this type of effect, a ribbon path would fail as a representational device: it would be obscured by the character's body or, for motion away from the viewer, would itself obscure the body in motion. On the other hand, the complete omission of motion symbols would render an apparently static scene rather than a motion event. Motion lines add the dynamic of motion in the z-axis without representing the path structure of a complete movement.

Figure 3. Example of motion lines.
(From *Ultimate Spider-Man #81*, Marvel Comics, 2005. Used with permission.)

Here it's worth returning to the comparison of comics to cinema to consider similarities in the depiction of motion events. In the typical depiction of movement, a comics panel employs a film-like composition, with the trajector's movement carrying it from one viewable location in the panel to another. This is the planar component of the object's trajectory. Depth of motion out of or into the plane is suggested by the object's increased or reduced size in relation to other recognizable objects in the panel, making it appear nearer or more distant, and by the tapering or spreading of the lines outlining the ribbon path, emphasizing visual perspective. In Figure 2, for example, the trajector is drawn quite small with a noticeably tapering ribbon path, making it appear to have receded far into the distance. In contrast, panels with motion lines, such as the example shown in Figure 3, deviate from theatrical convention by breaking the 'fourth wall': orienting the moving object directly toward (or away from) the viewer with both appearing to

move together through space; this is similar to the cinematic effect created by the camera moving with the hero through the setting. The excitement elicited by this apparent joint motion comes at a cost: it tends to disrupt the hidden observer/spectator viewpoint so important to the voyeuristic pleasure of cinema.

Panels containing motion lines elicit a stronger first-person perspective, a perspective that replicates the point of view of a person directly in the middle of the action. Motion lines encourage the reader to '[call] up personal references to action—blurred mental pictures of objects in motion' (Taylor 2001: 46) or, more properly, of the background scenery in motion when focusing on an object moving with the viewer through space. In comics, motion lines lead the reader's eye to the focal object, precluding perception of a background.   In these respects, motion lines are a visual metaphor for a first-person embodied perspective, supporting the link between real-world experiences of motion and their depiction on the comics page, thus 'imitating [and] exaggerating reality' (Eisner 1996: 1-2). The reader is placed momentarily in the center of the action, before returning to the more comfortable position as hidden spectator of the unfolding events.

Impact Flashes for Force Events

Up to this point we have discussed motion events without regard to the forces that propel objects into motion or deflect objects already in motion. To add force dynamics (Talmy 2000) to their representations, artists employ two devices: impact flashes and sound effects rendered as text in exaggerated typefaces. An example of an impact flash is shown in Figure 4. Here a 'flash' or spot of bright color with radiating points marks a collision between objects. Flashes are also often used to mark the source of movement: the place where a ribbon path originates when force has been exerted or applied to launch an object into motion. In both uses, flashes mark the sites of force-dynamic events, bursts of energy that initiate or modify movements through space.

Figure 4. Example of an impact flash.
(From *Ultimate Spider-Man #84*, Marvel Comics, 2005. Used with permission.)

Together, ribbon paths and impact flashes create a visual map for an entire action event. Flashes capture visual attention while ribbon paths lead the eye across the page, so the reader's own eye movements produce a sense of motion in the art. Time and cause-and-effect are compressed such that a single still image with ribbon paths and flashes comes to represent a rapid sequence of connected events that lead directly to the depicted moment, the endpoint, captured in the art of the panel. As the reader's eye is attracted to flashes and scans along paths, the reader conceives of a sequence of happenings, creating dynamic action from static art.

Conventionally, the visual representation of an impact in action comics is straightforward: a sunburst-shaped bright spot in the image appears to be a flash of light captured at the moment of bursting into radiation. From a conceptual point of view, however, a mystery emerges: just how is the depiction of a flash of light (a visual phenomenon) so readily interpreted as a physical impact (a non-visual event)? Partly, the answer is learned representational convention, but there is naturalness to the mapping that begs a conceptual explanation. We argue that the impact flash functions so effectively because it is based on a primary conceptual metaphor, that is, a mapping between different modalities of sensory experience. The bright spot on the page depicts a flash of light, a visual perception of bursting energy that is associated with perceptions of bursting energy in other sensory modalities: pressure impacting the body and a percussive sound in the ear. An explosion is a prototypical example of this kind of burst: a flash of light, felt pressure, and a bang. A collision provides pressure and a bang without a flash of light. Because comics are still and silent (audible only through text), the visual flash metaphorically invokes the embodied experience of sudden percussive force. The temporal dynamics of a visual flash — sudden onset, brief high energy or power, and immediate release — correspond to the dynamics of a felt or heard impact, so that, conceptually speaking, the image-schematic structure of a flash structures the reader's conceptualization of the force-dynamic event. The characteristic sound associated with the substance of the colliding objects is rendered onomatopoetically in text next to the flash, completing the sensory image of impact. In Figure 4, the text reads 'FUNK', representing the sound of pointed metal becoming lodged in wood.

Evidence for this cross-modal mapping appears in the scalar rendering of intensity: a more intense (higher-force) collision is associated with a brighter flash and a louder sound. In general, bright colors and loud noises are highly stimulating, whereas dark colors and soft noises are less stimulating (Gibbs & Colston 1995: 361). The metaphoric mapping preserves this directionality, so that a tropical shirt is 'loud' while dark colors are 'muted'. On the comics page, an impact flash is drawn larger to represent a higher-force collision while the text for the sound effect is written larger to represent a higher-volume noise. This invokes the familiar metaphoric mapping linking intensity to physical size: MORE IS BIGGER. A larger flash is a more powerful exertion or exchange of force, while a larger type size is a louder sound. The mapping is so natural that we hardly discern its metaphoric nature.

Time and Pacing of Action

Now that we have analyzed the conceptual basis for some conventional ways of depicting paths of motion and force dynamics in comics, let's consider the issue of time and the pacing of action.

In comics, time is elastic: it can be stretched or compressed for dramatic effect in rendering the events of the story. Pacing emerges partly in the reader's experience of taking in panel after panel, so artists can exert control over pacing through the size and placement of panels on the comics page, affecting how readers shift gaze from image to image. Artists can

also manipulate the contents of a series of panels so that they appear to depict happenings in a sequence, happenings separated by time or space (often with a textual cue such as 'later…' or 'meanwhile…'), closely-spaced moments in a single happening (like frames of slow-motion), or even a single moment rendered from multiple vantage points or in increasing close-up or pull-back. The combination of gaze-shifting from panel to panel and apparent temporal spacing of moments depicted in subsequent images gives the reader an experience of pacing that is more dramatic than real, including fast motion, slow motion, frozen moments, and leaps in time. Here again, comics show a kinship to cinema: the composition of images, shifts in vantage point, and temporal manipulations are key visual techniques of film, but in comics the reader retains greater control over pacing by deciding when and where to shift gaze to take in new information and how quickly to move from panel to panel. While the frames of a film are displayed to the viewer sequentially at a fixed pace in a single location, the panels in a comic book are available to the viewer simultaneously, spread across the page, with the sequence and pace determined by the action of reading. The reader has the ability to 'roam, to peek at the ending, or dwell' on a particular image (Eisner 1985: 71). Part of the joy of reading comics is exerting control over how one experiences the story.

More relevant to our discussion is how comics artists manipulate the experience of time within a single panel. On a comics page, each panel represents a certain length of time within the story. Janson (2002) argues that readers interpret similarly-sized panels as representing similar lengths of time and that any action within the panels is read as occurring within the same general amount of time (111). Yet as Scott McCloud observes in *Understanding Comics* (1994), time and space tend to be 'defined more by the contents of the panel than by the panel itself' (99). The within-panel experience of time is affected by dialogue or monologue rendered as text which must be read, by sound effects taking the form of onomatopoetic words placed near the objects meant to produce the sounds, and by symbols representing motion (McCloud 1994: 110). Speech and other sounds in real life are perceived over time, so readers interpret the reading of text and sound effects in a panel as representing a comparable amount of time passing in the depicted story. In the absence of speech or sound effects, however, the within-panel sense of time passing comes primarily from the depiction of movement, which is our focus in the present chapter.

In the physical world, every movement takes place through time, so time must pass during the course of any movement (Eisner 1985: 25). Motion and time are conceptually linked: whenever we conceive of motion, we conceive of time passing. Ribbon paths and impact flashes not only help the reader decipher what type of event produced the illustrated moment (a punch, a kick, or a throw, for example), they also instill time into the image. Interpreting an object as having moved along a ribbon path to its present position entails interpreting a corresponding amount of time as having passed in leading to that moment. How much time depends on the reader's encyclopedic knowledge of different types of events; a bullet flies faster than a bird, for example. Relative time durations are also reinforced by visual clues: a thin, straight path appears faster than a curved or meandering path; longer or shorter speed lines trailing from a fast-moving object suggest faster or slower speed; and so on. These guide the interpretation of speed in the depicted motion and therefore the sense of a certain interval of time passing. Even impact flashes convey temporal information. In the real world, a flash of light, impact, or bang is sudden and brief. A reader viewing an impact flash interprets it as standing for a fraction of a second in the action. As these examples show, a comics reader simultaneously interprets how the action unfolds and how the time passes. Visual devices like ribbon paths and impact flashes

add temporal information to the image, shaping readers' impressions of the internal structure of portrayed events, whether action happens quickly or slowly, and how much time passes in the space of a single panel.

In an action sequence portrayed across a series of panels, such as a fight between a hero and a villain, the amount of time understood to pass for the sequence depends on how many movements are depicted, while the pacing of action depends largely on how the depictions of movement are spread across the panels. One movement per panel tends to be read as a metered, steady pace of action; this approach was standard in the early days of comics, when each panel portrayed a single action in the sequence of the story. Today, artists achieve a more dynamic, faster-paced sense of action by layering multiple movements in a single panel. Since one panel of equivalent size to another represents roughly the same amount of time, several movements in one panel seem to happen more quickly than one movement per panel. This is an advantage in action comics, as a fast-paced battle is more exciting and engaging to the reader. It does, however, present the reader with a greater conceptual challenge: how to assemble the multiple depictions of movement into a meaningful action event within the context of the story. The movements depicted in a panel might be simultaneous, overlapping, or sequential, and they might be independent or interdependent. Determining their sequence and relations requires the reader to draw on knowledge of action types, durations, and interrelations to add CAUSE-EFFECT structure to the conceptualization. This, together with the image-schematic structure provided by ribbon paths and impact flashes, equips the reader to build a coherent understanding of what the panel portrays. In the next section, we illustrate this idea with analysis of a single panel portraying complex action.

Interpreting the Action in a Comic Panel

As an example of multiple symbols in a single image, consider this panel (Figure 5) from *The Brave and the Bold #13*, published by DC Comics. Readers easily understand the sequence of events represented here despite the complexity of the composition and its layering of symbols. All of the motion symbols appear concurrently and are simultaneously available to perception, yet readers interpret the movements as occurring one after another through time. Because so many movements are drawn within the same panel, the reader deciphers the movements as occurring in rapid succession over a brief interval. How do readers parse this complex image to produce the intended meaning?

Figure 5. A panel depicting complex action.
(From *The Brave and the Bold #13*, DC Comics, 2008. Used with permission.)

A cursory evaluation of the panel reveals the events as the artist likely intended them to be interpreted: Batman throws a batarang across the space between himself and the android, and the android blocks the batarang with his sword. In order to recognize the nature of the events and understand their sequence, the reader must do several things together: classify the actions depicted (as throwing an object or swinging a sword), extract image-schematic structure from the visual symbols (ribbon paths and impact flashes) to simulate paths of motion and force-dynamic interactions, and add CAUSE-EFFECT structure to conceptualize the sequence of connected events.

Interpretation of the panel begins with the reader's encyclopedic knowledge: familiarity with objects in the world (the window, the cape, the sword, and so on) and their properties, with familiar actions (such as throwing an object or swinging a stick or sword), with characteristic sounds and their associations (the sound of the word 'KTANG' emulating the sound of metal striking metal), and the like. Readers of action comics also have familiarity with comics in general and with the superhero genre in particular, including its stereotypical characters, storylines, and representational conventions. Readers of Batman comics will already know much about this superhero and his history, personality, and behavior, and readers of the present comic will know the events leading up to the depicted moment and thus have expectations about what will happen next. All of this knowledge shapes the construction of a particular meaning from this panel, yet what remains to be added is the image-schematic structure of the cognitive representation: the conceptual structure needed to support mental simulation of the action.

Paths of motion and force dynamics form the conceptual basis for piecing together the events of the panel. Here a combination of ribbon paths depicts four distinct phases of movement, and the reader must employ SOURCE-PATH-GOAL image-schematic structure to understand the illustration, orientation, and direction of each. By visually tracing these paths, the reader's scanning creates a dynamic sense of motion. The composition of the panel helps the reader determine the sequence of actions by taking advantage of the reader's entrenched habit of reading from left to right. Beginning on the left, the reader first encounters the ribbon path that symbolizes the swinging of Batman's hand and arm from the top left corner through an arc toward the bottom of the panel. Because the ribbon path is narrower near the top of the panel than at the bottom, the reader understands Batman's hand as having moved from the background into the foreground, closer to the reader's vantage point. Batman's arm is depicted in a position near the end of the movement, after having released the batarang (whose path is discussed below), this being the critical element that defines the movement as a throwing action. The ribbon path provides the source, a nearly complete path, and the direction of movement, with the ribbon itself marking the portion of the path already traversed, and with the object at the end of the ribbon, Batman's hand, marked as the trajector (the object in motion). Without actually moving (or being replaced by subsequent images in rapid succession to create the cinematic illusion of motion), the image makes Batman's arm appear to have swung around his body, flinging the batarang away from him.

After tracing this ribbon path, the reader's eye then follows the batarang's path across the panel. The orientation of this second ribbon path with respect to the first indicates that the batarang started to travel away from Batman while his arm was in mid-motion, consistent with a throwing action. Interestingly, though, the ribbon path for the batarang does not begin at the ribbon path for Batman's swinging hand, which must have released it on its flight; instead, the ribbon path for the batarang starts closer to Batman's body, appearing to cross the path for Batman's hand. This apparent logical inconsistency provides two conceptual advantages. First, it makes use of the Gestalt principle of continuation to visually separate the paths, helping the

reader see two distinct paths crossing rather than a unitary object with branching arms. Second, it uses proximity (incorporating the PROXIMITY image schema) to encourage the viewer to see Batman as the originator or source of the batarang's motion. This example clearly accentuates the conceptual function of ribbon paths: rather than depicting objects in the scene (ribbon paths don't really appear in the air), they supply image-schematic structure to guide the reader's conceptualization.

The ribbon path for the batarang moves horizontally across the panel in the familiar rightward reading direction, so that the reader's eyes scan smoothly and effortlessly across the page, creating a sensation of speed, until they encounter the jagged impact flash where the batarang collides with the sword. Here the brightly colored flash suggests a forceful impact, using the primary conceptual metaphor described above, while the sound effect (the text 'KTANG' read subvocally, with the enlarged 'A' expanding the central vowel sound) provides the onomatopoetic sensation of metal striking metal. The ribbon path deflects, as shown by the upward shift in the angle of the path and by the change from tapering to expanding outlines indicating a shift in motion toward the viewer. Importantly, the angle of deflection is consistent with the reader's experience of real-world moving objects colliding with one another, so the artist avoids violating the reader's expectations. Following the new direction of the path leads the reader's eye directly to the batarang itself, the object in motion (the trajector) which becomes visibly identifiable for the first time just before it exits the frame, an implication of continuing motion. Behind the batarang, the swinging of the sword into blocking position is represented by a latticed ribbon path drawn in silver to match the sword; this effectively conveys the movement of this elongated trajector without obscuring the background or dominating the panel with color. More importantly from a conceptual point of view, the latticed ribbon path allows for the layering of movement symbols, so that the ribbon path for the batarang can be drawn on top of, and thus appear in front of, the latticed path signifying motion of the sword. In this way, four distinct movements—throw, fly, swing, deflect—emerge from the constellation of ribbon paths and an impact flash in this single panel.

While the ribbon paths and impact flash provide important image-schematic support to the reader's conceptualization of dynamics, they do not in themselves provide the cause-effect structure needed to link these dynamic actions into a coherent event. In his seminal work on force dynamics in language and cognition, Talmy (2000) argues that we interpret cause and effect via force-dynamic image schemas and that abstract causes and effects are conceptualized metaphorically using image-schematic structure derived from physical events. Readers know that an effect must have a cause, and that a cause must result in an effect. Each of the four movements in the panel must be parsed to produce the correct order and relation of cause and effect, or they will not amount to a logical sequence of action. This panel has been carefully composed so that the visual symbol for each movement implies the movement's orientation and direction toward a goal, as well as the span of time through which it unfolds. The reader interprets the depicted entities, salient features, spatial relations, and conceptual symbols against a backdrop of encyclopedic knowledge, described earlier, to determine the sequence and causal connections. In order for the batarang to fly across the room, it must have been propelled. In order for its path to change, it must have been deflected by a force. The swinging of Batman's arm and his placement at the start of the batarang's path imply that he threw it. At the same time as he threw it, the android must have been bringing up its sword to block the batarang, or the sword would not have arrived in time to deflect it, and so on. The left-to-right layout of the panel helps the viewer read the motion events in sequence, while the depiction of these

movements in a single panel preserves the simultaneity of overlapping action. Even in the absence of alignment with the conventional direction of reading, the events could be reconstructed using knowledge of the world and force-dynamic schemas of cause and effect to determine or explain how objects move. The artwork itself has no motion, sequence, or time, yet the reader's visual scanning, interpretation of schematic structure in the ribbons paths and impact flash, and incorporation of world knowledge create a dynamic sense of meaningful action unfolding through a brief interval of time.

Conclusion

As a genre brimming with motion and force dynamics, action comics pose a considerable representational challenge to artists trying to tell action-filled stories in still images. To meet this challenge, comics artists have developed stylized symbols to prompt the reader's conceptualization, symbols which are tied to well-established patterns in the human mind. Ribbon paths depict routes traveled by moving objects, motion lines provide an embodied participant perspective on action, and impact flashes (with sound effects) denote the sites and magnitudes of collisions. All function successfully only if readers have the conceptual apparatus to interpret them naturally and effortlessly.

Approaching the study of these visual symbols from the perspective of cognitive linguistics shows that they are not arbitrary, nor does readers' understanding of them depend solely on the conventionality of their use. Though not necessarily predictable, the form of the symbols is clearly motivated. A ribbon path encapsulates source-path-goal image-schematic structure, while its light color and tapering lines attract visual attention and add apparent depth to motion. Motion lines act as an analog to the optic flow we experience when focusing on an object while moving with it through the environment. Flashes have the proper temporal dynamics and synesthetic associations with pressure waves and percussive sounds to stand as symbols for impacts. While these symbols do become familiar to readers through repetition, so that their interpretation becomes automatic, they are nevertheless readily decipherable by novices precisely because they are yoked to these familiar patterns in the human mind.

In action comics, artists use visual symbols of movement and force to evoke basic conceptual patterns in readers' minds: image schemas derived from bodily experience in the physical world and conceptual metaphors linking different domains of experience. Through ordinary processes of meaning construction, readers add time, motion, and event structure to the panels on the page, generating the fast pace and thrilling action of superhero stories, thus turning comics into cinema in the mind.

Endnotes

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