Spatial Properties of ACTION Verb Semantics: Experimental Evidence for Image Schema Orientation in Transitive vs. Reciprocal Verbs and Its Implications for Ideology

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Introduction

Research in Cognitive Linguistics has argued extensively for the pervasive role played by space in structuring the concepts and conceptualisations associated with linguistic items and language usages. Space is a fundamental area of human experience. It is therefore not surprising to find that spatial cognition is exploited in the architecture of other cognitive systems like language. A key claim of Cognitive Linguistics has been that many of the meanings encoded by language are represented in the mind in the form of *image schemas* – spatially laid out representations of the recurrent structural properties of scenes and events (Lakoff 1987; Langacker 1987, 1991, 2008; Talmy 2000). Many of these schemas emerge from our bodily location in and interaction with space (Johnson 1987). This embodied view of language is developed in opposition to amodal or symbol-manipulation approaches to representation (Fodor 1975; May 1985). The motivation for a modal rather than an amodal account of meaning stems partly from commonalities perceived between language and the visual 'parsing' of a scene (Landau and Jackendoff 1993) and partly from the nuanced meaningful distinctions that a spatial representational format is able to capture between alternative linguistic structures (Langacker 1987: Talmy 2000). A further finding from Cognitive Linguistics has been that these experientially derived image schemas frequently serve as models for understanding more complex and abstract areas of experience in a system of conceptual metaphors (Lakoff and Johnson 1980, 1999). In this way, much of the conceptual system, as reflected in repeated patterns of language use, is grounded metaphorically in our knowledge and understanding of space.

A considerable body of work extending Cognitive Linguistics to the analysis of discourse has shown that image schemas derived from spatial experience, such as CONTAINER, UP/DOWN, PROXIMAL/DISTAL and FORWARD/BACKWARD MOTION, are mobilised to structure areas of contested social experience where they come to function ideologically (Charteris-Black 2006; Chilton 1996, 2004; Dirven, Frank & Pütz 2003; Goatly 2007; Hart 2010, 2011; Chilton and Lakoff 1995). For example, the CONTAINER schema is frequently exploited in discourses of migration and national identity where it acts as a principle of division and promotes exclusionary behaviour (Charteris-Black 2006; Chilton 2004; Hart 2010).

When language directly describes spatial relations or spatial markers such as prepositions are used explicitly to signal a spatial understanding of the target situation, it is not surprising that the conceptual representations invoked should be spatial in format. What is perhaps more interesting is that spatial forms of representation seem also to be a feature of language in areas which are not directly concerned with space or where no explicit spatial grounding is provided. For example, Richardson et al. (2001) showed that a number of both concrete action and more abstract verbs and psychological predicates include a spatial component as part of their meaning. Richardson et al. (2001) presented subjects with twenty target verbs hypothesised to encode images schemas in either a horizontal (e.g., *push, pull, argue, offend*) or vertical (e.g., *lift, sink, hope, respect*) orientation. Verbs were embedded in rebus sentence in past tense form (e.g., ○ lifted □). For each sentence, subjects were asked to select the image schema, presented in four orientations, which best depicted the scene described by the sentence. The results showed a high degree of consistency among subjects in

assigning horizontal or vertical orientations as postulated for each verb. The same paradigm was adapted by Meteyard and Vigliocco (2009) and extended to account for both orientation and direction of motion in a larger-scale study of 299 verbs. Again, a high degree of consistency was demonstrated among subjects. The results of these studies are insightful because convergence among speakers suggests common, underlying forms of representations constitutive of linguistic knowledge or meaning. A number of other experimental paradigms have also been exploited to provide further evidence for spatial properties of verb semantics (Bergen et al. 2007; Meteyard et al. 2007, 2008; Richardson et al. 2003).

That the meaning of these verbs includes a spatial dimension, at least in the case of concrete action and motion verbs, is likely motivated by the fact that the events they designate unfold in space. Correspondingly, the image schemas attached to verbs should not be thought of as static representations but dynamic simulations with spatio-temporal properties. There is now a growing body of empirical evidence suggesting that language understanding involves a mental perceptual or motor simulation of the scenes and events described in utterances (Bergen, Chang and Narayanan 2004; Glenberg and Kaschak 2002; Stanfield and Zwaan 2001; Zwaan et al. 2002). From an embodied simulation perspective, different points of view, specified in the semantics of the utterance, guide the reader toward assuming different roles and positions as an 'immersed experiencer' in a rich and dynamic mental model of the situation (Zwaan 2004).

While the ideological implications of spatial forms of representation have been widely studied in relation to figurative language, this is not the case for literal language usages (cf. Hart 2015). This chapter investigates (i) image schema orientation in transitive vs. reciprocal action verbs (e.g. *attack* vs. *clash with*) and (ii) the ideological implications that arise from contrasting spatial configurations associated with these verb types.

The study is motivated by previous research (Hart 2013a/b) which found that, in reporting political protests, newspapers on the political right, as in (1), prefer to report violence between police and protesters using transitive verbs with protesters as the sole agent while more liberal newspapers, as in (2), favour reciprocal verbs which encode both participants as agentive. Interestingly, it was further found that when right-wing newspapers did use reciprocal verbs, as in (3), it was with a marked difference in information sequence compared to more liberal newspapers.

(1)   A number of police officers were injured after [they PATIENT] [came under attack from ACTION[T]] [youths AGENT], some wearing scarves to hide their faces. (*Telegraph*, 10th November 2010)

(2)   [Police wielding batons AGENT[1]] [clashed with ACTION[R]] [a crowd hurling placard sticks, eggs and bottles AGENT[2]]. (*Guardian*, 10th November 2010)

(3)   Twenty-three people were arrested as [protestors AGENT[1]] [clashed with ACTION[R]] [police AGENT[2]] around the Bank of England. (*Telegraph*, 1 April 2009)

Hart (2015) analysed these competing formulations as evoking image schemas which not only have slightly different internal structures (representing a one-sided action event vs. a two-sided action event in transitive vs. reciprocal verbs respectively) but which occur in different orientations relative to the conceptualiser. According to this analysis, while for both verb types the associated image schema is represented in the horizontal dimension, the schema associated with transitive verbs is represented on the sagittal axis while the schema associated with reciprocal verbs is represented on the transversal axis. In line with embodied theories of language, this analysis suggests that the body itself, with its three intersecting axes (Tversky 1998; Tversky et al. 1999), provides a frame of reference

for egocentric meaning construction. Contrasts in voice (transitive verbs) and information sequence (reciprocal verbs) represent the schema in 180° rotations.

The analysis presented by Hart (2015) is based on intuition and assumptions drawn from the literature in Cognitive Linguistics. It is not yet clear whether naïve subjects will share in these intuitions or behave in such a way as to betray the underlying spatial forms of representation proposed. If, as is the claim, transitive versus reciprocal verbs encode image schemas in alternative orientations, then it is reasonable to assume that there will be commonalities across speakers in respect of which orientation is encoded for a given verb. We should therefore expect, in an experimental setting, to find convergence among subjects when asked to judge the image schema orientation for different verbs and verb-types. Any evidence for this kind of consensus among speakers can be taken as support for the hypothesis (Richardson et al. 2001).

Experiment 1

Methods

Participants. 55 participants took part in the study, recruited from the undergraduate population at Lancaster University. Two participants were excluded for having failed to complete the task. All participants were native speakers of English, defined as speaking or learning English since birth and currently using English as their primary language. Culturally, the participant sample was predominantly Western/European.

Materials and Design. Following Richardson et al. (2001), participants completed a forced-choice sentence-picture matching task. Participants were presented with a single A4 sheet of paper containing a list of 32 'action' sentences beneath an image schema presented in four orientations labelled A - D.

The action sentences were of four types (eight items per type): (i) transitive active voice; (ii) transitive passive voice; (iii) reciprocal sequence AB; (iv) reciprocal sequence BA. Sentences were presented in simple past tense form. To avoid interference from personal politics and target specifically the semantics of the verbs and constructions presented, agents and patients were given as 'the circle' and 'the square' rather than 'police' and 'protesters'. In transitive constructions, the agent was always 'the circle'. Full sentences rather than rebus sentences were used in order to mitigate any potential for visual bias in picture selection (Meteyard and Vigliocco 2009).

The image schema was made up of two main elements, a circle and a square, connected by a line. The schema was presented at 90° rotations so that two ran sagittally and two ran transversally with the order of elements on each axis presented as mirror images (see Figure 1). To create a sagittal sense (i.e. an illusion of depth in a two-dimensional format) four steps were taken: (1) all four schemas were presented against a meshed quadrilateral which provided a horizontal reference plain; (2) elements on the sagittal schemas were arranged on a mild diagonal line; (2) the nearest element on sagittal schemas was slightly enlarged; (4) the line connecting elements on sagittal schemas was drawn extending to the centre of the furthest element.

For each sentence, participants were instructed to select the image schema that best represented the event described in the sentence. Four randomised versions of the task sheet were created with different orderings for both sentences and images. The four versions were then randomly distributed to participants. Participants gave their selection by writing A,B,C or D inside empty parentheses on

the same line as the target sentence (see Figure 1). The independent variable was therefore the verb and sentence types being judged and the dependent variable was consistency across picture choices. The design was within subjects.
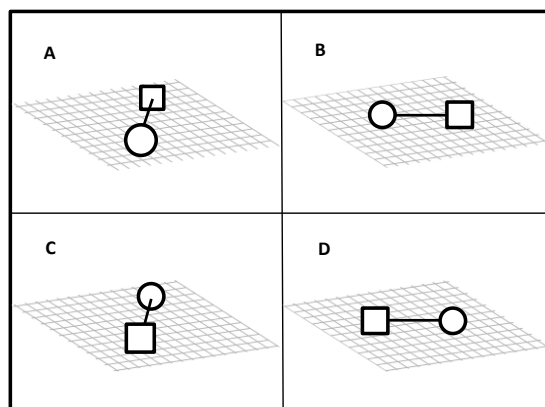
1. The circle attacked the square   [   ]
2. The circle clashed with the square   [   ]
   .....

Figure 1. Example of questionnaire in Experiment 1

Hypotheses. The primary hypothesis is that transitive versus reciprocal action verbs encode image schemas in orientations which follow sagittal versus transversal axes respectively. Secondary hypotheses are that constructional differences in the form of voice and information sequence are associated with opposite orientations on the primary axes.

Results

Participant responses are summarised in Table 1. The table shows the percentage of participants choosing each image for each verb and sentence type. For each item, the value for most frequently selected image schema is in bold. On average, for any given item, the image schema orientation that was most frequently selected was chosen by 64% of participants (the figure was higher for transitive verbs (70%) than for reciprocal verbs (58%)). This indicates a substantial degree of agreement between participants.

Following Richardson et al. (2001), to further test the primary hypothesis concerning the main axis of transitive vs reciprocal verbs, the forced choice data was converted into axis angles. Sagittal choices were assigned an angle value of 0° while transversal choices were assigned an angle of 90°. A mean axis angle was then calculated (see Table 2). Values show how far, on average, the verb types steer toward a sagittal or transversal conceptualisation. This is visually depicted in Figure 2 which shows transitive verbs close to the sagittal axis and reciprocal verbs closer to the transversal axis. Binary logistic regression analysis reveals a significant relationship between verb type and main axis (β=-2.1219, SE = 0.115, χ^2 (1) = 373.46, $p<0.001$).

Construction		Verb	Sagittal		Transversal	
			(circle above square)	(circle below square)	(circle—square)	(square—circle)
Transitive — Active / Circle VERBED square		Attack	**74.5**	12.7	10.9	1.8
		Strike	**67.3**	14.5	18.2	0
		Hit	**69.1**	5.5	23.6	1.8
		Assault	**69.1**	16.4	7.3	7.3
		Beat	**69.1**	10.9	12.7	7.3
		Kick	**67.3**	12.7	18.2	1.8
		Punch	**72.7**	9.1	14.5	3.6
		Whack	**76.4**	10.9	12.7	0
Passive / Square VERBED by circle		Attack	**70.9**	16.4	10.9	1.8
		Strike	**70.9**	12.7	10.9	5.5
		Hit	**67.3**	21.8	9.1	1.8
		Assault	**74.5**	7.3	12.7	5.5
		Beat	**67.3**	14.5	9.1	9.1
		Kick	**69.1**	14.5	10.9	5.5
		Punch	**70.9**	14.5	9.1	5.5
		Whack	**70.9**	12.7	9.1	7.3
Reciprocal — Sequence 1 / Circle VERBED with square		Clash	29.1	16.4	**50.9**	3.6
		Fight	23.6	5.5	**65.5**	5.5
		Battle	27.3	5.5	**58.2**	9.1
		Collide	27.3	10.9	**54.5**	7.3
		Struggle	20	20	**50.9**	9.1
		Scrap	38.2	12.7	**40.0**	9.1
		Trade punches	14.5	3.6	**67.3**	14.5
		Exchange blows	12.7	7.3	**78.2**	1.8
Sequence 2 / Square VERBED with circle		Clash	7.3	41.8	7.3	**43.6**
		Fight	5.5	25.5	10.9	**58.2**
		Battle	9.1	25.5	0	**65.5**
		Collide	10.9	25.5	12.7	**50.9**
		Struggle	12.7	20	9.1	**58.2**
		Scrap	7.3	**49.1**	1.8	41.8
		Trade punches	5.5	14.5	10.9	**69.1**
		Exchange blows	7.3	23.6	1.8	**67.3**
	Means		43.3	16.1	22.5	18.1

Table 1. Percentage of participants choosing each image schema orientation

Transitive		Reciprocal	
Active voice	Passive voice	Sequence AB	Sequence BA
16°	14°	59°	57°

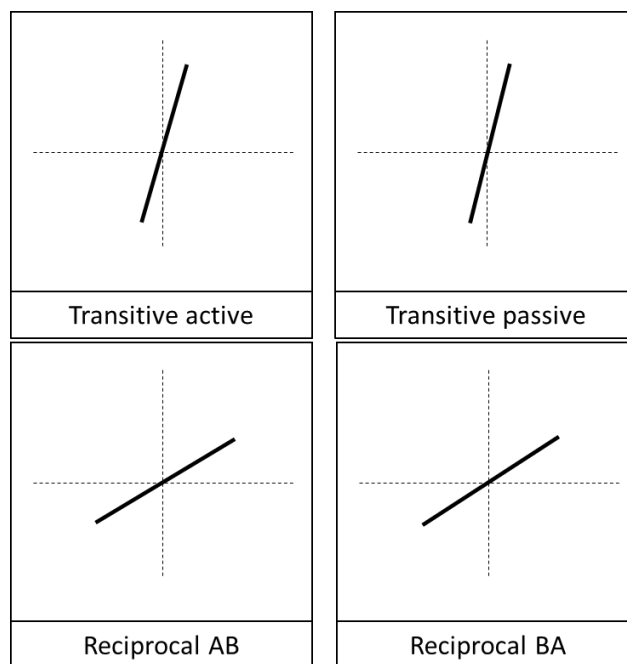**Table 2.** Mean axis angles for transitive vs reciprocal verbs

Figure 2. Visual depiction of mean axis angles for transitive vs reciprocal verbs

For reciprocal verbs, there was a strong tendency to select the transversal schemas whose left-right orientation was congruent with information sequence (see Figure 3). Thus, for reciprocal sentences of the form 'circle VERBED *with* square', 88.6% of transversal selections were for the schema locating the circle on the left while for sentences of the form 'square VERBED *with* circle' only 10.7% of transversal selections had the circle on the left ($ß$=-4.133, *SE* = 0.268, $\chi2$ (1) = 238.31, *p*<0.001). Contrary to the hypothesis, however, no equivalent pattern was found for voice in transitive verbs (see Figure 4). Sagittal selections for transitive verbs tended to locate the circle as the nearest element in both active (85.9%) and passive (83.1%) voice constructions ($ß$=-.218, *SE* = 0.205, $\chi2$ (1) = 1.131, *p*=.228, *ns*).
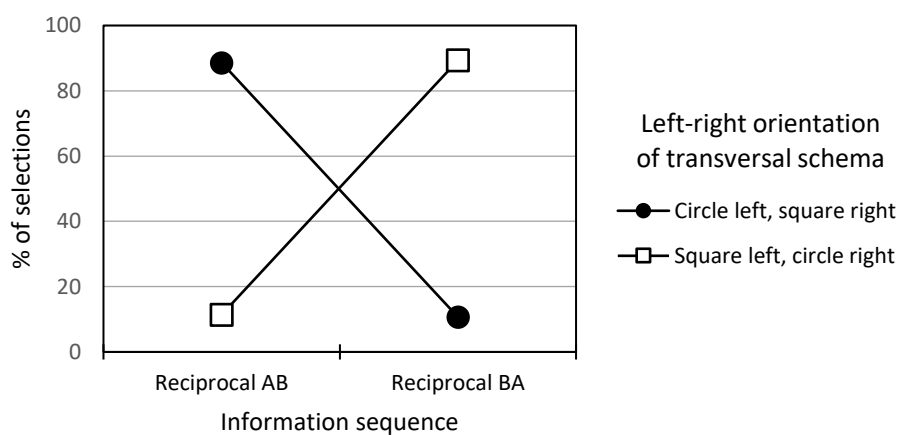

Figure 3. Left-right orientation of transversal schema for reciprocal verbs
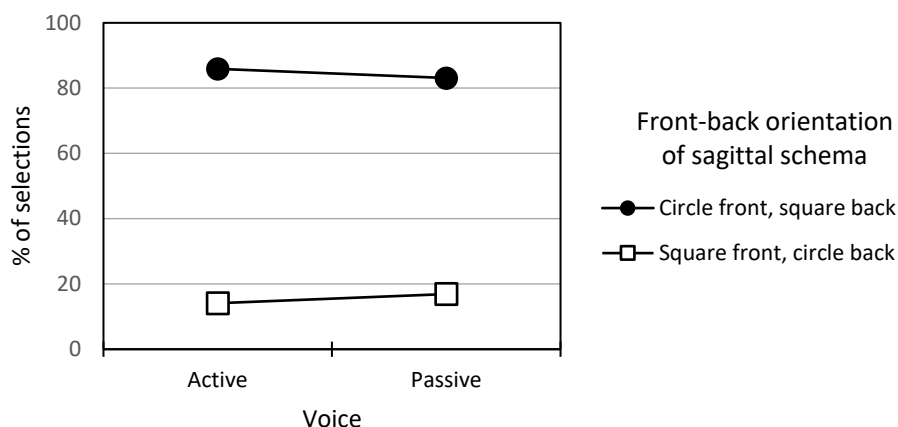
Figure 4. Front-back orientation of sagittal schema for transitive verbs

Discussion

The results show an impressive degree of convergence among subjects on the orientation of image schemas associated with transitive versus reciprocal verbs. This evidence suggests there is indeed a spatial dimension to the underlying mental representations indexed by these verb types with orientation a crucial parameter. In so far as orientation is concomitant with viewpoint, the study provides empirical evidence for linguistic theories in which point of view, as a fundamental feature of conceptualisation, figures in the semantic specifications of linguistic units (Hart 2015; Langacker 1987, 1991, 2008; Talmy 2000).

The study shows that transitive action verbs are conceptualised along the sagittal axis while reciprocal action verbs are conceptualised along the transversal axis. One explanation for this may have to do with the fact that reciprocal verbs encode mutual action, whereby both participants are equally agentive. Reciprocal verbs may therefore motivate a construal of the situation as 'balanced' and we tend to make judgements concerning balance based on a twin-pan schema conceived along the transversal axis – rooted in our embodied experience of judging relative weights and pressures in our left and right hands (Johnson 1987). By contrast, transitive verbs are distinctly one-sided and so may encourage a perspective aligned with one or other of the participants in the scene.

For reciprocal verbs, the left-right orientation of the schema was found to follow the information sequence of the sentence. This suggests an iconic relationship between the linearity of the clause and resulting mental representations of events (Perniss, Thompson and Vigliocco 2010) and raises interesting questions for languages with different writing directions. For example, in the semantic domain of time, which typically receives conceptual structure from the domain of space, it has been shown that the specific spatial configurations used to conceptualise time depend on writing direction (Bergen and Chan Lau 2012; Fuhrman and Boroditsky 2010; Tversky, Kugelmass and Winter 1991). For transitive verbs, by contrast, the front-back orientation of the image schema did not change in active versus passive sentences. In both cases, subjects selected the orientation that placed the agent as the nearest participant. On a dynamic simulation account, it may be that in processing transitive verbs, readers have to adopt the perspective of the agent in order to simulate the action designated in the

sentence. This raises questions concerning the function of the passive voice if not for switching perspective between agent and patient as is usually assumed (Bergen 2012).

Now, point of view and relative spatial values like left, right, front and back are not interpersonally or ideologically neutral. For example, an extensive body of research in visual semiotics suggests that the spatial layout of a text or image engages the reader in different ways and confers different evaluations on the actors and actions represented (e.g. Kress and van Leeuwen 1996; O'Halloran 2004; van Leeuwen and Jewitt 2001). Here, as Kress and van Leeuwen (2006: 146) state, "the addition of perspective adds nothing to the representational meaning [of images] but it does add attitudinal meaning". For example, the functional difference between a frontal angle (and thus sagittal arrangement) and an oblique angle (and thus transversal arrangement) on the horizontal plain is said to be the difference between involvement and detachment (Kress and van Leeweun 1996: 136). For Kress and van Leeuwen, the frontal angle places a demand on the viewer that they enter into some form of relationship with the actors depicted in the image. The oblique angle, by contrast, merely offers the content of the image to the viewer as a neutral observer. The oblique angle, however, is not an entirely neutral point of view because spatial positions left and right carry symbolic associations. According to Kress and van Leeuwen, the left region of an image is associated with 'given' information while the right region is associated with 'new' information (following a systemic functional analysis of typical English clause structure where given information is presented sentence-initially in the Theme while new information follows in the Rheme). These different information values mean that objects located in the left region of an image are treated as part of common ground while objects located in the right region are subject to contestation. The validity of extending functional linguistic units to the analysis of images in this way has been questioned (Bateman, Delin and Henschel 2004; Stöckl 2004). Indeed, Kress and van Leeuwen (1998: 218) themselves concede that "the major challenge to our approach is the epistemological status of our claim … [H]ow can we know that left and right, and top and bottom, have the values we attribute to them, or more fundamentally, have any value at all? However, there is evidence to suggest that spatial values are associated with ideological values. This comes from two sources, both suggesting an embodied basis to the connection. In the first, lexical evidence points to conceptual metaphors, such as SOCIAL DISTANCE IS PHYSICAL DISTANCE or MORALITY IS UP/IMMORALITY IS DOWN, in which social and ideological domains are structured in terms of spatial schemas (Feng 2011; Feng and Espindola 2013; Hart 2014). Here, the inference is that if interpersonal or ideological 'positions' are conceptualised as positions in space, then via some process of metaphor feedback, positions in space connote interpersonal or ideological evaluations. These metaphors are ultimately grounded in situated experiences of affective states correlating with physical locations and relations in space (Grady 1997). The second line of evidence comes from experimental studies. For example, there is some empirical support for the kind of bidirectional metaphor transfer effect alluded to above whereby spatial configurations in real-world situation types are shown to influence social judgements in ways predicted by conceptual metaphors (Winter and Matlock 2013; Winter, Daguna and Matlock 2018). This reversed transfer effect is discussed in social psychology as part of what researchers refer to as 'metaphor-enriched social cognition' (Landau, Meier & Keefer, 2010). Specifically in relation to left and right, Casasanto (2009) has shown that for right-handers (who vastly outnumber left-handers) rightward space is associated with positive valence and leftward space is associated with more negative valence while the opposite is the case for left-handers. This pattern was observed for judgements across a range of character traits including goodness, intelligence, attractiveness and honesty. According to Casasanto, these body-specific associations emerge from the positive experiences we have in controlling and manipulating objects on the dominant side of our body. Casasanto and Jasmin (2010) have similarly shown that politicians tend to produce spontaneous co-speech gestures using their dominant hand

(usually the right hand) when communicating positive messages but their non-dominant hand when communicating more negative messages. Casasanto's findings run counter to Kress and van Leeuwen's analysis showing that, for most people, the positive versus negative value associations of left versus right are the other way around, with right having positive valence and left having negative valence, and rooted in embodied experience rather than cultural or linguistic conventions. All of these findings, however, point to a general mapping between spatial values and subjective evaluations.

This has implications for the ideological potentials of language (see Hart 2016a for extended discussion). Since there is no principled reason to suppose that spatial parameters should function differently across communicative modalities, then, if language is spatial, linguistic units may confer subtle ideological evaluations as a consequence of the spatial forms of representation they encode. In the case of transitive versus reciprocal verbs, any ideological effects arising from their use may, in part, be due to the contrasting viewpoints and relative image schema orientations that are constitutive of their meaning. Support for this claim would come from studies which show that the ideological effects of transitive versus reciprocal verbs in context are the same as for their visual analogues in the same context.

The ideological effects of transitive versus reciprocal verbs in media reports of political protests was investigated in an experiment which has previously been published (Hart 2016b) and is summarised here.

In Hart (2016b), participants read the lead paragraph of an online news article reporting violence at a recent protest in the fictitious city of Southfield. There were four conditions in a between subjects design. Each report contained two target descriptions of violent encounters between police and protesters. The independent variable was whether the violence was described using a transitive verb (with protesters as agent) or a reciprocal verb as well as voice and information sequence respectively. The texts were otherwise identical across conditions. The text is reproduced below, shown in the transitive active voice condition by way of example (emphasis added).

> A protest against local council policy turned violent yesterday in the city of Southfield. *Protesters attacked police officers* amid scenes of chaos outside City Hall. The protest later moved to the central square where *protesters continued to assault police officers*. Police officers used batons to control the crowds, which eventually dispersed around 9pm. 10 people received treatment for injuries

After reading the article, participants were asked where they would place the blame for the violence that occurred and how aggressive they thought the different actors involved were. The question of blame was answered on a 5-point Likert scale <protesters fully to blame – protesters mainly to blame – both parties equally to blame – police mainly to blame – police fully to blame>. Aggression of the actors was judged on a 7-point semantic differential scale <not at all aggressive – extremely aggressive>. Results showed a significant difference in how blame was apportioned that depended first and foremost on whether the violence was described using transitive or reciprocal verbs (χ^2=32.3911, p<.001). Participants given transitive verbs (with protesters as agent) were more likely to see the protesters as fully (22%) or mainly (54%) to blame and less likely to assign equal blame (18%). Conversely, participants given reciprocal verbs were much more likely to apportion equal blame (45%). Moreover, of those participants given reciprocal verbs who did assign blame to one party over the other, there was a fairly even distribution (protesters mainly to blame = 25%, police mainly to blame = 23%). Where blame was disproportionately assigned in response to reciprocal verbs, this depended on information sequence with participants in the protester-first version more

likely to assign blame to protesters (46%) than police (11%) and participants in the police-first version more likely to assign blame to the police (36%) than to protesters (11%) (χ^2=13.5761, *p*<.01).

For perceptions of aggression, police were ranked as more aggressive in response to reciprocal verbs (*M*=5.1), where they are agentive, than in response to transitive verbs where they are the patient (*M*=3.87) (*U*=1436, p<.001). Conversely, protesters are ranked as less aggressive in response to reciprocal verbs (*M*=4.66) than transitive verbs where they are the sole agent (*M*=5.4) (*U*=1893, p<.001). Within reciprocal verb constructions, perception of aggression depended on information sequence. Actors were judged as more aggressive when they occurred first in information sequence (*M*=5.125) than when they occurred second (*M*=4.63) (*U*=2.5949, p=<.01). Contrary to the hypothesis, however, within transitive verb constructions, voice had no significant effects on perception of aggression.

The results of this experiment show that the choice of transitive versus reciprocal verbs and information sequence within reciprocal verb constructions affect blame assignment and perception of aggression. The effects observed can be attributed to the alternative image schemas evoked by transitive versus reciprocal verbs (one-sided versus two-sided action schemas respectively). When there is only one agent, the agentive actor attracts blame and actors are perceived as more aggressive when they are encoded as agents than when they are encoded as patients. Similarly, within reciprocal verbs, the effects of information sequence may have to do with levels of agency ascribed to actors. Although, semantically, reciprocal verbs ascribe equal levels of agency to the actors involved, grammatically the subject nominal is closely associated with agenthood. The first agent in a reciprocal construction may therefore be judged as more agent-like. However, the effects found may also arise as a function of viewpoint and relative image schema orientation. The 'involved' perspective encoded by transitive verbs may encourage an action-based simulation in which the conceptualiser imagines themselves performing the action designated. Such an engaged perspective may then facilitate blame and aggression judgements based on a recognition of the subjective intentional and affective mental states that would accompany such an action. By contrast, the 'observer's' perspective encoded in reciprocal verbs may encourage a perception-based simulation in which the conceptualiser imagines themselves as a more neutral witness to the scene described. Within reciprocal verb constructions, the effects of information sequence may be due to the relative left-right orientation of the image schema invoked. The first agent may be judged as more aggressive because they occupy the left region of the schema and, as Casasanto (2009) has shown, leftward space is associated with negative character traits. Within transitive verb constructions, the fact that voice alternates had no similar ideological effects is consistent with results from Experiment 1 where voice was found not to encode contrasting image schema orientations on the sagittal axis. The extent to which the ideological functions of transitive versus reciprocal verbs and information sequence within reciprocal verb constructions are a consequence of image schema orientation, as well as differences in the internal structure of the image schemas invoked, remains an open question. However, evidence supporting the claim that image schema orientation is a semiotically consequential factor would come if congruent ideological effects are found for actual images where viewpoint or relative orientation is the only variable.

Experiment 2

If viewpoint and relative orientation is a functional semantic feature of the conceptualisation invoked by transitive versus reciprocal verbs, then we should expect to observe the same ideological effects arising from corresponding viewpoints presented by images in the same discursive context. In other words, if the ideological effects arising from viewpoint in actual images (within the same social context) are congruent, by the hypothesis, with the ideological effects of transitive versus reciprocal verb constructions, then this can be taken as further evidence that viewpoint is a semiotically significant feature of the conceptualisations invoked by these linguistic forms. Experiments 2a-b therefore investigated the ideological effects, in blame assignment and perception of aggression, of viewpoint and relative orientation in images of violent encounters between police and protesters. Experiment 2a investigated the effects of viewpoint on blame assignment while Experiment 2b investigated the effects of viewpoint on perception of aggression.

Methods

Participants. For Experiment 2a, 106 participants were recruited from the undergraduate student population at Lancaster University. For Experiment 2b, 115 participants were recruited via Amazon's Mechanical Turk (www.mturk.com) (Buhrmester, Kwang and Gosling 2011; Crump, McDonnel and Gureckis 2013; Mason and Suri 2012; Paolacci, Chandler and Ipeirotis 2010). Participation was restricted to users registered in the UK, the U.S., the Republic of Ireland, Canada and Australia. To ensure high quality participants only "Turkers" with a HIT Approval Rate of 98% or above were eligible. This rating indicates that participants had completed at least 98% of previous tasks satisfactorily. Participants in both experiments were native speakers of English (by self-report). This was important to avoid potential interference from language systems with difference writing directions.

Materials and Design. Experiment 2a was conducted online as part of a package of other unrelated experiments. Instructions informed participants that they would see an illustration of a violent encounter at a recent political protest and be asked a follow up question about the image. Participants were then presented with a single image of a violent encounter between a police officer and a protester. The experiment followed a between subjects design in which participants were auto-randomly assigned to one of four conditions presenting the image in contrasting orientations corresponding with the image-schema orientations in Experiment 1. In order to ensure that viewpoint was the only variable introduced, illustrations rather than photographs of real-life protests were used.[1] The stimulus images are shown in Figure 5. To measure blame allocation, participants were asked to indicate, on a 5-point Likert scale, where they would place the blame for the violence that occurred: <protesters fully to blame – protesters mainly to blame – both parties equally to blame – police mainly to blame – police fully to blame>.

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[1] It should be noted that one potential confound is the handedness of actors in the transversal images where one actor is left-handed and the other is right handed. However, maintaining consistency in handedness for actors in the image, as well as in the body poses assumed, would necessarily result in an obscuration of one or other of the actors' faces. And while it is possible that handedness may influence participant judgements, visible facial expression is much more likely to be a significant factor affecting social perception (Willis, Palermo and Burke 2011).
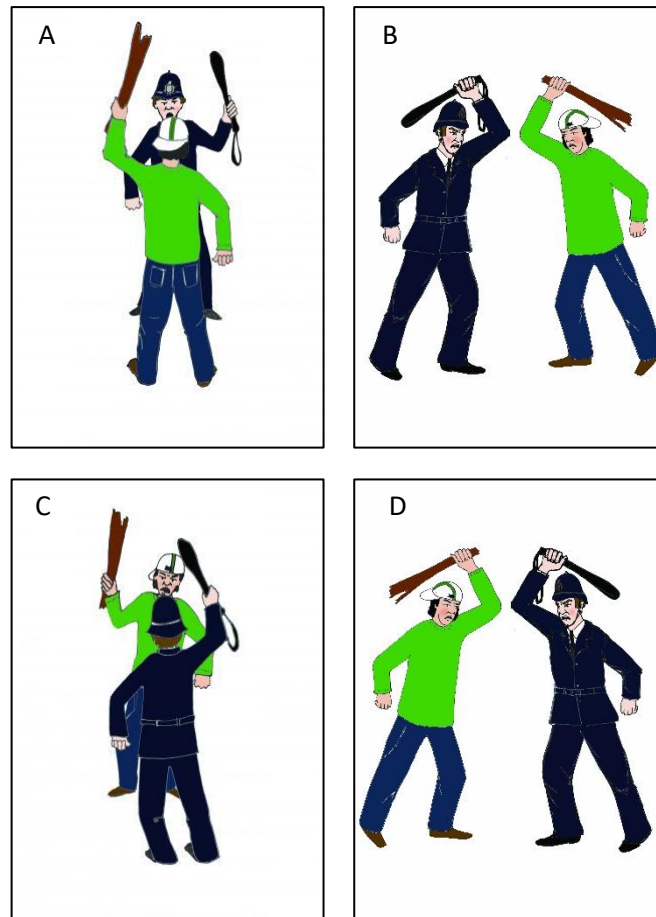
Figure 5. Stimulus Images used in Experiments 2a and 2b.

Experiment 2b was conducted online and followed a within subjects design. In Experiment 2b, participants saw pairs of images in six trials per pair. Images were paired by primary axis so that images A and C in Figure 5 were presented together as were images B and D. Paired images were presented simultaneously in each trial. Transversal images B and D were presented on the screen one above the other in order to avoid any interference from values associated with a left-right positioning of the images themselves. This was counter-balanced so that half of participants saw image B above image D and half saw image D above image B. Similarly, sagittal images A and C were shown side by side on the screen so as to avoid any interference from values associated with top and bottom regions of the screen. This was also counter-balanced between participants.

Participants were instructed that they would be shown a series of paired illustrations depicting violent encounters at a political protest and asked to make a judgement about the images. In each trial, participants were asked to give a judgement, based on six adjectives relating to aggression, indicating in which image the protester was most *aggressive / unfriendly / intimidating / frightening / threatening / hostile*. The protester rather than the police officer was chosen as the social actor whose status and legitimacy is typically at issue in media discourses of political protest. The 12 total trials were presented in random order to minimise any potential carry-over effects between conditions.

Transversal and sagittal conditions were analysed separately. For the transversal images, the binary choices made by participants were used to categorise them as either 'left=aggressive' or 'right=aggressive' coders. Participants were categorised as left=aggressive coders when the image selected in 4/6 or more trials showed the subject character on the left. Participants were categorised as right-aggressive coders when the image selected in 4/6 or more trials showed the subject character on the right. Participants who showed no directional preference, i.e. selected the image with the subject character on the left in 3/6 trials and on the right in 3/6 trials, were excluded from the analysis. The same method was employed for the sagittal images categorising participants as 'front=aggressive' and 'back=aggressive'.

Hypotheses. The primary hypothesis, tested in Experiment 2a, is that blame allocation will be a function of viewpoint such that blame will be assigned more evenly in transversal images than in sagittal images. The secondary hypothesis, tested in Experiment 2b, is that spatial values on the transversal and sagittal axes are differentially associated with aggression. For transversal images, it is hypothesised that spatial left is more strongly associated with aggression than spatial right. For sagittal images, it is hypothesised that the distal, ego-opposed position will be more strongly associated with aggression than the proximal, ego-aligned position.

Results and Discussion

Results from Experiment 2a confirm that viewpoint and relative orientation is a significant factor in blame allocation for images of violence at political protests. Participants presented with transversal images were much more likely to assign equal blame (61%) for the violence depicted than participants presented with sagittal images (25%) (χ^2=13.7414, p<.001). Results from Experiment 2a are shown in Figure 6. As discussed earlier, the transversal arrangement may encourage more equal blame assignment based on the typical 'twin-pan' concept of BALANCE which is conceived in terms of a transversal schema (Johnson 1987). The effect may also arise due to feedback from a general conceptual metaphor STANCE IS POSITION IN SPACE (Hart 2014). In the transversal images, the viewer's sagittal line intersects the midpoint between actors in the image. And, as evidenced by linguistic expressions such 'occupy the middle ground', this spatial position is associated with neutrality. Based on the same metaphor, we might then expect participants given sagittal images to assign blame differently depending on whose 'side' the image asks them to take. However, in all conditions, when blame was unequally assigned, it was most often assigned to the protester, regardless of position on the primary axis, suggesting an entrenched discourse of deviance in relation to political protest (Hall 1973). This points to the competing influences of conceptual metaphors and pre-existing beliefs and value positions in the social perception of images.

Results from Experiment 2b (see Figure 7) show that opposing viewpoints in both sagittal and transversal images does affect perception of aggression. For transversal images, 65% of non-neutral participants exhibited a tendency to code the subject character as more aggressive when they appeared in the left region of the image (6 participants were excluded as neutral, n=109). The result is significantly above chance (χ^2=4.8144, p<.05) and seems to confirm Casasanto's (2009) claim that for the majority of people spatial left is symbolically associated with negative valence (86% of participants were right-handed, identified by self-report).[2] For sagittal images, 83% of non-neutral participants exhibited a tendency to code the subject character as more aggressive in images where

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[2] Parametric tests with a dependant variable created from the number of left selections made by each participant also produce significant results when measured against chance (t=3.111149, p<.01).

they appeared as distal and ego-opposed (9 participants were excluded as neutral, n=106). This result is highly significant when measured against chance (χ^2=25.9415, *p*<.001) with the effect more pronounced than for left versus right positions in transversal images.[3] This shows that near and far positions in sagittal images are highly evaluatively laden with the distal position judged much more negatively. As suggested earlier, this may be a result of some general association between GOOD/BAD and PROXIMAL/DISTAL which is encoded across conceptual metaphors such as SOCIAL DISTANCE IS PHYSICAL DISTANCE, MORALITY IS DISTANCE and SIMILARITY IS DISTANCE (Chilton 2004; Winter and Matlock 2013; Winter, Daguna and Matlock in press). However, it is not only position but also orientation in space that is likely to account for the effect. In the sagittal images, the nearest actor is presented ego-aligned with the viewer. By contrast, the furthest actor is presented ego-opposed. And, as suggested in the etymology of words like *confrontation*, the ego-opposed orientation is associated with antagonism. Moreover, on a dynamic simulation account of how we understand images, whereby viewers 'complete' the scene depicted by a static image inside a mental situation model (Proverbio, Riva & Zani 2009; Winawer, Huk and Boroditsky 2008), the distal, ego-opposed actor may be perceived as more aggressive as they are imagined moving toward the viewer.
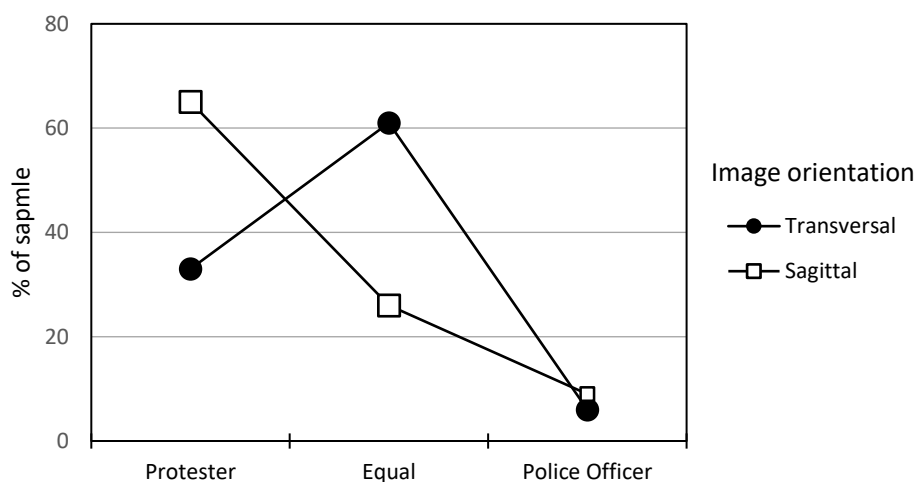

Figure 6. Blame allocation in transversal versus sagittal images.

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[3] Again, parametric tests with a dependent variable created from the number of back selections made by each participant also produce significant results when measured against chance (*t*=9.049638, *p*<.0001)
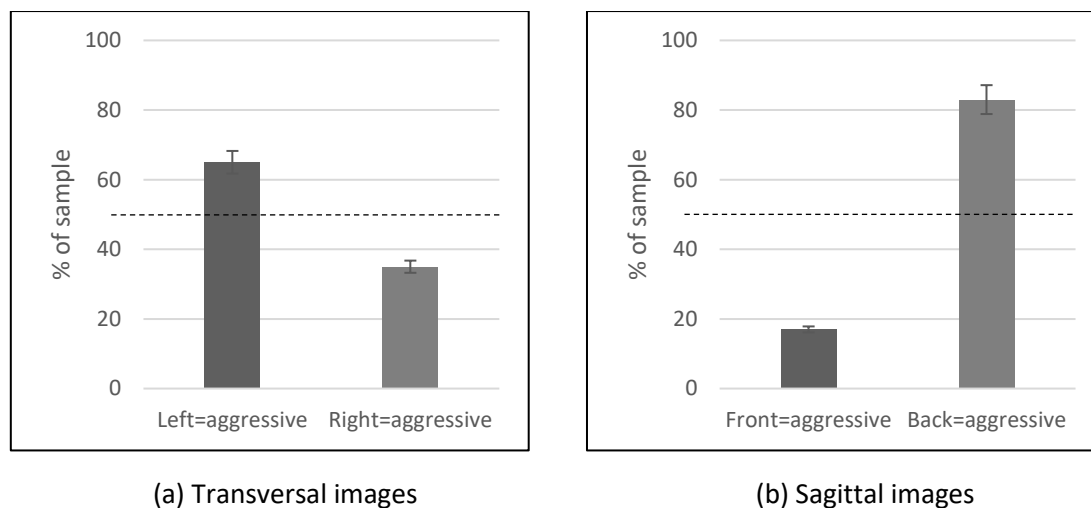
(a) Transversal images   (b) Sagittal images

Figure 7. Spatial discrimination in perception of aggression

General Discussion and Conclusion

In summary of this chapter, I have presented data from three experiments which, taken together, suggest that (i) transitive versus reciprocal verbs and differences in information sequence within reciprocal verb constructions include as part of their meaning a viewpoint specification and that (ii) the alternative viewpoints associated with these linguistic forms, when used in contexts of reporting violent interactions between police and protesters, may be responsible for ideological effects in blame assignment and perception of aggression. The three experiments, thus, provide convergent evidence for hypotheses made within cognitive linguistic approaches to critical discourse analysis (e.g. Hart 2015).

In Experiment 1, a sentence-image matching task showed an impressive degree of convergence among participants in selecting image schemas in different orientations as best representing the meaning of transitive versus reciprocal sentences. This consensus is taken as betraying common underlying representations constitutive of native speaker knowledge and thus offers further evidence that ostensibly non-spatial language usages include as part of their meaning a spatial component (Richardson et al. 2001). It could be argued, however, that the results reflect the limited, forced-choice nature of the task rather than a deeper level of commonality in participants' mental representations. It should also be noted that the task is a reflective one, based on metalinguistic intuitions, and therefore does not necessarily indicate that these spatialised forms of representation are activated in real-time language processing (see Richardson 2003). Future work might look to corroborate these results using a free-form task or paradigms explicitly intended to access online language processing such as the image-sentence compatibility effect (ICE) (Stanfield and Zwaan 2001; Winter and Bergen 2012; Zwaan, Stanfield and Yaxley 2002) or eye-tracking, where eye-movements have been found to 'follow' the spatial locations, orientations and directions implied in language usages (Matlock and Richardson 2004; Richardson, Dale and Spivey 2007; Spivey and Geng 2001; Spivey et al. 2000).

Further evidence to support the claim that viewpoint and relative orientation is a meaningful feature of the conceptualisations invoked by transitive versus reciprocal verb constructions, it was argued, would come from studies which show that the same ideological effects arise from language usages and images which are, by the hypothesis, congruent. This works on the assumption that, if

understanding language involves the activation of mental imagery, the mental imagery invoked by specific language usages will have similar framing effects to comparable concrete images (Hart 2017). This was tested across two experiments – Experiment 2 and a previously reported experiment (Hart 2016b). The results of these two experiments were indeed consistent with one another. Images of violent interactions between police and protesters where viewpoint was the only variable produced ideological effects in the same direction as their purported linguistic counterparts. The only exception was in relation to voice alternates in transitive verb constructions. While opposite viewpoints in sagittal images significantly affected the level of aggression ascribed to actors in the image, no equivalent effect was found for the active versus passive voice, which was originally hypothesised as involving a perspective-switch on the sagittal axis. However, the fact that the same effect is not reproduced across modalities here is in fact consistent with results from Experiment 1, which defeated this hypothesis and suggested that voice does not involve such a shift in viewpoint. We should therefore not expect to find equivalent effects in this case.

To conclude, at a more general level, the chapter has demonstrated at least one way in which cognitive linguistic analysis can be usefully extended to the realm of text and discourse where it can illuminate the ideological qualities of conceptualisations associated with attested language usages. Further, by exploiting experimental methodologies, as is consistent with the most recent developments in cognitive linguistics, I hope to have shown empirically the validity of such an approach to text and discourse analysis.

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