

Can pictures say no or not? Negation and denial in the visual mode[☆]



Eleonore Oversteegen^{*}, Joost Schilperoord¹

Tilburg University, Postbox 90153, 5000 LE Tilburg, The Netherlands

Received 26 September 2013; received in revised form 24 March 2014; accepted 30 March 2014

Abstract

In principle, verbal and image languages have different ways of coding conceptual content. Moreover, there is no reason to believe that both modes, the linguistic and the visual, can convey identical contents, and indeed, linguists have claimed that images are not suited for expressing the meaning of certain linguistic categories, like negation. As the linguistic literature argues convincingly, in natural language a distinction between negation and denial is justified. Employing insights in visual communication and cognition science, this paper explores the possibilities for visually expressing negation and/or denial. At the hand of both the analysis and an empirical pilot study of a set of advertisements, we come up with a positive answer to the title question: yes, pictures can say 'no'.

© 2014 Elsevier B.V. All rights reserved.

Keywords: Negation; Denial; NLsemantics; Images; Erasure; Experiment

1. Introduction

The topic of this paper can be phrased as: can you say *X is not Y* with a picture? Or can a picture say *not X*? If it comes to expressive potential, there is consensus in the linguistic literature: the visual mode is by far inferior to natural language. For example, the visual mode lacks the kind of expressive devices permitting type/token distinctions, such as modifiers and determiners; neither can it express causality, optatives, conditionals, or spatiotemporal references. On a more general level, the received view is that the visual mode lacks vocabulary and grammar, and therefore cannot express assertions, i.e. expressions that can be assigned a true value. The possibility of *negation* can be seen as a litmus test here: only if a certain modality is capable of expressing a true proposition *p*, is it capable of reversing its true value by expressing *not p*. A clear stance on the subject is taken by Worth in his illustrious statement 'Pictures can't say ain't' (Worth, 1981:162). In the same vein, Jackendoff (2007, 105ff) argues that only natural language allows one to attend to what is not, and to express the complex conceptual structures that negation supposes. More recently, Khemlani et al. state that 'Much of language cannot have a perceptual representation, such as a visual image, and negation is one of the most important of such concepts' (Khemlani et al., 2012:546). Case closed, so it would appear.

However, Giora et al. (2009, in this issue) take a different, less logocentric stance on the matter of pictorial negation. Addressing the question whether the visual modality is equipped with devices equivalent to lexical/morphological markers

[☆] The authors are grateful to Jung von Matt, Alster Werbeagentur GmbH, the International Service for Human Rights, Sony Benelux and Sony Europe Limited, Saatchi & Saatchi, the Love Marks Company, for granting permission to reproduce in our paper images of which they are copy rights holders.

^{*} Corresponding author. Tilburg University, Postbox 90153, 5000 LE Tilburg, The Netherlands. Tel.: +31 13 4662691.

E-mail address: E.Oversteegen@uvt.nl (E. Oversteegen).

¹ Tel.: +31 13 4669111.

such as *no*, *not* or *un-*, Giora et al. (2009) call attention to conventional visual markers like (red) crosses and stripes used, for example, in traffic signs and price tags announcing discounts. Such markers establish negation by being superimposed upon an image (or a word), their scope being determined by their size. In a message like ~~discrimination~~ the scope of the strikethrough is limited to *discrimi*, while the remaining *nation* suggests some opposite meaning that results from negating the first part: *no discrimination produces nation*. The authors conclude that those signs '(...)' allow a picture, taken as a whole, to visually say “no” (...)’ (Giora et al., 2009:2224).

Markers like stripes and crosses are decidedly non-verbal. At the same time, however, they are not an integral part of the semantics of the pictorial modality but instead constitute a separate, extra-diagetic coding system relative to the visual mode. The goal of this paper is to explore possibilities for visual negation. However, rather than focusing on the kind of extra-diagetic markers studied by Giora et al., we intend to explore visual forms of negation that *can* be considered integral to the visual mode. The question addressed here is whether it is possible for a still picture to attend viewers to what is not, using devices that belong to the system of visual signs and its principles of assemblage. By taking issue with these matters we strive to deepen our understanding of the structural factors and expressive potential of visual expressions – in short, our understanding of visual communication.

The paper is organized in five sections. Section 1 is logocentric: it discusses views on linguistic negation in order to identify some of its forms and prerequisites. The conclusion is that negation comes in different types, that it is sensitive to focus, and that it may apply to various parts and aspects of an utterance. Section 2 addresses in general terms some of the expressive problems that visual communication is faced with. Sections 3 and 4 present the main results of our study. In section 3, we isolate and exemplify two pictorial templates capable of putting a certain entity in the viewer’s focus of attention, and subsequently nullify that entity. Section 4 reports on an empirical study into the way ‘real’ viewers respond to images that instantiate the templates outlined in section 3. Section 5 concludes the paper.

2. Types of negation in natural language

In natural language semantics, a distinction is drawn between *negation* and *denial*. Awareness of this distinction may enhance our recognition of the kind of negation effects pictures might bring about. *Negation* is a sentential operator which changes the truth value of the sentence. Although negation markers such as ‘not’ or ‘no’ can occupy various positions in a sentence, at the level of formal representation the place of the negator is relatively fixed and allows only for minimal variation, such as scope variation with respect to other operators like quantifiers or modal operators.² In the examples (1), taken from Khemlani et al. (2012), (1a) exemplifies broad scope or sentential negation, whereas (1b) exemplifies narrow scope or VP- negation.

- (1) a. No artists are beekeepers
b. Some artists are not beekeepers

The *communis opinio* is, however, that the difference between sentential and VP negation can be neglected. Horn (2001) treats both cases as VP negation, while Giannakidou (2004) argues that the analysis of negation as a VP-operator is not at odds with the propositional analysis, but rather a variant of it (Giannakidou, 2004; see also Napoli, 2006:247).

Denial is a concept of Speech Act theory. Its function is to *object* to a previous utterance, that is, ‘(...) to remove previously introduced material from the common ground’ (van der Sandt, 1991:1). In order to appreciate the difference between negation and denial, compare the following examples.

- (2) a. S₁ Peter lost his wife. Mary is not happy.
b. S₁ Mary is happy
S₂ Mary is not happy

Sentence pair (2a) contains an example of *negation*. The two sentences enumerate (sad) situations, or together form an argument for introducing Peter and Mary to each other. In this case, stating that Mary is not happy is not meant to refute someone else’s claim to the contrary, i.e. that Mary is happy. The dialog in (2b) exemplifies *denial*. S₂’s contribution produces some inconsistency with regard to the assertion made by S₁, to the effect of removing its content (i.e. *Mary is happy*) from the common ground. In (2a), on the other hand, no such inconsistency is at stake. In other words, denials negate a certain utterance X that is part of the immediate discourse context by expressing *not* (X), whereas negations

² Cf. Moscati (2006): ‘The overt realization of sentential negation is subject to broad cross-linguistic variation, while the logical representation of the negative operator seems to be unaffected by those surface variations’ (abstract).

express a predicate (*not X*) without indicating that *X* is part of the context. Hence, a distinctive feature of denial appears to be the *supposition of the contrary* in the common ground. Denial is the kind of nullification that goes together with this supposition.³

Unlike negation, whose scope always concerns the entire utterance (or the VP) in which the overt marker appears, the scope of denial can vary. Denial may be *metalinguistic* (Horn, 1985), while other forms are *focus sensitive* (van der Auwera and de Vogelaer, 2005). Metalinguistic denial constitutes a ‘(. . .) device for objecting to a previous utterance on any ground whatever’ (Horn, 1985, 121). Apart from a previous utterance’s content (see 2b), such grounds may be incompleteness, wrong register, false implicatures, false presuppositions, and so forth. The expressions in (3), taken from Lee (2005), exemplify some possibilities of metalinguistic denial.

- (3) a. S₁ John stopped smoking
 S₂ John did not stop smoking; he never smoked
 b. S₁ Some men are chauvinists
 S₂ Some men aren’t chauvinists; all men are chauvinists
 c. S₁ Granny is feeling lousy
 S₂ Granny isn’t feeling lousy, Johnny, she is badly indisposed!

S₂’s utterance in (3a) denies the *presupposition* of S₁’s utterance. If John has quitted smoking, it is presupposed that he must have been a smoker, which is therefore part of the common ground. Only this part of the conceptual content of the utterance is actually denied; i.e. *John never smoked*. S₂’s utterance in (3b) denies the *implicature* of S₁’s assertion. If some men are chauvinist, there must be men who are not. If the implicature is considered part of the conceptual structure, then that part of the content is denied: all men are chauvinists. Finally, in example (3c) the denial does not affect the conceptual content of the proposition but only its *form*: Granny is feeling lousy. Apparently, S₂ opposes to using disrespectful language.

Focus sensitive denial is illustrated by examples (4a–d), where italics mark stress.

- (4) S₁ Mary introduced Bill to Sue
 S₂ a. *Mary* did not introduce Bill to Sue (but Jane did)
 b. Mary did not introduce *Bill* to Sue (but John was)
 c. Mary did not introduce Bill to *Sue* (but to Jill)
 d. Mary did not *introduce* Bill to Sue (she mentioned him to her)

S₂’s contributions a–d are genuine cases of denial in that all object to some claim to the contrary. However, in these cases, only the stressed part of each sentence is contrasted with S₁’s utterance; stress serving as an overt focus marker. In (4a), it concerns the agent *Mary*, whereas in (4b) and (4c) denial applies to the patient *Bill* or the beneficiary *Sue*. In 4(d), finally, the action of *introducing* is denied, but not the arguments involved. In fact, focus sensitive denial may apply to any constituent as long as it is somehow put in focus through stress or other types of marking like the (pseudo)cleft construction (cf. *It was not Bill whom Mary introduced to Sue*).

The effect of focus in cases like these is described in detail in Rooth (1985, 1992). In his view, focus has the effect of adding an additional semantic value to a sentence.

‘At an intuitive level, we think of the *focus semantic value* of a sentence as a set of alternatives from which the ordinary semantic value is drawn, or a set of propositions which potentially contrast with the ordinary semantic value’ (Rooth, 1992, 76).

The set of alternatives is comparable to an *equivalence class*. The focus semantic value thus resembles a Saussurian paradigm as the equivalence class indicates a set of alternatives, each of which may replace the actual expression. Hence, in (4c), the focus semantic value consists of some contextually given set of women which includes Sue. In (4)b, it consists of a set of males, including Bill, and in (4)d the focus semantic value consists of some alternative actions which Mary could have performed with respect to Bill and Sue, such as *mention*, *hand over*, and so on.

Although Rooth (1992) does not explicitly discuss the case of a negative modifier – he is concerned with adverbs such as *only* – the notion of focus semantic value does explain how the adverb *not* interacts with focus. For example, in (4b) *not* selects the only member of the set that the sentence actually expresses: *Bill*, which is the ‘ordinary’ semantic value. As a

³ A parallel distinction is the one between *retention* versus *suppression* of negated concepts (Giora et al., 2009). If *not X* is intended to negate *X*, the hearer should retain *X* together with the negation marker. Denial, on the other hand, intends the hearer to suppress the negated *X* by removing it from the common ground (and by substituting it by a contrastive concept *Y*). See also Verhagen (2005).

consequence, reference is established to a contextually evoked set of alternatives for the focused expression. In effect, focused denial creates a set and refers to the absence of some member from the set with respect to the proposition expressed.

The criterion which we phrased for denial – removing previously introduced material from the common ground – applies to all focused cases in (4). Each of the examples would be unacceptable were it not for the presence of a supposition in the context concerning the positive variant of the sentence. In these cases, however, only *part* of the entire utterance is objected to: the focused part. If an entire utterance is denied, as in (2b), it is hard to speak about focus or focus sensitivity. In the words of [Khemlani et al. \(2012\)](#): “Intonational focus in a denial acts as a way to associate the interpretation of the focused element of a sentence with negation, and almost always serves to reduce the scope of the negation” ([Khemlani et al., 2012:545](#)).

To conclude, four types of negation can be distinguished. First, in standard negation the negator has scope over either VP or S and reverses the truth value of the proposition. Second, in basic cases of denial, the negator also applies to the entire utterance, but additionally takes along the assumption that its contrary was uttered in the context. Third, in metalinguistic denial, the objection is expressed with respect to the assumed contrary on a wide choice of grounds other than the content. And fourth, in focus sensitive denial, an equivalence class is evoked, a set of alternatives for the referent of the expression denied. These linguistically motivated distinctions suggest a set of expressive requirements, or ‘building instructions’ for the mental representation, which are instrumental in bringing about negation or denial in any modality. An attempt to phrase these building instructions is presented as (5), (6) and (7). Instructions (5) and (6) define standard negation and denial respectively, while (7) defines focus sensitive denial.⁴ In (5) and (6), ‘p’ stands for proposition, and in (7), ‘x’ stands for *entity*.

Negation:

- (5) **If** the goal is to express ‘not p’
Then update the discourse model by introducing p
And update the discourse model adding a negator to p

Denial:

- (6) **If** the goal is to express ‘not p’
And p is part of the discourse model
Then update the discourse model by erasing p
- (7) **If** the goal is to express ‘not x’
And some focus set F: $x \in F$ is part of the discourse model
Then update the discourse model by erasing x

Note that the consequent instructions in (6) and (7) are stated in terms of *erasing* rather than *removing*, as in [van der Sandt \(1991\)](#). The concept of erasure was adopted from [Giora et al. \(2009\)](#) and is intended to express the fact that x does not completely disappear from the mental model. Or, in other words, x will be retained rather than suppressed (see for this processing distinction [Giora, 2003, 2007](#)).

The building instructions (5) to (7) allow us to specify the question this paper addresses as follows: what form can the building instructions (5–7) take on in the visual mode, either for negating or denying an assertive sentence as in (5) and (6) respectively, or for denying part of it, as in (7)? For that purpose, in section 2, we will first discuss the expressive potential of the visual mode in general.

3. Can pictures express assertions?

Negation and denial operate on (parts of) assertions. Consequently, the first question requiring an answer seems to be: can pictures express assertions? This section discusses some of the arguments put forth against or in support of a positive response.

The common view on the side of the antagonists is that, pictures cannot be true or false in themselves, since they are capable of presenting only (cf. [Gombrich, 1960](#); [Bennett, 1974](#); [Eco, 1976](#); [Jackendoff, 2007](#); [Kennedy, 2008](#); [Messaris, 2009](#)). If this is true, the search for negation or denial in pictures would be futile. If no truth value can be attributed to

⁴ Given the complex character of metalinguistic denial, pertaining to presuppositions, register, etc., we will for now ignore the possibility of visual expression of these delicate distinctions.

pictures, no truth value can be changed – ergo: there is no pictorial negation. If pictures cannot state that some assumption made previously does not hold, there is no pictorial denial.

The inability of pictures to make true or false statements has been argued on the grounds of *contextual incompleteness* (cf. Gombrich, 1960:58–59; Noth, 1996). Only in conjunction with a verbal message is it possible for a picture to make assertions. Hence, pictures may be *part* of true or false statements, but they cannot make them on their own. In the same vein, it has been argued that pictures can only function as *predicates* (Bennett, 1974:263), or as *arguments* of a proposition (Muckenhaupt, 1984:88), i.e. as part of a larger whole.

Other arguments against visual negation pertain to the non-existence of a *visual vocabulary* and *syntax*. Hence pictures do not allow semantic demarcation and decoding, both being necessary requirements to express propositions and to establish reference unambiguously (cf. among others Fleming, 1996; Johnson, 2003). Whereas natural language is a conventional sign system, where words can be coined for anything and everything we might wish, the visual mode, being iconic rather than arbitrary and conventional, has a less productive sign-meaning relation. For negation, there simply is no visual sign. Burke gives us an explanation for this omission: ‘there are no negatives in nature (i.e. the visible world, eo & js), where everything simply is what it is and as it is (...) for the negative is an idea; there can be no image of it’ (Burke, 1966 cited in Lake and Pickering, 1998:81). In accordance, Khemlani et al. (2012) claim that negation cannot have a perceptual representation – hence cannot be visualized. According to all scientists mentioned here, there cannot be a certain (part of an) image inherently expressing negation (or denial).

Arguments to the contrary, however, can also be found. Noth (1996) provides two arguments against the *contextual incompleteness* stance with respect to pictures. As one convincing counter example, Noth mentions *police photos* which are used to represent an actual state of affairs – and ‘(...) only because they assert [this state of affairs, eo & js] can they serve as legal or scientific documents of truth’ (Noth, 1996:12). In addition, he argues that the difference between verbal and pictorial messages is not one of completeness versus incompleteness since *both* types of message are in fact incomplete. In general, natural language expressions need contextualization as well to become assertions, so this is not typical of pictures: ‘The difference between verbal and pictorial assertions is that the contextual indicators of an assertion in the medium of language can be expressed in the same medium, while those of pictorial messages cannot’ (Noth, 1996:12). In this view, the way pictures may *function* in certain contexts is comparable to how natural language propositions may function in context, and as such they can be interpreted as assertions if they appear in a proper context (cf. Blair, 2012; Groarke, 2009). As a consequence, the non-existence of a visual sign for negation does not necessarily imply that there is no visualization; negation could simply be established in another way, for example by some operation that is uniquely visual.

Looking at the natural language building rules (5) to (7), the one for negation in (5) actually implies the addition of some negator. This marker being absent in the visual mode, we turn to (6) and (7), building rules for the representation of natural language denials. There, we find that the effect of denial consists in *erasing* a certain entity from the mental representation. However, in contrast to (6), the focus sensitive denial in (7) does not apply to an entire assertion and it brings along some contextually defined set. For these reasons, it seems sensible to start looking for a visual pendant of focus sensitive denial, obeying the building instruction in (7).

For visually expressing this type of denial, there seem to be two important general prerequisites. First, some encompassing whole *F* must be expressed in the picture. Secondly, some salient part *x* of *F* must be noticeably absent, but at the same time reconstructable. Translating into the visual domain, these prerequisites would be met by *erasing* a certain highly salient attribute or entity from a depicted object or *scene*. As we shall argue, there seems to be no reason along the lines of Gombrich (1960) or Burke (1966) to prohibit the possibility of an erasure operation in pictures, as long as it can be ‘observed’ somehow by the interpreter and as long as there is visual context. The next section demonstrates how visual denial may be effected by applying the graphic operation *erase x* on images.

4. Visual denial: the *erasure* operation

Current research on visual communication suggests that still images can convey complex conceptual structures like *categorization*, *analogy*, *causality* and even *temporal intervals* (cf. Forceville, 1997; McQuarrie and Mick, 1999; Maes and Schilperoord, 2008). In Schilperoord (2013) it is argued that such conceptual effects can be brought about by deliberate invocation of certain types of visual anomalies in otherwise ‘realistic’ dispositions of objects or scenes. Such anomalous depictments are called *visual incongruities*. Consider Fig. 1 – an advertisement for a brand of car tires.

Incongruity is created here by *inserting* an entity whose presence is highly improbable within the immediate visual context: drains are not part of country roads. Incongruities have the effect of attracting the viewer’s attention. However, in agreement with the maxim of relevance (Grice, 1975), the viewer will not dismiss such anomalous images as nonsensical. Instead, s/he will attempt to ‘solve’ the incongruity by producing some kind of interpretation for it. What all incongruities have in common is that the entity responsible for it makes up a crucial part of the interpretation. In Fig. 1, the interpretation would settle on some analogous structure: Kleber tires have the same effect on *sprayed roads* as a *drain* has (in a sink); i.e. effectively remove waste water.



Fig. 1. Insertion.

Four types of graphic operations to create visual anomalies have been discerned: *insertion*, *substitution*, *distortion* and *erasure* (cf. Schilperoord, 2013).⁵ Because building instruction (7) as defined for focused denial stipulates the main function of denial to be to *erase* previously introduced material from the common ground, the erasing operation seems a promising candidate for establishing visual denial.

This section isolates two general templates which may serve to visually express denial. The distinction adheres to the general distinction between *schematic* and *categorical* organization of information in cognitive theories of memory and information retrieval (cf. Hudson and Fivush, 1983; Mandler, 1978; Shen, 1999). While section 4.4 discusses the possibility of categorically organized images, sections 4.1–4.3 specify three types of schemas that may serve to provide the required context for some omitted part. These three kinds of schemas correspond to three basic units of human experience: *objects*, *scenes* and *events*. In order to investigate the use of instruction (7) for the visualizations of these units of experience, we need to slightly amend it. Objects, scenes and events are not commonly thought of as sets of entities. Usually, the relation between an object like a human face and its constituents: eyes, eyebrows, mouth, nose, hair, etc., is analyzed as a part-whole relation. This perspective can be argued in mereological terms. As stated in Varzi (1996) “As a formal theory, mereology is simply an attempt to set out the general principles underlying the relationships between a whole and its constituent parts, just like set theory is an attempt to set out the principles underlying the relationships between a class and its constituent members” (Varzi, 1996:260). Since, indeed, entities like eyes, mouth and nose are constituents rather than (similar) elements of a face; we will henceforth refer to F as a ‘whole’, which serves as a local context to detect some missing part X. Hence, building instruction (7) can be revised as (8), where “ \subseteq ” stands for the relation “inclusion” or “proper part of”.

- (8) **If** the goal is to express ‘not X’
And some whole W : $X \subseteq W$ is part of the discourse model
Then update the discourse model by erasing X

4.1. Schematically organized images: object-based denial

Consider Fig. 2. It shows an example of the rhetorical operation *erase* applied to an image depicting a certain *object*: Incongruity is established by the erasing of a mouth in the woman’s face. The accompanying caption reads: *Don’t be without a topic. Read books.* The advertisement aims at raising the audience’s awareness of the importance of literacy.

If Fig. 2 is approached as if resulting from building instruction (8), according to the second condition, there should be some whole W : $X \subseteq W$, a part of the discourse model, for (8) to be applicable. This condition is met if the face is interpreted as the whole W and the mouth as its proper part X . However, (8) does not suffice as a rule for denial. The girl in Fig. 2 does not wear glasses – does that mean that we might as well interpret the glasses as being visually negated? Without a context making glasses relevant, this is not the case. Consequently, for an object to function as W , it has to obey certain conditions. Firstly, the object in question must have identifiable parts. In addition, the absence of some identifiable part X

⁵ Schilperoord (2013) refers to the latter operation as ‘removal’. For reasons of terminological clarity, we use the term ‘erasure’ instead.



Fig. 2. Object-based denial.

will have to attract the attention of the viewer because this part is *expected* or, in other words, *predictable*. Therefore, an object image may be said to fit (8) as W if (at least some of) its parts are predictable.

To determine in what case parts are predictable from wholes, we turn to the field of visual recognition. In this field, the concept of *diagnosticity* had been coined to single out the kind of attributes that are crucial for recognizing a certain object (see Skowronski and Carlston, 1986; Deane, 1992; Oliva and Schijns, 1997). In general, an entity X is considered a *part* of some object O if X is an attribute of O, but not (necessarily) predictable by means of O. On the other hand, X is considered a *diagnostic part* if its presence is actually predicted by O. Consequently, if X is a diagnostic part of O, X will be experienced as *missing* if it is omitted in a visual representation of O (provided a suitable viewing point is offered). The representation of a human, mouthless face in Fig. 2 meets the criterion: X, the mouth, is predictable from W, the face, whereas a pair of glasses would not be.

Consequently, to produce object-based pictorial denial, (8) is specified as (9), where O means Object and “ \subseteq_p ” stands for “predictable proper part of”.⁶

- (9) **If** the goal is to express ‘no/not X’
And some Object: $X \subseteq_p O$ is part of the discourse model
Then update the discourse model by erasing X

Is Fig. 2 actually intended to express denial? In other words, the conditions in the second and third lines of (9) are realized by Fig. 2 – but is the first as well? Is there reason to qualify the figure as an intended visual denial? There certainly is: if we do not interpret the figure as expressing “this girl has no mouth”, there is no way to obtain the intended, metaphorically derived interpretation: “this girl has nothing to say” – or as the caption puts it: “(this girl is) without a topic”.⁷ Consequently, the denial is a prerequisite for the interpretation of the advertisement as a whole. In this case, as in the examples discussed in following sections, a viewer will interpret the image as expressing denial, but s/he will only be able to *explain* the function of the denied entity in terms of the message as a whole. We conclude by phrasing the expectation that subjects confronted with an image like Fig. 2 will interpret it in terms of denial.⁸

⁶ The second and third conditions in (9) presuppose that a mental representation of some object O contains its predictable parts (cf. Deane, 1992).

⁷ The image in Fig. 2 could just as well serve a campaign to promote freedom of speech or democratic elections. In such cases, the image serves as an argument.

⁸ In our opinion, this interpretation is not *lead* by the caption but is evoked *independently*. In section 4, evidence for this claim will be provided.



Fig. 3. Scene-based denial.

4.2. Schematically organized images: scene-based denial

A second type of schema-based visual denial operates on knowledge of *natural scenes*. Scene recognition is one of the main concerns of theories of visual perception. Henderson and Ferreira (2004) offer the following definition.

[A natural scene is] a semantically coherent (and often nameable) human-scaled view of a real-world environment comprising background elements and multiple discrete objects arranged in a spatially licensed manner' (Henderson and Ferreira, 2004:5)

Biederman (1982) has submitted a model that accounts for scene coherency in terms of (only) five types of relations between an overall scene on the one hand – i.e. the whole – and its attributes and characteristics on the other – the parts. These relations involve *support*; most objects cannot float, or *place*; certain objects often occupy predictable locations within a scene. Another relation distinguished by Biederman, *probability*, refers to the (un)likeliness that a certain object is part of a certain scene, and can thus be considered the scenic counterpart of diagnostic object attributes. This relation is especially relevant for our purposes: whereas the operation of *insertion* has the effect of placing an object in attentional focus because of its *low* probability (see the drain in the country road, Fig. 1), *erasure* operates in the opposite direction: the erased object is rendered salient due to its *highly probable* presence. Consider Fig. 3, showing an ad claiming that no water is needed if one uses the recommended rinse free hand cleansing gel.

The picture expresses this message by having the highly probable faucet removed from the wash bowl. The general format of scene-based pictorial denial can be phrased as (10), where S stands for scene, and $X \subseteq_p S$ indicates that X constitutes a predictable part of S. Although probability may be slightly weaker than predictability, 'highly probable' becomes predictable.

- (10) **If** the goal is to express 'no/not X'
And some scene S: $X \subseteq_p S$ is part of the discourse model
Then update the discourse model by erasing X

4.3. Schematically organized images: event-based denial

Event-based denial operates on knowledge of events. Unlike objects and scenes, events are *dynamic* by nature, which entails that perceiving a certain action allows viewers to construct event structure specifying a causal-temporal sequence of actions – the whole – of which the perceived action is a part. *Event schemas* can be specified as complex representations that capture actors (who are involved in the event?); objects (what kinds of objects are used?); causal and hierarchical relations among sub events (what is done to what end?); temporal sequences (what stages can be discerned, what comes before what?); and spatiotemporal aspects (where does the event usually take place, how much time will it take? – see for example Zacks and Tversky, 2001; Kurby and Zacks, 2008; Radvansky and Zacks, 2011). A picture may show no more than a slice of an event but due to the evoked event schema, the viewer is capable of inferring a whole

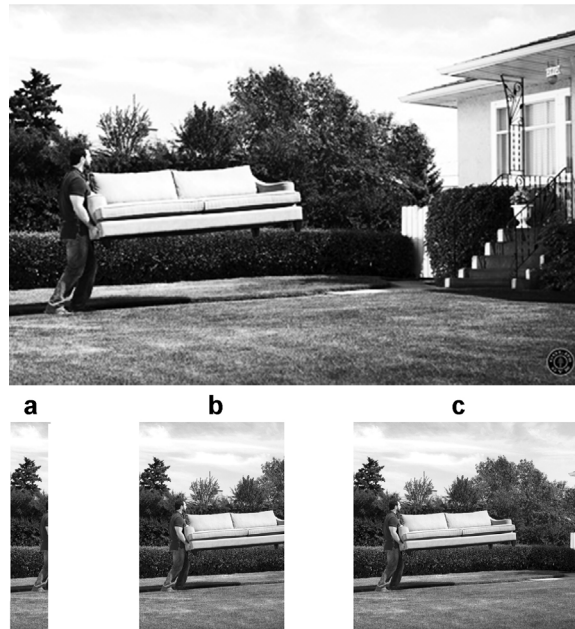


Fig. 4. Event-based denial. (a–c) Event-based predictions.

sequence of actions, actors, and their conceptual and temporal relations. Fig. 4 presents an ad for a Gym school. The claimed muscular strength one gains by visiting the gym is illustrated by a man carrying a couch on his own.

According to Zacks and colleagues, the dynamics of event knowledge can be captured in terms of our ability to *predict* both upcoming events, and the presence of actors and objects from the perceptual cues as provided. Imagine the picture in (4) shown to a viewer, while being covered by a sheet that is moved slowly to the right (see Fig. 4a–c).

Initially, scenic knowledge of a suburban garden will be activated (4a). Subsequently, however, the perception of a man carrying a couch urges the viewer to activate schematic knowledge of the event of ‘carrying a couch’ (4b), which renders the presence of a second actor carrying the other side of the couch highly predictable. Predictions that are not borne out (there is *no* second actor) cause the cognitive system to monitor an event-based incongruity (4c). Rather than adjusting the schema (‘apparently it’s possible that one person carries such a couch’), the viewer will decide that something is ostensibly absent – or: omitted. Consequently, presented with Fig. 4c, the viewer will start out by registering *no* second man.

The intended meaning of the picture in (4c) will remain obscure. Only if the viewer is confronted with the entire ad (4c), including the brand mark, the meaning of the absent second man may become clear: he is not required for carrying the couch, since the man that is pictured has grown muscles in the Gym.

Like scene-based denial, event-based denial can be brought about by omitting an actor or object whose presence is highly predictable on the basis of the activated event schema. The general building instructions for event based visual denial can be phrased as (11), where E stands for event.

- (11) **If** the goal is to express ‘no/not X’
And some scheme event E: $X \subseteq_p E$ is part of the discourse model
Then erase X from the discourse model

Summarizing, visual incongruities experienced as omissions, can be envisaged as being created by *erasing some part x* from a picture of an object, a scene or an event. The x is rendered salient if it constitutes a predictable part of an object-schema, a scene-schema or an event-schema. These omissions invoke building instruction (9) to (11), containing an instruction to erase something, and hence they are supposed to bring about denial.

4.4. Categorically organized images: juxtaposition as a basis for denial

Another potential application of *erasure* resulting in a noticeably absent, or omitted item comes closer to the original rule (7), as it seems to involve a true focus set F. This application is exemplified in Fig. 5 which shows an advertisement that was published shortly before the 2008 Olympic Games in China in order to raise awareness of the violation of human rights of the hosting country.



Fig. 5. Unfortunately China does not copy everything.

The upper row depicts a couple of typical Western consumer products, each of which forms a column with a Chinese copy of it, except for the right most item. This item is therefore experienced as missing: there is *no* copy of the manifest of human rights.⁹ The intended interpretation hence involves denial. In this section we argue that this template for visual denial comes close to Rooth's notion of *focus semantic value*. The building instruction for this type of visual denial is the unadjusted version of (7), repeated here as (12).

- (12) **If** the goal is to express 'not x'
And some focus set F : $x \in F$ is part of the discourse model
Then update the discourse model by erasing x

To substantiate the claim that Fig. 5 instantiates (12), we first focus on the focus set F , and, secondly, on the way in which the awareness of a removed item is brought about in this case.

The pictorial design template employed in Fig. 5 is referred to as *symmetric object alignment* (see Schilperoord et al., 2009; Teng and Sun, 2002). The template employs object *juxtaposition*, i.e., the detachment of a set of objects from their familiar environment and by showing them side by side, within a single, mostly neutral pictorial plane. Alignment can be created by employing the objects' size or shape, the spatial orientation of depicting them, equal distances toward each other, projection along an axis and the like. In Fig. 5, alignment is perceptually created by showing the objects as similarly sized, depicting them at equal distances, and by using similar colors (red, silver). Despite their obvious differences the perceptual cues provided by the visual template suggests some kind of object similarity- based on the primary incentive *closeness is similarity* (cf. the *clumpiness* principle, Casasanto, 2009). This, in turn, might encourage viewers to conceptually *group* the objects for example by creating the *ad hoc* category *products of a civilized culture* (cf. Barsalou, 1983; van Weelden et al., 2011, 2012). This then might explain the way object alignment in Fig. 5 manages to evoke a set F .

In Fig. 5, grouping functions both horizontally and vertically. The upper row in the image horizontally evokes the (*ad hoc*) equivalence class *products of a civilized culture*. The vertical columns represent a second equivalence class, of almost identical items: the products as copied by China. As a consequence, the empty slot in the rightmost position is not 'just empty': the booklet is *in focus* and noticeably absent from the lower equivalent class, where it is experienced as being *omitted*. In sum, the alignment template suggests the omitted entity to be an element of an equivalence class – and at the same time *denies* its existence as far as China is concerned. The focus semantic value in this case consists of the contextually given set of commodities including a human rights document.¹⁰

4.5. Summary

We have explored some possibilities of visual denial starting from the third 'building instruction' for focus sensitive linguistic negation. Linguistic negation markers like *no* or *not* can be interpreted as instructions for erasing from the discourse model an entity x being part of an equivalence class F . Two general visual templates which seem to qualify as

⁹ This interpretation is further substantiated by the caption: 'China doesn't copy everything'.

¹⁰ Obviously, human rights are not commodities, or an industrial product. But at the appropriate level of abstraction, the analogy becomes clear: just like cars, lawn mowers and the like, human rights are a 'product' of any civilized culture.

visual pendants of the linguistic case have been identified: schema-based denial, brought about by omitting objects that are expected to be present as parts of a whole (an object, a scene or an event), and categorical denial, brought about by omitting an element of an equivalence class, established by juxtaposition. Next, we turn to empirical matters.

5. Empirical study

5.1. Introduction

The aim of the experiment this section reports on is to provide a first and informal test for the hypothesis that the operation *erasure* applied to images like the ones in Figs. 2–5 produces a negation interpretation as discussed in the former sections. The materials used to analyze pictorial negation come from a large corpus of pictures from advertising messages. Such images often serve to express complex messages that viewers have to interpret rather than recognize. Designers of those images operate at the forefront of exploring the possibilities of visual communication. However, our claims probe further and are not limited to this particular genre of visual communication. They extend to other visual genres like cartooning, comics, visual arts, film or instruction.

Three questions were addressed in the experiment:

- (i) are the images resulting from *erasure* interpreted in terms of negation?
- (ii) does pragmatic context affect the interpretation?
- (iii) does the operation *substitution* have a similar effect on interpretation?

In this paper, we focus on the first two questions. To get some preliminary answers, we showed subjects several of the kind of images discussed in the former sections, and asked them to interpret the images while *thinking out loud* (cf. Ericson and Simon, 1984). The data obtained in a thinking-out-loud experiment require systematic interpretation, which must proceed according to a pre-established protocol (see section 4.2). By consequence, the resulting data provide a first validation of predicted mental operations and their outcomes – but they do not allow to formally *test* hypotheses. To that end, the results can be used to set up systematic experiments.

The images that were used either did or did not contain signs of their pragmatic function, i.e. expressing some advertising claim. In fact, half of the participants were denied the knowledge that the images were part of advertising messages by removing all signs of communicative intention or sender (text captions, brand names and so on). The other half saw the original Images – i.e. as part of a certain advertisement. As a consequence of our analyses in section 3, we predicted that *all* subjects would interpret the incongruities in terms of negation, and, moreover, that only the second group of subjects would be able to *explain* how the negation functioned within the overall message. In what follows, the images-as-images will be called ‘non ad-versions’, while the images-as-advertisement will be called ‘ad-versions’.

5.2. Method

The data sampling method employed is known as *thinking-out-loud* (Ericson and Simon, 1984). The method requires subjects to verbalize, as spontaneously as possible, every thought that pops up in their minds while performing on some cognitively demanding task, such as interpreting a certain image. The reports provided are transcribed, resulting in *protocols* which are believed to reflect relevant traces of the on line mental processes of people while performing on the task at hand (cf. Ericson and Simon, 1984).

Subjects ($n = 24$, mean age 22.2, 7 males) were recruited from the student subject pool of the Tilburg Institute for Communication and Cognition. They received study points as credit.

Materials. Each subject saw nine images: six of these containing schematically organized omissions and three categorically organized omissions.¹¹ They were all like the originals, but shown either without (non-ad-versions) or with (ad-versions) verbal captions or brand names. One of these was the Gym ad (Fig. 4). The variants used in the experiment are shown in Fig. 6a and b.

Procedure. Each subject was tested individually in a quiet room, and in the company of one experimenter. Prior to testing, subjects were informed that they were going to see a set of pictures that they had to interpret. To familiarize them with visual incongruities, they were shown an example of a visual incongruity *not based* on the erasure operation. After

¹¹ The latter three images were meant to address research question (iii) above, and were shown either in the original version (for example the China ad in Fig. 5) or in a fabricated version containing a substituting entity: instead of an empty box, the image showed a gallows. Results of protocols induced by these images will not be discussed in this paper.



Fig. 6. (a) Without brand name, and (b) with brand name.

that, they received the instruction (in Dutch): ‘*In a moment, you will be shown several pictures like the example you just saw. Explain what you see in that picture and describe what, in your opinion, this picture is trying to tell you. What does it mean?*’ In addition, the instruction urged the subjects to verbalize every thought they had while trying to make sense of the images. Next, they were briefly trained in the thinking-out-loud technique, using the so-called ‘Tower-of-Hanoi’ problem (see Anderson, 1983).¹² After this training session, the experiment started. The test images were presented to the subjects for as long as they wanted, using a power point presentation and a normal computer screen. During the entire sessions, recordings were made of their thought processes. The experimenter’s only role was to encourage subjects to keep on talking while processing the pictures.¹³ The recordings were later transcribed verbatim and subjected to further analysis.

5.3. Data analysis

The recordings were analyzed according to the following analytical protocol. First, they were segmented into simple clauses, considered to be the grammatical and pragmatic concordance of a single unit of thought (cf. Schilperoord and Verhagen, 1998). The clauses were further grouped into clusters reflecting the following interpretation stages:

- (13)
- i. registering (describing the image)
 - ii. diagnosing (describing the incongruity)
 - iii. integrating (making sense of the image and the incongruity)

Subsequently, all segments were coded for the presence of (Dutch) negation markers, such as the lexical markers ‘geen’ (*no*), ‘niet’ (*not*), and the morphological marker ‘on-’ (*un-*). In addition, segments were coded for the presence of verbs indicating absence, such as ‘ontbreken’ (*lack*), ‘missen’ (*miss*) or ‘verwijderen’ (*remove, erase*).

5.4. Results

The results will be discussed with reference to of the Gym advertisement (see Fig. 6a for the non-ad version and Fig. 6b for the ad-version).

5.4.1. Non ad-version

Consider protocol (14). The first column contains line numbers, the second one stage coding, the third one the presence (1) or absence (0) of linguistic negation markers, and the fourth one the protocol segments. Negation markers (and other clues that we consider relevant) are bold faced.

(14)

1	i	0	I see someone carrying a couch into the house
2	ii	0	But he is carrying it by himself
3	ii	0	On the other side there ought to be another person

¹² Detailed descriptions of this procedure and justification of its various stages (instruction, practice) are provided in van Someren et al. (1994).

¹³ See van den Bergh and Kuypers (2010), who collected the data.

4	ii	1	But he is not there
5	iii	0	There is no product name or something
6	iii	0	So I don't know what this is about
7	iii	0	Perhaps it is about the couch
8	iii	0	Because you see it in the center
9	iii	0	Or about movers who are so good that they do the job alone

In the first four lines, protocol (14) represents the stages (i) and (ii), of describing both the image and the incongruity, i.e. the missing person, using a negation marker (line 4). The lines 5 to 9 convey the subjects inability to arrive at a coherent interpretation. Protocol (15) has a pattern similar to the one in (14).

(15)	1	i	0	A bungalow
	2	i	0	A house with a mover who is carrying a couch inside
	3	ii	1	But he is carrying it on his own
	4	ii	1	And the second man is missing
	5	iii	0	It's probably an ad for manpower
	6	iii	0	The brand... I wouldn't know it
	7	i	0	That man just carries the couch on his own
	8	i	0	That man lifts the couch on his own
	9	ii	1	And it looks like the second person has been removed

Apart from a marker of absence ('missing'), the protocol contains an alternative clue indicating that the participant is monitoring the anomalous absence of the second actor. In line 4, he refers to the absent person, using the definite determiner 'de' (*the*). A second example occurs in line 9. Definite determiners are considered markers of *high accessibility* of the intended referent (cf. Ariel, 1988). In a given stretch of discourse, the use of a definite determiner usually accompanies a second or third reference to the entity denoted by the noun. Because line 4 marks a *first* reference to the 'missing' actor, the use of the definite determiner seems to signal a crucial property of denial: its *focus-sensitivity*.

Sometimes, subjects even use *pronouns* to refer to the missing second actor without having introduced them prior to this reference. See protocol (16), line 6.

(16)	1	i	0	He walks along the garden path
	2	i	0	And he carries a huge couch
	3	ii	1	... which normally he cannot carry on his own
	4	ii	1	Well, that's not going to happen
	5	ii	0	He probably needs assistance
	6	ii	1	But he is not there

Note that the pronoun in lines 1, 2, and 5 refers to the person that can actually be seen, whereas the pronoun in line 6 refers to the 'absent' person – i.e. the omission. Despite the inherently ambiguous nature of pronouns, this participant refers to a distinct actor using the same pronoun as he does in lines 1 to 3. Again, this testifies to the highly salient cognitive status of the referred entities. The high accessibility of the referent may also be inferred from the use of the ordinal numeral

'tweede' (*the second man*) in combination with the definite determiner: see protocol (15), line 4. If the event schema of carrying indeed allows for the prediction of two actors, the ordinal numeral once again signals the saliency of that concept. The fact that subjects notice that the second actor is *removed* from the scene rather than just being absent, is furthermore suggested, in protocols not cited here, by the use of verbs like 'to leave out', 'erased', 'to "out-Photoshop"' and so on.

In the non-ad condition, no participant can make sense of the incongruity (c.f. (13) stage (iii)), just as predicted. In the protocols (14), (15), and (16), there is evidence of the participants' inability to explain *why* there is no 'second man'. In protocol (14) line 5, and in protocol (15), line 6, the absence of a brand name is mentioned, as well as the consequential problem with explaining the anomaly. Other ways of marking the failure to understand the images are 'I don't know'; 'I have no idea what this image is about' and so on. Note that all markers signaling the inability to explain (stage (iii) in (13)) were produced *after* monitoring the absence of a second person (stage (ii) in (13)).

Some participants made attempts to resolve the incongruity that they noticed by expressing certain expectations with regard to the couch, rather than to the second actor missing. Again, negation markers are used to arrive at such a resolution (see 17).

(17)	1	i	0	Yes, I see a house and a lawn
	2	i	0	A man carrying a couch on one side
	3	iii	1	Well I guess that couch is not that heavy
	4	iii	1	Otherwise he would not be able to carry it by himself

Similar patterns were found for different ads.

5.4.2. Ad-version

Results from the *ad-version* further testify to the claim argued in this paper: *all* subjects would interpret the incongruities in terms of negation, but only subjects in the ad condition are able to *explain* how the negation functions within the overall message. Consider the protocol in (18).

(18)	1	li	1	Someone is lacking
	2	i	0	I see someone carrying a couch
	3	ii	1	But one person is not there
	4	ii	0	Gold Gym It's a Gym
	5	iii	0	And that man is a member of that gym
	6	iii	0	And he is so strong that he can carry that couch on his own
	7	iii	1	He is so strong that the second person is no longer needed

In this recording, negation occurs as early as in line 1 and is repeated in line 3, whereas the brand is not referred to before line 4. As soon as the brand name is registered, the subject is able to start interpreting the advertisement (lines 5, 6 and 7). This pattern, regularly occurring in the protocols resulting from the ad version, suggests the predicted processing sequence in (13): (i) monitoring the anomaly; (ii) interpreting it in terms of negation; and (iii) marking the inability to explain the negation (non-ad condition) *or* integrating the negated entity within the overall message (ad condition). Evidently, this sequence requires further research.

6. Conclusion

The outcomes of this study suggest that visual incongruities based on *remove* evoke the kind of processing reflected by the building instruction (8). Most participants interpreted the images as intending to communicate the absence of some salient entity (clauses 1 and 2 in 8) and they regularly reflected being aware of the omission (clause 3). In the non-ad condition, the majority of the subjects (for each ad, 10 to 11 out of 12) did interpret the image as negating some entity; they

used overt negation markers to reflect this interpretation. However, they were not able to solve the incongruity. On the other hand, subjects processing the ad-versions were actually able to explain the negated element in terms of the advertisement's claim. Still, the group of subjects allowed to see the brand name always started with *describing* and *diagnosing* the image itself, using negation just like the subjects in the non-ad condition did.

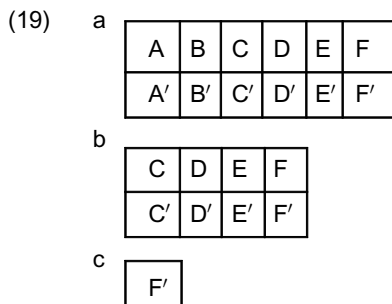
7. Discussion

We confined ourselves to the visual pendant of focus sensitive, narrow scope denial, as captured by building instruction (7). Is it possible to set the pictures discussed in the paper apart from 'pure' cases of negation (see the examples in 1)? The distinctive feature of denial was described in section 1 as: the supposition of the contrary of what is denied in common ground. The linguistic cases (2b) and (4) necessitate some previous utterance of the supposition to the contrary. It is, for example, communicatively awkward to say 'Mary did not introduce Bill to Sue (but Jane did)' if no speaker has made the claim that Mary did. If we were to apply this requirement to visual expressions, visual denials would not be possible. Even if we consider sequential visual language (comics) with an image depicting an entity *x* and a second one in which *x* is missing, viewers would not interpret the second image as denying the first one. A more likely reading would be 'x has gone' or 'x has been removed'. In other words, such pairs of images do not produce incompatible 'statements'. However, if we replace the 'supposition of the contrary' by the supposition that an absent entity *X* is a predictable part of some whole *Y*, and, consequently, that *X* is expected to be present whenever *Y* is, then all advertisements discussed in the paper are cases of visual denial.

On the other hand, the fact that there is no previous assertion in the visual mode can be taken to indicate that our cases of 'pictures saying no' are visual instances of negation. The observation that a negation invokes its positive pendant has been made for the linguistic mode as well, witness the polyphony approach developed by Oswald Ducrot and Jean-Claude Anscombe. In sum, we can see no ground for deciding whether the cases discussed in this paper should be considered visual negation or visual denial.

Contrary to Worth's lament, the answer to the question can pictures say "no"? seems to be 'Yes, in specific circumstances pictures can say "no"'. The present paper has presented two types of pictorial assemblage capable of expressing negation/denial: *schematically organized images* and *categorically organized images*. We argued that the presence of a certain entity can be visually denied by applying the operation *erase*. A crucial prerequisite is that the image must allow viewers to notice an omission. Once this condition is met, the templates actually instantiate the building instructions in (7) and (8).

Generalizing, we can conclude that the essence of visual negation/denial resides, somewhat paradoxically, in rendering an object or attribute highly salient by *not* showing it. That is, to 'mention' it without mentioning it. Apparently, Khemlani *et al.* were slightly too pessimistic when stating that negation "(...) cannot have a perceptual representation, such as a visual image (...)" (Khemlani *et al.*, 2012:546). The fact that negation *can* be perceptually represented (i.e. as an image) could be further substantiated if we would be able to demonstrate that Khemlani *et al.*'s definition of negation applies equally to cases of visual negation distinguished in this paper. Their definition takes negation to constitute a '(...) function that takes a single argument, determined by scope, which refers to a set of models. The core meaning of negation is a function that returns the complement of the set.' (Khemlani *et al.*, 2012:545).¹⁴ The argument taken by a sentential negation function is, obviously, the non-negated sentence, and the models referred to are those in which the non-negated sentence holds. Applying this definition of negation to the China advertisement in Fig. 5, the argument of the negation function would be the set of models containing the relevant entity *F'*. *F'* holds in models like the one containing: A, B, C, D, E, F, A', B', C', D', E', F', as pictured in (19a), but also in models like (19b) and (c), where A, B and A', B', etc. represent the depicted objects.



¹⁴ The negated expression can be of several types, witness a different formulation of the definition: "the core meaning of negation refers to the complement of the set to which the non-negated sentence, clause or constituent refers" (Khemlani *et al.*, 2012:551).



Fig. 7. Noise canceling headphones.

The set of models resulting from the negation function forms the complement of this set of models. Each of these models may contain any of the items except, of course, F' . One of these models would in fact be (20).

(20)

A	B	C	D	E	F
A'	B'	C'	D'	E'	

Since (20) is a schematized version of the actual advertising image, the conclusion has to be that it is part of the set of models resulting from the negation function and so the image should, according to Khemlani et al.'s definition, be interpreted as negation. And because no language is used here, but only visual entities, it should be interpreted as *visual* negation.

There remains the question concerning *scope*: is the visual mode suitable for small scope negation only? Consider the quite intriguing image in Fig. 7.

Whereas all earlier examples could be analyzed as instantiating the building instructions for focus sensitive denial, and all concerned an entity that was part of a certain object, scene or event, this image seems to deny a full-fledged event structure [PLAY [BRASS BAND, IN STREET]]. It does so by indexical means: shadows are the effects caused by entities. We conclude by noting that much remains to be discovered about limitations and possibilities of the visual mode. In addition, we hope to have demonstrated the fruitfulness of such research being guided by linguistic theories of meaning. Not because the visual and the verbal modes are identical – but because they have a fascinating thing in common: expressive creativity.

References

- Anderson, John R., 1983. *The Architecture of Cognition*. MIT Press.
- Ariel, Myra, 1988. Referring and accessibility. *J. Linguist.* 24 (1), 65–87.
- Barsalou, Lawrence W., 1983. Ad hoc categories. *Mem. Cogn.* 11 (3), 211–227.
- Bennett, John G., 1974. Depiction and convention. *Monist* 58, 255–268.
- Biederman, Ian, 1982. On the semantics of a glance at a scene. In: Kubovy, M., Pomerantz, J.R. (Eds.), *Perceptual Organization*. Lawrence Erlbaum, Hillsdale, NJ, pp. 213–263.
- Blair, Anthony, 2012. The possibility and actuality of visual arguments. In: Blair, J.A. (Ed.), *Groundwork in the Theory of Argumentation*. Springer Science + Business Media.
- Burke, Kenneth, 1966. *Language as Symbolic Action*. University of California Press, Berkeley.
- Casasanto, Daniel, 2009. When is a linguistic metaphor a conceptual metaphor? In: Evans, V., Pourcel, S. (Eds.), *New Directions in Cognitive Linguistics*. Amsterdam, Benjamins.
- Deane, Paul D., 1992. *Grammar in Mind and Brain. Explorations in Cognitive Syntax*. Mouton de Gruyter, Berlin.
- Eco, Umberto, 1976. *A Theory of Semiotics*. Indiana University Press, Bloomington.
- Ericson, K. Anders, Simon, Herbert A., 1984. *Protocol Analysis: Verbal Reports as Data*. MIT Press, Cambridge, MA.
- Fleming, David, 1996. Can there be visual arguments? *Argument. Advoc.* 33, 1–20.
- Forceville, Charles, 1997. *Pictorial Metaphor in Advertising*. Routledge, London.
- Giannakidou, Anastasia, 2004. Laurence Horn *A natural history of negation reviewed by Anastasia Giannakidou*. *J. Linguist.* 40, 426–433.
- Giora, Rachel, 2003. *On Our Mind: Saliency, Context and Figurative Language*. Oxford University Press, New York.
- Giora, Rachel, 2007. "A good Arab is not a dead Arab – a racist incitement": on the accessibility of negated concepts. In: Kecskes, I., Horn, L.R. (Eds.), *Explorations in Pragmatics: Linguistic, Cognitive and Intercultural Aspects*. Mouton de Gruyter, Berlin, pp. 129–162.

- Giora, Rachel, Heruti, V., Metuki, N., Fein, O., 2009. "When we say no we mean no" (Decker 2007) (emphasis added): interpreting negation in vision and language. *J. Pragmatics* 41, 2222–2234.
- Gombrich, E.H., 1960. *Art and Illusion*. Phaidon, London.
- Grice, Paul, 1975. *Logic and conversation*. In: Cole, P., Morgan, J.L. (Eds.), *Syntax and Semantics: Speech Acts*, vol. 3. Academic Press, New York.
- Groarke, Leo, 2009. *Five theses on toulmin and visual argument*. In: Van Eemeren, Frans H., Garssen, Bart (Eds.), *Pondering on Problems of Argumentation*, Argumentation Library, vol. 14. pp. 229–239.
- Henderson, John M., Ferreira, F., 2004. *Scene perception for psycholinguists*. In: Henderson, J.M., Ferreira, F. (Eds.), *The Interface of Language, Vision, and Action*. Psychology Press, New York.
- Horn, Lawrence R., 1985. *Metalinguistic negation and pragmatic ambiguity*. *Language* 61, 121–174.
- Horn, Lawrence R., 2001. *A Natural History of Negation*. CSLI Publications, Stanford, CA.
- Hudson, Judith A., Fivush, Robyn, 1983. *Categorical and schematic organization and the development of retrieval strategies*. *J. Exp. Child Psychol.* 36, 32–42.
- Jackendoff, Ray, 2007. *Language, Consciousness, Culture: Essays on Mental Structure*. MIT Press, Cambridge, MA.
- Johnson, Ralph H., 2003. *Why 'visual arguments' aren't arguments*. Retrieved from: http://web2.uwindows.car/faculty/arts/philosophy/ILat/edited_johnson.doc.
- Kennedy, John M., 2008. *Metaphor and art*. In: Gibbs, W.R. (Ed.), *Cambridge Handbook of Metaphor and Thought*. Cambridge University Press, New York, pp. 447–461.
- Khemlani, Sangeet, Isabel, Orenes, Johnson-Laird, P.N., 2012. *Negation: a theory of its meaning, representation, and use*. *J. Cogn. Psychol.* 24 (5), 541–559.
- Kurby, Christopher A., Zacks, Jeffrey M., 2008. *Segmentation in the perception and memory of events*. *Trends Cogn. Sci.* vol12, 72–79.
- Lake, Randall A., Pickering, Barbara A., 1998. *Argumentation, the visual, and the possibility of refutation: an exploration*. *Argumentation* 12, 79–93.
- Lee, Hye-Kyung, 2005. *Presupposition and implicature under negation*. *J. Pragmatics* 37, 595–609.
- Maes, Alfons, Schilperoord, Joost, 2008. *Classifying visual rhetoric: the interplay of conceptual structural and rhetorical aspects of visual rhetoric in advertising*. In: Phillips, J., McQuarrie, E.F. (Eds.), *Go Figure! New Directions in Advertising Rhetoric*. M.E. Sharpe, Armonk, NY, pp. 227–257.
- Mandler, Jean, 1978. *Categorical and schematic organization in memory*. In: Puff, C.R. (Ed.), *Memory, Organization, and Structure*. Academic Press, New York.
- McQuarrie, Edward F., Mick, David G., 1999. *Visual rhetoric in advertising: text-interpretive, experimental and reader-response analyses*. *J. Consum. Res.* 26, 37–54.
- Messaris, Paul, 2009. *What's visual about 'visual rhetoric'?* *Q. J. Speech* 95 (2), 210–223.
- Moscati, Vincenzo, 2006. *The Scope of Negation*. Diss. University of Siena.
- Muckenhaupt, Manfred, 1984. *Text und Bild*. *Tübinger Beiträge zur Linguistik*.
- Napoli, E., 2006. *Negation*. *Grazer Philosophische Studien* 72, 233–252.
- Noth, Winfred, 1996. *Can pictures lie?* *Semiotic Rev. Books* 6, 10–12.
- Oliva, Aude, Schijns, Philippe G., 1997. *Coarse blobs or Fine edges? Evidence that information diagnosticity changes the perception of complex visual stimuli*. *Cogn. Psychol.* 34, 72–107.
- Radvansky, Gabriel A., Zacks, Rose T., 2011. *Event perception*. *Cogn. Sci.* 2 (6), 608–620.
- Rooth, Mats, 1985. *Association with Focus*. (PhD) GLSA, University of Massachusetts.
- Rooth, Mats, 1992. *A theory of focus interpretation*. *Nat. Lang. Semantics* 1, 75–116.
- Schilperoord, Joost, 2013. *How Images Mean. Structure and Content of Visual Incongruities in Advertising Images*. Ms Univ. of Tilburg.
- Schilperoord, Joost, Verhagen, Arie, 1998. *Conceptual dependency and the clausal structure of discourse*. In: Koenig, J. (Ed.), *Discourse and Cognition. Bridging the Gap*. CSLI Publications, Stanford, CA, pp. 141–163.
- Schilperoord, Joost, Alfons, Maes, Ferdinandusse, H., 2009. *Perceptual and conceptual visual rhetoric: the case of symmetric object alignment*. *Metaphor Symbol* 24, 155–174.
- Shen, Yeshayahu, 1999. *Principles of metaphor interpretation and the notion of 'domain': a proposal for a hybrid model*. *J. Pragmatics* 31, 1631–1653.
- Skowronski, John J., Carlston, Donald E., 1986. *Trait memory and behavior memory: the effects of alternative pathways on impression judgment response times*. *J. Pers. Soc. Psychol.* 50 (1), 5–13.
- Teng, Norman Y., Sun, Sewen, 2002. *Grouping, simile, and oxymoron in pictures: a design-based cognitive approach*. *Metaphor Symbol* 17, 295–316.
- van den Bergh, Loeki, Kuypers, Chantal, 2010. *Kunnen beelden nee zeggen? (Can pictures say no?)*. (Unpublished Master thesis) University of Tilburg.
- van der Auwera, Johan, de Vogelaer, G., 2005. *Negation and Quantification*. [Webh01.ua.ac.be](http://webh01.ua.ac.be).
- van der Sandt, Rob, 1991. *Denial*. In: *CLSII Papers from the Parasession on Negation*.
- van Someren, Maarten W., Barnard, Yvonne F., Sandberg, Jacobijn A.C., 1994. *The Think Aloud method: A Practical Guide to Modeling Cognitive Processes*. Department of Social Science Informatics, University of Amsterdam, Academic Press, London.
- van Weelden, Lisanne, Maes, Alfons, Schilperoord, Joost, Cozijn, Rein, 2011. *The role of shape in comparing objects: How perceptual similarity may affect visual metaphor processing*. *Metaphor Symbol* 26, 272–298.
- van Weelden, Lisanne, Maes, Alfons, Schilperoord, Joost, Swerts, Marc, 2012. *How object shape affects visual metaphor processing*. *Exp. Psychol.* 59, 364–371.
- Varzi, Achille, 1996. *Parts, wholes, and part-whole relations: the prospects of mereology*. *Data Knowl. Eng.* 20 (3), 259–286.
- Verhagen, Arie, 2005. *Constructions of Intersubjectivity: Discourse, Syntax and Cognition*. Oxford University Press, Oxford.
- Worth, Sol, 1981. *Studying Visual Communication*. University of Pennsylvania Press, Philadelphia. Retrieved from: <http://astro.temple.edu/~ruby/wava/worth/svscom.html>.
- Zacks, Jeffrey M., Tversky, Barbara, 2001. *Event structure in perception and cognition*. *Psychol. Bull.* 127, 3–21.

Eleonore Oversteegen studied linguistics and logic. In 1989, she wrote a PhD on temporal semantics. She teaches discourse theory, semantics and argumentation as associate professor at the University of Tilburg. Her main research interest are in the field of semantics and pragmatics of discourse.

Joost Schilperoord studied communication and psycholinguistics. His dissertation is on the psycholinguistics of text production. His current research interests is visual communication and the semantics of visual expressions. He teaches statistics and visual communication as associate professor at the University of Tilburg.