"When we say *no* we mean *no*": Interpreting negation in vision and language[☆]

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Abstract

This study looks into visual negation. It tests the assumption that visual negation operates along the same lines proposed for linguistic negation (Giora, 2006, 2007). Specifically, it assumes that, like linguistic negation, visually negated information is not unconditionally discarded. Instead, it is sensitive to discourse goals and requirements and will therefore allow information within its scope to remain accessible to comprehenders, should the circumstances require it. This must be true not only of highly restricting contexts that can tolerate no intricate inferencing (e.g. road signs) but also of contexts inviting complex inferential processes that could afford suppression and replacement with alternatives (e.g. works of art). On the basis of interpretations of straightforward and complex visual stimuli as well as empirical data collected from raters, we show that, as predicted, when communicators visually communicate "not X" interpreters often take them to mean "not **X**", retaining 'X' in memory rather than replacing it by an alternative opposite ('Y').
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Keywords: Visual negation; Suppression; Retention; Opposite; Contrast; Context

1. Introduction

Recent evidence in the field of psycholinguistics demonstrates that concepts within the scope of negation are made accessible to comprehenders very early on (between 150 and 500 ms following their offset). The consensus, then, is that initially *The dress is **not pretty*** is represented as *The dress is **pretty*** (Fischler et al., 1983; Hald et al., 2005; Hasson and Glucksberg, 2006; Giora, 2006; Giora et al., 2005a; Kaup et al., 2007). There is, however, some disagreement with regard to later processes. The received view (titled "the suppression hypothesis") is that suppression of negated concepts is mandatory and will reduce initial levels of activation to base-line levels (as shown by Hasson and Glucksberg, 2006; Kaup et al., 2006) and below (as shown by Kaup et al., 2006). Thus, when comprehenders are allowed longer processing time (1500 ms), negated concepts ('open' in *The door is **not open***) will be suppressed and replaced with an available contrasting concept ('closed'; as shown by Kaup et al., 2006; MacDonald and Just, 1989).

According to "the suppression/retention hypothesis" proposed by Giora and colleagues (Giora, 2006, 2007; Giora et al., 2005a, 2007), however, following negation, neither suppression nor retention are obligatory but instead are

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[☆] Decker (2007) (emphasis added).

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sensitive to discourse goals and speakers' intentions (as shown also by Kaup and Zwaan, 2003). On this view, then, negation might have a number of contextually motivated effects rather than a single contrastive outcome (Horn, 2004). It thus follows that often when we say "Not X" we mean 'Not **X**'—intending comprehenders to retain '**X**' rather than activate a contrastive alternative ('**Y**').

For example, retention following negation has been shown to be invited in order to allow discourse resonance. Discourse resonance occurs when affinities across utterances are activated (Du Bois, 2001). Clearly, activation of affinities following negation is made possible by the retainability of negated information. Indeed, in corpora, such information has been shown to resonate with both prior and subsequent related concepts (e.g. "But the moment you realize that something is **not right**, then even if the whole world feels it is **right**, it is **not right** for you"; see Giora, 2007).

Online evidence further testifies to such backward and forward resonance. In Giora et al. (2007),[1] we show that when a negated concept (***not wealthy***) was preceded by a relevant context (*I live in the neighborhood of *millionaires* who like only their own kind. Nonetheless on Saturday night, I also invited to the party at my place a woman who is **not wealthy***), backward resonance was maintained up to 750 ms following the negated target's offset. Similarly, when a negated concept (***no rocket***) was followed by a relevant context (*The train to Boston was **no rocket**. **The trip to the city was *fast***, **though***), negated information ("rocket") facilitated a related concept (*fast*) even as long as 1000 ms following its offset, thus allowing forward resonance.

Another outcome explained by retention following negation is negation's mitigating effect. For instance, when applied to scalar concepts, negation mostly resulted in a mitigated version of the statement rather than in a contrastive alternative (Fraenkel and Schul, 2008; Giora et al., 2005a,b; Horn, 2001; Paradis and Willners, 2006; Tottie, 1991; Tottie and Paradis, 1982).

In all, a number of findings demonstrate that, although possible, suppression following linguistic negation is not obligatory; a contrastive reading of negated concepts is thus not the only possible effect of negation (see also Verhagen, 2005:29). Instead, like affirmative concepts, negated concepts can be as sensitive to discourse goals and speakers' intentions and may result in a wide range of contextually appropriate interpretations, many of which require their retention rather than their elimination from the mental representation.

Will visual negation operate along the lines proposed for linguistic negation and hence be sensitive to contextual information, and, when required, either retain or suppress information within its scope, or will it suppress negated information unconditionally? To examine the way visual negation affects visual information in communicative environments, we look at negation markers in road signs – a domain aimed at maximum explicitness and minimum equivocalness – and visual arts – a domain that thrives on ambivalence and ambiguity and encourages implicature derivation. To argue against the received view, which expects suppression to follow negation unconditionally, we mostly look at stimuli that defy the suppression hypothesis. Specifically, we study examples that should challenge the predictions of the suppression hypothesis while adducing evidence in favor of the view that retention may also be an effect of negation, as predicted by the suppression/retention hypothesis (Giora, 2003, 2006; Giora et al., 2007).

2. Visual negation

Although interpretation of visual messages has been explored before (e.g., Carroll, 1994; Forceville, 1996; Kennedy and Kennedy, 1993), the exploration of visual negation and its effects on communication has not been attempted yet and should shed light on the processes induced by both verbal and nonverbal communication. However, before examining the effects of visual negation markers on interpretations of visual stimuli, let us briefly clarify the notion of "visual negation markers" employed here.

The received view of visual communication assumes that it differs from verbal communication in many ways,[2] not least in its inability to express negation: "Pictures can't say ain't" (Worth, 1981:162); "Pictures [...] cannot deal with

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[1] In Experiment 1 in Giora et al. (2007), we used Hasson and Glucksberg's (2006) English items and furnished them with late contexts. In Experiment 2, we used Hebrew items.

[2] Essentially, unlike language, a still picture is not presented linearly or temporally. Nevertheless, one could argue that its mental representation may well be a product of various temporally ordered routes of perception and interpretation (depending on various semantic, pragmatic, and visual factors such as size, location, spatial relations, light, color, figure/ground, global/local relations, informativeness, task requirements, etc. See, for example, Arnheim, 1974; Henderson and Hollingworth, 1999; Yarbus, 1967). In addition, it is not the case that language is processed temporally or unidirectional either, as demonstrated by eye-tracking outputs (see Rayner, 1998).

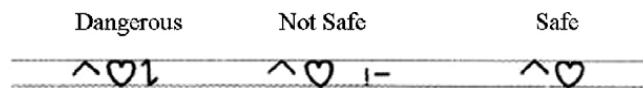| Dangerous	Not Safe	Safe
∧♡Z	∧♡ ⌐	∧♡

Plate 1.

what is not. That is, they cannot represent, portray, symbolize, say, mean, or indicate things equivalent to what verbal utterances of the type 'This is not a. . .' or 'It is not the case that. . . can do'' (Worth, 1981:173); ''Pictures do not have verbs or nouns [. . .] Hence, they cannot make claims. They cannot say A is B or A is not B'' (Kennedy, 2008:459; for a similar view, see also Sonesson, 1989).

When, however, pictures do employ visual symbols or signs with negative meanings, such as a red crossbar over an image (communicating *forbidden*, or *do not*, or the like), such signs are viewed as visual negation markers. Their **uses**, however, are not taken to be ''*pictorial*. . . but rather *linguistic*'' (Worth, 1981:173).

Assuming this view, it is quite interesting to note how, in a newly created artificial language called Bliss (see Blissymbolics: http://www.blissymbolics.org/bliss.shtml), the various functions of linguistic negation noted above, are visually teased apart. In this language there are two different signs for negation: When negation invites suppression of information within its scope (*safe*) and its replacement with an alternative opposite (*dangerous*), this is signaled by a suppression marker (Z) (see leftmost marker in Plate 1); when negation operates as a modifier inviting retention, this is signaled by a retention marker (!-), as in the marker in mid position in Plate 1.

Note further that in classic American Hobo (the language of the ''homeless'' which must be opaque to ''others''), when a negated concept (Plate 2a) is intended to be replaced by an alternative opposite, this alternative can be marked explicitly (Plate 2b). Thus, while (Plate 2a) denotes ''There is no use going this way'', (Plate 2b) indicates ''Go this way'' (see http://www.slackaction.com/signroll.htm#, Retrieved on June 11, 2008).[3]
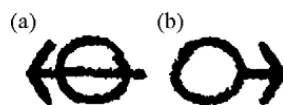
(a)   (b)

Plate 2.

It is not the case, then, that following negation, suppressing concepts and replacing them by an alternative is a default strategy—a strategy that need not be marked, since it is automatically invoked. Instead, we see that visual languages find it necessary to **indicate** an opposite interpretation.

What notion of visual negation do we employ here, then? In this paper the visual negation markers we study are ''linguistic-like'' in that they are extra-diagetic—they do not make up an integral part of the ''semantics'' of the pictorial stimulus; they are not iconic in the way that an image is *vis à vis* what it portrays, but are perceived as being superimposed on the visual percept. And when the visual negation markers do assume an iconic shape (as in Plates 13 and 15), they can still be viewed as laid over the image in question. In all, the markers discussed here are, by and large, conventional (such as a cross or a line) or semi-conventional—a variant of a conventional negation marker.

Importantly, what we study here is the effect of such markers on the interpretation of the percepts they negate, which allow a picture, taken as a whole, to visually say ''no''. We thus aim to show that, despite the numerous differences obtaining between the pictorial and the verbal, verbal and verbal-like visual negation markers might affect the representation of what is within their scope in a very similar way.

Indeed, while there is evidence demonstrating that, under certain circumstances, suppression following linguistic negation is triggered (see Giora et al., 2007, among others), this is by no mean the only optional effect of negation, neither in verbal nor in visual communication. Thus, suppression following negation may be invited in the visual domain as well (see Plate 3). For instance, the photo in Plate 3 by Parrhesia Group (2007) documents an intention on the part of the Israeli erasers to discard the Arabic street names from Israeli viewers' mental representation, while keeping intact the Hebrew and English versions as the only ''legitimate'' alternatives (see especially Bar Ilan street

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[3] To make Hobo interpretable to Hobo speakers only, many of the negation markers used conventionally in non-Hobo languages, such as a cross, assume an opposite (positive) meaning here.

Plate 3.

sign in which the Arabic is completely erased, and Ben Gurion, Giv'at Sha'ul, and Bezalel street signs, in which the Arabic is replaced by an alternative).

However, if visually negating a percept may be shown to also invite its retention rather than its suppression, this would allow for a generalization of the claim about the multi-functionality of negation even beyond the verbal domain.

3. When context discourages complex inferential processes

To demonstrate that retention is also an optional effect of visual negation, we first examine road signs. Given that road signs belong in an environment that has zero tolerance for vagueness and implicitness, how these signs are used and interpreted can best illustrate negation's sensitivity to contextual information. Indeed, both the negative (Plate 4a and b) and affirmative (Plate 4c) signs mean exactly what they explicate: Like the verbal ''No exit'' sign, they do not invite complex inferential processes. Thus, 'No entry/Do not enter' in Plate 4a does not activate its available opposite 'exit'; nor does the sign in Plate 4b, indicating 'No **right** turn', invite its accessible antonym 'Turn **left**' (Plate 4c), not even when this, in effect, is the only possible alternative.

And when visual negation signals suppression (Plate 5a), indicating that previous information (Plate 5b) is no longer relevant and should be discarded, this is often immediately followed by an explicit alternative (Plate 5c) (indicating entry to urban areas where the speed is limited to 50 km/h) so that no inferencing would be required.

Note that when (affirmative) road signs either do not send across an explicit enough message or invite an inference that can be easily ignored, it takes a (artistically) negation marker to flesh out their message (Tartakover, 2004). The negation (cross) marker used in Plate 6, which is also part of the symbol of death, says ''No'' to the killing of children
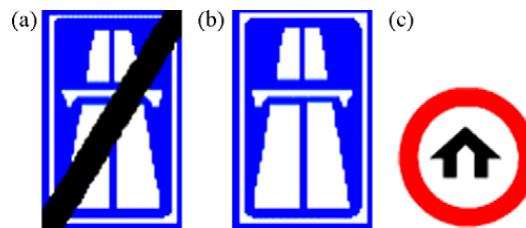

Plate 4.

(a) (b) (c)

Plate 5.

Plate 6.

on the roads, while further transforming the road sign into a face-like image, forcing people to look death in the eye rather than ignore or suppress it.

Because the environment of road signs should discourage guessing and implicatures, it constitutes a strong test for negation's sensitivity to contextual information. In a context in which inferencing and replacement of negated information by an available alternative should be avoided, negation's resistance to suppression should prevail. As shown, it is not the case that visual negation in road signs never invites suppression. It is, however, the case that it does not induce suppression unconditionally either. Unless otherwise motivated, visual negation, like verbal negation, in fact, retains information within its scope.

4. When context encourages complex inferential processes

Unlike road signs, other genres such as posters, ads, and works of art are a lot less constrained and often invite complex inferential processes. Will such a less constraining, rather open-ended environment induce suppression unconditionally and invite replacement with available alternatives? In this section, we examine visual negation effects on interpreting posters and works of art. We start by looking at how such negation affects linguistic stimuli (section 4.1) and then proceed to examine its effect on visual stimuli (section 4.2).

4.1. Visually negating linguistic stimuli

How does visually erasing or crossing off words affect their processing? If the crossed-off word is visible, either wholly or partially, in a way that allows its reconstruction, then its meaning is retainable. In fact, if the artist had wanted this word to be inaccessible, s/he could have replaced it with an alternative or leave no traces behind. This indeed has been exercised by Calle (1996: 197) in Plate 7. However, the adjacent verbal explication of this erasure (clarifying that it is her husband's lover's initial that is blotted out and replaced by hers) makes up for the apparent untraceability. Clearly, when a visually negated word is visible, its meaning cannot be bypassed, which can therefore be followed by inferencing. Will that inferencing also involve retention of that meaning?

For instance, Kosuth's (1986) crossing off of words in Plate 8 left them perfectly readable (not least because of the use of neon light, which brings out both the negation marker and the negated word). According to him, negation allows
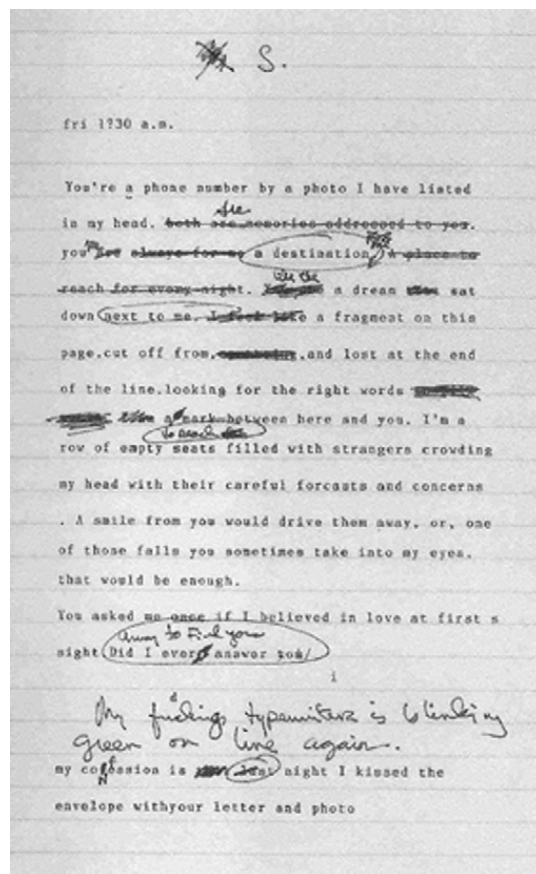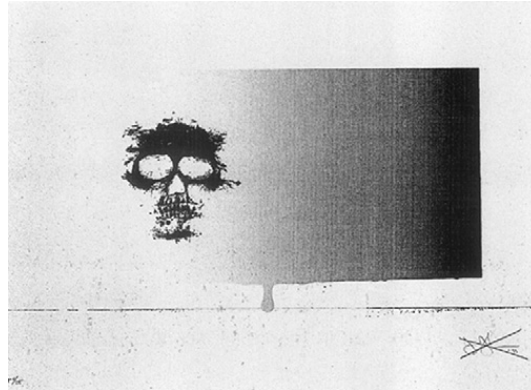

Plate 7.

Plate 8.

Plate 9.

a negated presence and a positive absence to be entertained simultaneously (Kosuth, 1991:21). Similar in this respect is Johns' (1973) crossed-off signature in (Plate 9): Why did he let us retrace the signature so that it is retained in memory? Crossing off the artist's signature might indicate approval of the ideology of ''the death of the author''—of the individual author, as commented on by Orton (1989:38–9): ''He [Johns] seems to be writing that it's necessary but inaccurate to say that this was made by Jasper Johns. . . drawing attention to the problematic nature of authorship and ownership by crossing out signing, clearly opening to doubt its power to confer authenticity, but not denying it.'' (For a similar view, see also Heruti, 2007.)

Consider further how, in Plate 10, the crossing off of Abir Aramin's graffiti obituary (Anon., 2007) (stating that the 11-year-old was murdered by an Israeli officer) does not obscure the text nor the choice of words (the use of ''murdered'' when it comes to Palestinian victims is rare if not entirely absent from the Israeli discourse). The choice of such a negation device invites retention of the negated message and a possible inference that it was intended to protest the Israelis' indifference to the murdering of Palestinian children, thus making the negated percept stand for a whole group of individuals. Indeed, negating the obituary in this manner could then implicate that wiping such murders off from our memory constitutes a form of annihilation (as suggested by Coussin, 2007).

What these works show, then, is that even genres that encourage generation of multiple interpretations use visual negation markers to make interpreters focus on the negated concept ('X' in ''not X'') rather than replace it with other alternatives ('Y', 'Z', etc.).

4.2. Visually negating visual stimuli

How does visual negation affect negated percepts' interpretation? Does it induce suppression unconditionally? Does it allow retention of the negated percept? The following examples support the view that suppression following negation is not obligatory. Instead, retention is often aimed at. For example, in Kratzman and Reeb (2003) in Plate 11, crossing off the images of a leaves them intact and accessible.

Plate 10.

Plate 11.

Interpreting Tartakover's (1997) poster in Plate 12 might be more illustrative, since it has an available alternative. But does it invite or aim at getting across that alternative? By crossing off the generals who engineered the Israeli occupation of the Palestinian territory (using three crosses, which also indicate 30), Tartakover condemns the ongoing occupation: he protests the Israeli 30 years of occupation. This is the message that should be kept in mind despite available alternatives ('liberation'/'withdrawal'). Indeed, this interpretation is supported by the artist's replications of this poster in works whose backgrounds are enriched by scenes of daily life, by announcements of cultural events, and by memorial albums for fallen soldiers. Such information invites the viewer to focus also on the effect of the occupation on ''all aspects of life in the Israeli society'' (Tartakover, 2007b).

Plate 12.

In Plate 13, Tartakover (1998) uses a more intricate visual negation—a sniper's target marker (which, while being somewhat iconic is also superimposed on the child's photo that is used for the poster). This is a polysemous marker. It indicates that 6-year-old Ali Muhamed Juarwish is both crossed out and about to be executed. Moreover, in Plate 14, Tartakover (2007a) negates this same negated percept once again (while establishing backward resonance with the image in Plate 13).

Like the cross in Plate 12, the ''X'' in Plate 14 functions both as a negation marker (a superimposed cross) and as a roman numeral, which makes up part of *XL* (indicating 40). Crossing over the previously negated poster by an additional negation marker assumes the accessibility of what has been negated in the first place Plate 13, while further amplifying it by using another negation marker (XL), which, on its own, is ambiguous between its numerical and 'Extra-Large' meanings. Given also that the negation marker *XL* is placed on one of the boy's eyes, limiting his sight (compared to that of the sniper's), the message the piece is getting across is related to the ruthless killing of Palestinian children by Israelis, and how, after 40 years of occupation, this destruction is being exercised on such a large scale.

In both posters, however, the negated percept – the Palestinian child – is not suppressed, nor is it replaced by an alternative. Marking the boy by a negation marker, especially in the form of a target marker, makes viewers focus on the ''target in sight''; using two negations draws even more attention to it. It is this killing of **children** that these posters protest, while offering no alternative.[4]

Plate 13.

Plate 14.

Morcos (2003) also uses a (polysemous) negation marker, depicting Mashrabiya—an Egyptian window with bars in the shape of a cross through which women can look at the street but remain invisible.[5] This marker, rather than detracting attention, draws attention to the negated percepts (Plate 15). It directs attention to what is barred and negated—the various parts of a woman's face and their expression. While using an iconic-like negation marker, which can still be seen as superimposed on the ''faces'' behind it, the art is protesting what is barred. It communicates disapproval of male-biased cultures that reject every aspect of womanhood.[6]

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[4] Interpretation confirmed by the artist (David Tartakover, 6 May 2008, personal communication).

[5] ''Mashrabiya is for privacy''. It allows a good view of the street ''without being seen'' (http://en.wikipedia.org/wiki/Shanasheel; 25 July, 2008).

[6] Discussing her art, Morcos contends that both men and women are male chauvinists; women too accept male biased norms, choosing not to go out but only look at the public sphere. ''The gates were open but the women never went out'', which is why she protests this culture by representing a window that allows one to see but not to be seen (Morcos, 24 April 2008, personal communication, reconstructed from memory).
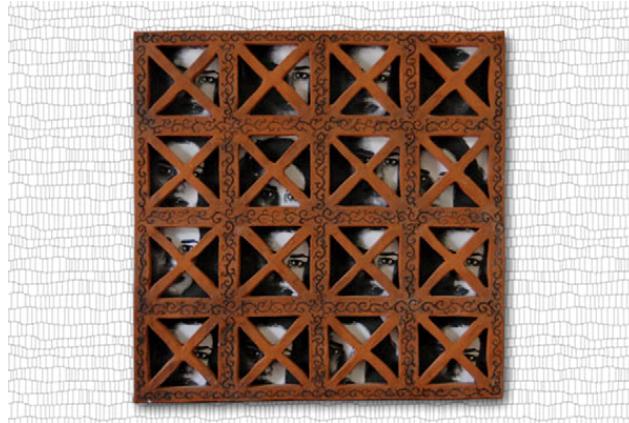
Plate 15.

In addition to the crossing off of a percept, erasing it is another form of negation. Wiping off an object indeed expels it from the actual scene, but at the same time often leaves traces that allow for it to be reconstructed. For instance, in Gal (1996), it is The Israel Museum of Art that is wiped off an aerial photo (Plate 16). This wiping off draws attention to the erased object, which makes the art meaningful. Erasing a major Israeli museum in a fashion analogous to that of the Military Censor likens it to a military base (which, as a routine, would be erased from such aerial photos). This is indeed the artist's way of expressing his criticism of the collaboration of Israeli institutional art in the oppression of the Palestinians and the occupation of their territory (as made explicit in Gal, 2006).

Plate 16.

Similarly, to make sense of Rauschenberg's (1953) *Erased de Kooning* (Plate 17), it is essential to realize that the drawing that has been erased is de Kooning's (as indicated by the artist himself; see http://www.youtube.com/watch?v=tpCWh3IFtDQ&feature=related). It is only through this specific realization that the act of erasing becomes meaningful and the art interpretable, suggesting that the artist thrives on challenging his master's legacy. To quote Rauschenberg (1976:75), this art was aimed ''to purge myself of my teaching'', to test ''whether a drawing could be made out of erasing''. Ironically, albeit erased, de Kooning must be very much present, as the title, which makes up an integral part of the art, suggests (Heruti, 2007). This has also been noted by others who viewed this art as ''an act both of destruction and devotion''—a spoof of de Kooning (Kimmelman, 2008).

Plate 17.

Suppression following visual negation, then, is not obligatory, not even in a context inviting complex inferential processes. Instead, like linguistic negation, it often requires that the negated object or concept be retained in memory and deliberated upon.

4.3. Visually negating visual stimuli—empirical support

To further support the hypothesis that suppression following visual negation is not obligatory, but instead retention of negated concepts is often invited, we conducted an experiment. In this experiment, participants were presented a visual stimulus involving a visual negation marker, followed by three utterances. They were asked to rate the extent to which each of these utterances offered an appropriate interpretation of the stimulus. The set of stimuli included visually negated items with an available opposite. Based on the retention hypothesis, we predicted that the interpretations featuring the negated concepts (Plates 18B; 19B), thus suggesting their retention, will rank high on the appropriate-interpretation scale.

4.3.1. Method
4.3.1.1. Participants.
Participants were 30 first-year students at Tel Aviv University and the School of Art, Beit Berl College (22 women and 8 men), between the ages of 22 and 31, right-handed (of families with right-handedness dominance), not color-blind, and native speakers of Hebrew. They either volunteered to participate in the experiment or were paid 20 Israeli shekels.

4.3.1.2. Materials.
Materials included 32 visual items: 20 experimental items involving a visual negation marker and 12 filler items involving no negation. The experimental items were bi-polar—they all had an available antonym (e.g., "open"/"close"). Each item was followed by three possible verbal interpretations that were similarly articulated for both the experimental and filler items (Plates 18 and 19). The interpretations were equally divided between negative and affirmative directives (Plate 18A and B) and negative and affirmative non-directive utterances (Plate 19b and c). Each interpretation was followed by a seven-point interpretation–appropriateness scale. One interpretation included a negatively phrased description of the percept (Plates 18B and 19B); another included its alternative opposite and was positively phrased (Plates 18A and 19C); and another was marginally related to the percept (Plates 18C and 19A) and was either negatively or positively phrased. Their order of presentation was random (for the full list, see http://www.tau.ac.il/~giorar/materials.html). Two different booklets were prepared with different orderings of the materials so that half of the participants saw one ordering and the other half saw another ordering.

A. Close the door!

1	2	3	4	5	6	7
Inappropriate interpretation of the image			Partially appropriate interpretation of the image			Highly appropriate interpretation of the image

B. Don't leave the door open!

1	2	3	4	5	6	7
Inappropriate interpretation of the image			Partially appropriate interpretation of the image			Highly appropriate interpretation of the image

C. There is a strong lock in the door.

1	2	3	4	5	6	7
Inappropriate interpretation of the image			Partially appropriate interpretation of the image			Highly appropriate interpretation of the image

Plate 18.

4.3.1.3. Procedure. Participants who agreed to take part in the experiment were sent an electronic booklet. They were asked to rate, on a seven-point interpretation–appropriateness scale, the extent to which each of the three interpretations reflected the message of the visual percept.

4.3.2. Results and discussion

As predicted, interpretations that included a negated concept ranked high, in fact, highest on the appropriateness scale ($M = 5.27$, S.D. = 0.74) and differed significantly from the affirmative descriptions' mean rating ($M = 3.80$, S.D. = 0.70), by both subject ($t_1(29) = 10.99$, $p < .0001$) and item ($t_2(19) = 7.06$, $p < .0001$) analyses. The affirmative alternatives, however, ranked higher than the marginally related interpretations ($M = 1.77$, S.D. = 0.44), $t_1(29) = 22.46$, $p < .0001$, $t_2(19) = 6.70$, $p < .0001$. Thus, when seeing an open door that had been crossed over, participants opted for the negated (''do not open'') interpretation significantly more often than for the available alternative (''close''). Such results demonstrate that visual negation operates along the lines proposed for linguistic negation (Giora, 2006). It does not suppress negated information unconditionally. Instead, it is sensitive to contextual information and, when required, retains information within its scope even when a contrastive concept is available.

One could suspect, however, that the preference for the negated interpretation (''Don't leave the door open!'') over the affirmative alternative (''Close the door!'') might be influenced by the type of speech act used. Unlike non-directives (''The pants are not loose any more''), directives could invite a negated rather than an affirmative articulation, because a negated expression usually comes across as more mitigated or polite than the affirmative alternative (on negation as mitigation, see Giora et al., 2005a,b). Thus, it is possible that this mitigating effect of

A. The shirt is long.

1	2	3	4	5	6	7
Inappropriate interpretation of the image			Partially appropriate interpretation of the image			Highly appropriate interpretation of the image

B. The pants are not loose anymore.

1	2	3	4	5	6	7
Inappropriate interpretation of the image			Partially appropriate interpretation of the image			Highly appropriate interpretation of the image

C. The pants are tight.

1	2	3	4	5	6	7
Inappropriate interpretation of the image			Partially appropriate interpretation of the image			Highly appropriate interpretation of the image

Plate 19.

negation biased people toward selecting a negated alterative when faced with, for example, instructions, requests, or commands. To rule out the possibility that our results are valid only for directives, we ran subject (F_1) and item (F_2) ANOVAs, taking both the type of speech act (directive/non-directive) and the negativity (negative/affirmative) of the description as independent variables.

The effect of negativity was significant by both subject and item analyses, F_1 (1,29) = 64.31, $p < .0001$, F_2 (1,18) = 21.44, $p < .0001$, reflecting the fact that negated concepts ranked significantly higher than their affirmative alternatives, regardless of speech act type (see Table 1). The effect of speech act was significant only in the subject analysis, F_1 (1,29) = 15.44, $p < .0001$, F_2 (1,18) = 5.15, $p = .16$. More importantly, the interaction effect was insignificant, F_1 (1,29) < 1, F_2 (1,18) < 1, indicating no difference between directives and non-directives with regard to the effect of negativity.

Table 1
Mean ratings of appropriateness.

	Negated concept	Affirmative description	Marginally related
Type of speech act			
Directive	5.69 (0.64)	4.10 (0.83)	1.75 (0.46)
Non-directive	4.84 (1.05)	3.51 (0.71)	1.79 (0.57)
Overall	5.27 (0.74)	3.80 (0.70)	1.77 (0.44)

One might argue, however, that politeness could be another confounding factor affecting our results. Since negative expressions often come across as more polite than their affirmative counterparts, it is possible the negative items in our sample were rated as more appropriate than their affirmative alternatives due to their greater politeness. To test this hypothesis, we ran another test, presenting 11 native speakers of Hebrew (5 women and 6 men, aged between 21 and 27) the same materials, while asking them to rate each interpretation on a seven-point politeness scale. We ran the same ANOVAs as before, with type of speech act and negativity as independent variables. Although the negative items were rated as slightly more polite than their affirmative alternatives (M = 4.95, S.D. = 0.88 as compared to M = 4.90, S.D. = 0.73), the negativity effect was insignificant by both subject and item ANOVAs (as were all the other effects). In addition, we calculated the correlation between the items' appropriateness ratings and the politeness ratings. The correlation was very small (-0.08) and insignificant.

Taken together, these findings rule out the possibility that the tendency to opt for a negated interpretation was induced either by the type of speech act used or by degree of politeness. In all, they demonstrate that the effects of visual negation are similar to those of verbal negation: neither necessarily eliminates negated information from the mental representation.

Note that previous findings, obtained via the use pictorial probes, did not vary from those obtained by verbal probes, once the conditions were similar. For instance, Kaup and her colleagues (see above) used visual probes to test interpretation of negated sentences presented in isolation. Their results attesting to suppression of negated concepts did not vary from those obtained by Hasson and Glucksberg's (see above), who also used negated sentences presented in isolation, which, however, were followed by verbal probes; Shuval and Hemforth (2008) applied the visual world paradigm—a cross-modal paradigm in which participants are exposed to audible strings while presented with related visual probes. Their results, demonstrating retention of negated concepts, did not differ from those obtained by studies using both verbal stimuli and verbal probes (see Giora et al., 2007).

5. Retention of both negated information and its alternative

So far we have shown that contextual information that motivates retention of the negated entity, whether visual or linguistic, allows the entity to be maintained, rather than discarded and replaced by a contrastive alternative. The various examples we review below show that linguistic-like visual negation not only invites retention of the negated percept, but also at the same time it further induces the retention of its alternative. In other words, the activation of an alternative need not suppress the negated concept nor be invited only when suppression occurs. In fact, as shown by Labov (1972) for spoken language, negation often allows both alternatives to be kept in mind and weighed against each other.

Visual examples might include Ben Shalom's (2006) crossing off of dates (Plate 20), allowing access to both those past days that are crossed-off and the future ones that still lie ahead. In Shalev (1996) as well, the alternatives that have been overwritten and the one that is selected as a viable option are all made explicit and accessible to the viewer (Plate 21).[7]

Plate 20.

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[7] When asked about her art, Shalev has said that it expresses her yearning for a home, symbolically represented by chicken soup (the only one not crossed off). This is allowed, she says, by weighing the chicken soup against the crossed off alternatives which must be kept in mind (Shalev, 24 April 2008, personal communication).
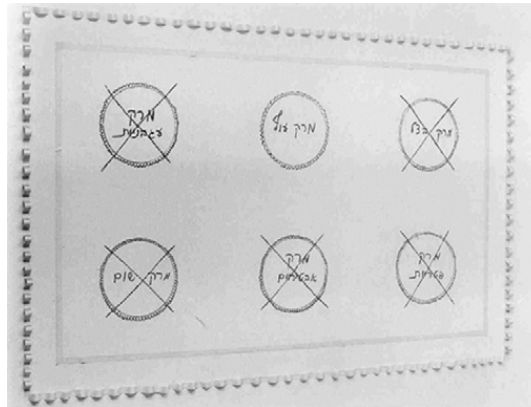
Plate 21.

Similarly, in Plate 22, crossing off one of the letters of the Hebrew word "divorced" (referring to the end-product of the act of divorcing a married woman, by which she becomes divorced in the full passive sense of the word) does not really wipe out its meaning. Instead, while keeping intact this word and its meaning, it further activates the meaning of a newly created word, which denotes "divorcing" (now an act performed by a woman, delivering the full active sense of the word). By using a visual negation marker, the artists, Hanna Ben-haim and Anat Bar el (2007), allow for the two meanings to be retained and interact.[8]

Likewise, in Plate 23, Landau (1999) crosses off parts of titles so that the original and the novel each make sense and at the same time interact with their alternative. The viewer needs to be able to access and retain the original and what is left of it as a result of the crossed-off words.
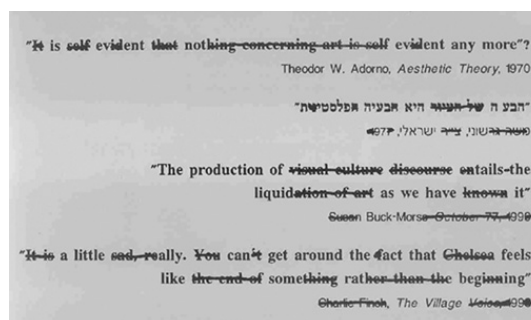

Plate 22.

Plate 23.

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[8] This effect was intended by the artists, as made explicit by Bar el (personal communication, 24 April 2008).

In sum, the use of visual negation markers (crosses, lines) does not necessarily write off the meaning of the negated stimulus even while activating an alternative opposite. Entertaining that opposite need not be done at the cost of discarding the concept within the scope of negation. Visual negation, then, affects visual discourse representation very much like lexical negation.

6. Conclusions

The aim of this study was to challenge a prevalent view in psycholinguistics – titled the suppression hypothesis – which posits that suppression of negated concepts operates unconditionally. To question this view, we focused on visual data that demonstrate that eliminating a visually negated concept from the mental representation need not be mandatory. Instead, as predicted by an alternative view – the suppression/retention hypothesis – retention of visually negated information is often allowed. Clearly, the examples reviewed here as well as the rating experiments show that linguistic-like visual negation operates along the same lines proposed for linguistic negation (Giora, 2006, 2007); it does not necessarily dispose of information within its scope. Instead, it often allows such information to remain accessible to comprehenders not only in highly restricting contexts that can tolerate no complex inferencing (road signs) but also in contexts inviting complex inferential processes that could afford suppression and replacement with alternatives (art).

Indeed, we have shown that road signs, although susceptible to suppression processes, do not always induce elimination of information within the scope of negation; we have also shown that works of art – posters, graffiti, and touched up Photos – allow viewers to deliberate on negated information. We have further shown that even when presented alongside their alternatives, negated percepts are not made redundant. Even such opposite alternatives need not suppress what they counter. Instead, these opposites can be deliberated on and weighed against each other (as shown for linguistic negation; see Labov, 1972).

The kinds of visual negation markers reviewed here range between highly conventional devices, such as crosses, lines, and erasures (both partial and complete) of linguistic and visual stimuli, and ambiguous/polysemous markers, such as window bars, a target marker, or roman numerals, all assuming a variant shape of a cross. This variety, however, does not seem to affect a corresponding variety of end-products, as suggested by our interpretations, those of art critics, as well as by those of the artists themselves.

In all, our analyses of the visual stimuli studied here alongside native speakers'/viewers' preferred interpretations support the view that a linguistic-like visual negation marker is not necessarily a suppression operator (as assumed for linguistic negation, by e.g., Fillenbaum, 1966; Hasson and Glucksberg, 2006; Kaup et al., 2006; MacDonald and Just, 1989; for a different view, suggesting possible retention effects of negation, see Fraenkel and Schul, 2008; Giora, 2006; Giora et al., 2005a,b, 2007; Horn, 2001; Kaup and Zwaan, 2003; Paradis and Willners, 2006; Tottie, 1991; Tottie and Paradis, 1982). Still, in order to support this view more firmly with regard to visual negation, online measures testing such negation while using visual probes need to be applied too, alongside eliciting viewers' spontaneous interpretations.

In sum, visual negation markers, superimposed on the images they negate, seem to have similar effects to those found for lexical negation, allowing information within their scope to be retained rather than replaced with an alternative contrast. Despite the uniqueness of the pictorial, some of the processes it entails are analogous to those invited by the verbal.

Acknowledgments

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