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On the Combined Influence of Attractive and Unattractive Locations on the Surroundings

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Abstract

Living near an unsafe housing block or a landfill is unattractive because of their negative influence on the environment. The question we ask is "Would a nearby attractive location cancel out this negative influence?" In two studies, participants were shown fictitious neighborhoods that contained an unattractive location (an unsafe housing block or a landfill) located close to an attractive location (one's own home or a park). The participants were asked to evaluate how pleasant it would feel to live at increasing distances from these locations. The results showed that positively evaluated locations can mitigate but not entirely neutralize the effects of negatively evaluated locations. The present research elucidates how people combine the effects of sources of positive and negative influence.

Keywords

place evaluation, spatial context, influence, evaluative information integration, negativity dominance

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Successful orientation in geographical space requires the continuous evaluation of the environment. At a basic level, places that facilitate the accomplishment of personal goals are generally deemed attractive, whereas places that hinder personal goals are deemed unattractive. In turn, people tend to veer toward attractive places and avoid unattractive places (Mehrabian & Russell, 1974). A crucial step in the prediction of people's movement in geographical space is to understand how they evaluate their environment. Blaison and Hess (2016; see also Blaison, Fayant, & Hess, in press; Blaison, Gollwitzer, & Hess, 2017) recently showed that negative or positive "hotspots"—that is, negatively valued locations (e.g., an unsafe housing block) or positively valued locations (e.g., an urban park) that pop-out affectively from the background of other, less salient locations—play a major role in people's evaluation of the environment. They color the evaluation of whole areas, sometimes over large distances. Their influence dissipates within a certain range called "gradient of influence." Places located within the gradient of influence of a negative hotspot look less attractive than a neutral comparison location without a negative hotspot, whereas places located outside tend to be more attractive than the neutral comparison. In Blaison et al. (2017), the reverse pattern was found for positive hotspots. For instance, a public park brightens the proximal environment but renders locations farther away less attractive compared with a neutral location without a park.

Whereas previous research has investigated the effect of negative and positive hotspots separately, the present research addresses a more complex issue. Environments usually contain not just one but several hotspots. Furthermore, these hotspots are often of opposite valence, like a neighborhood including both an unsafe housing block and a nice public park. We hence studied the interactive effect of sources of negative and positive influences on people's evaluation of the surroundings. This is important to deliver a better understanding of the mechanics of place evaluation. It also holds implications for urban policy in the way that positive hotspots could shield the surroundings against the harmful effects of negative hotspots. We will develop different possible scenarios in the next sections.

In target locations where positive and negative influences overlap, do these influences neutralize each other like waves propagating in opposite phases? Or can one influence at least mitigate the effects of the other when they differ in intensity? When faced with piecemeal evaluative information from different sources, people generally arrive at a global impression of a target by using simple algebraic rules, like averaging (Anderson, 1981, 2008; Wyer & Carlston, 1979). When asked to make a choice between person A who possesses two moderately and two extremely positive traits and person B who possesses only two extremely positive traits, participants generally like person B more than person A (Anderson, 1965). In the same vein, integrating the effects of negative and positive influences may simply require averaging their evaluative implications. If this is true, then a target location under both a positive and a negative influence should seem more attractive than the same target location under negative influence only (mitigation), and if both positive and negative influence have the same intensity, this target location should appear neutral (neutralization). In other words, if mitigation occurs, the target under both negative and positive influence is still negatively valued but less negatively valued than under negative influence only; if neutralization occurs, the target under both negative and positive influence is neutral because the influences completely cancel each other out.

However, negative and positive hotspots might influence each other mutually. This could decrease the positivity of positive hotspots and the negativity of negative hotspots, weakening the influence of both hotspots. Furthermore, we know that negative information weighs more heavily on judgment than positive information. This has been coined negativity bias or negativity effect (Anderson, 1965; Baumeister, Bratslavsky, Finkenauer, & Vohs, 2001; Cacioppo & Berntson, 1994; Fiske, 1980; Kahneman & Tversky, 1979; Lewicka, Czapinski, & Peeters, 1992; Peeters, 1971; Peeters & Czapinski, 1990; Rozin & Royzman, 2001). In our case, the negativity bias predicts a mutual influence that is asymmetric: A negative hotspot is more likely to taint a positive hotspot than a positive hotspot is able to brighten up the evaluation of a negative hotspot. Supporting evidence includes a study of Morales and Fitzsimons (2007) where participants preferred a less desirable brand of cookies when more desirable ones were in contact with feminine hygiene products. In the same vein, results from Blaison et al. (2017) predictably show that a park is less liked when it is surrounded by a poor neighborhood with unattractive buildings than when surrounded by a wealthy neighborhood with attractive buildings. By contrast, the evaluation of an unsafe housing block or of a busy highway is unaffected by the attractiveness of the surrounding neighborhood. This result shows that positive features of the surroundings are unable to brighten up people's attitude toward a negative hotspot. In fact, we know of no published evidence demonstrating that positive things or events can favorably influence things or events that are clearly negatively valued, although positive things or events can influence neutral things or events positively (e.g., Argo, Dahl, & Morales, 2008; Melamed & Moss, 1975; G. E. Newman, Diesendruck, & Bloom, 2011).[1] Therefore weakened positive hotspots wield less positive influence to counter the negative influence of negative hotspots. Positive hotspots may mitigate negative influence, but they may be unable to neutralize it entirely.

At this stage, we must also raise the possibility that the negativity bias operates not only at the hotspot evaluation level (the negative hotspot tainting people's attitude toward the positive hotspot) but also at the influence integration level. When integrating the effects of negative and positive influences on target locations further away from the hotspots, here again people could weigh negative influence more heavily than positive influence. On top of that, we know that more intense evaluative information weighs more heavily on judgment independently from valence (Fiske, 1980). As the influence of a tainted positive hotspot is both of positive valence—thus weighing less than negative influence due to the negativity bias—and weaker than the negative influence—thus weighing less than negative influence because it is less intense (Fiske, 1980)—it is uncertain in this scenario whether positive hotspots can mitigate negative influence at all.

Study 1

In Study 1, participants were shown a neighborhood with a positive hotspot located next to a negative hotspot. The positive hotspot was either a nice park or one's own home, whereas the negative hotspot was either a toxic landfill or an unsafe housing block. We chose a toxic landfill and an unsafe housing block because insecurity and environmental issues concern every citizen and these locations had been previously shown to elicit negative influence reliably (Blaison & Hess, 2016). Similarly, we chose a public park because parks are common in any city and vegetation and green spaces improve people's attitude toward the environment (Hull & Harvey, 1989; Sheets & Manzer, 1991). The choice of one's own home was based on similar criteria. One's own home should be positively evaluated because the self is generally positive (Greenwald & Farnham, 2000) and owned objects are associated with the self (e.g., Beggan, 1992; Gawronski, Bodenhausen, & Becker, 2007). Attachment should reinforce home positivity (Scannell & Gifford, 2010). Given that almost everyone has a home to call his or her own, investigating its effect on areas under negative influence is highly relevant for place evaluation. We also expected more resistance of one's own home to negative influence because Blaison and colleagues (2017) found that whereas people's evaluation of a park depends on the attractiveness of the context, people's evaluation of the home of a celebrity does not. If the home of a stranger resists negative influence better, we thought that one's own home should be even more resistant to negative influence.

Pretest 1 tested whether the influence of the park, of one's own home, of the unsafe housing block, and of the landfill on the surroundings were roughly comparable in intensity when taken in isolation. Pretest 2 tested to what extent pairs of these positive and negative hotspots had mutual influence on each other. The main experiment tested the combined effect of the pairs of hotspots on the evaluation of the surroundings.

Pretest 1

Different groups of participants evaluated housing blocks located at varying distances from the park, one's own home, the unsafe housing block, or the landfill. As it made little sense to ask participants how they would feel about living in housing blocks near their own home, all participants were asked to advise a stranger. Control participants rated the housing blocks in the absence of any hotspot. We reasoned that if the positive and negative hotspots have comparable amounts of influence at every measured distance, then the average of the ratings across the hotspot conditions should not differ significantly from the average of the ratings in the control condition (i.e., the average across the hotspot conditions and the control condition should not differ significantly from zero).

Method

Participants and design. A total of 131 participants (66 women, all U.S. residents) with a mean age of 33.77 years ($SD = 11.50$) were recruited online via Amazon's Mechanical Turk.[2] This sample size is largely sufficient to detect a difference against zero with an effect size (d) <.05, a power ($1 - \beta$) = .80, and an alpha (α) = .05 (G*Power 3.1; Faul, Erdfelder, Lang, & Buchner, 2007). To ensure high-quality data, we selected workers who had accomplished a minimum of 100 Mechanical Turk tasks (i.e., "hits") with a requester satisfaction rate of 95%.[3] We used a 5 (hotspot: park, home, unsafe housing block, landfill, and control) × 10 (distance), mixed design with hotspot as the between-subjects factors and distance as the within-subjects factor.

Stimulus material and procedure. We created fictitious satellite views of a neighborhood that were made up of a patchwork of satellite images (USGS Products; see Figure 1). In the first slide of instructions of the park condition, participants saw the neighborhood with the park and read "This is a neighborhood with a park." On the next slide, the instruction stated, "On an airplane trip, the person sitting next to you tells you that they will move into your city soon. In the next screen you will be asked to tell the person how, in your opinion, it would feel to live there by rating the pleasantness of a number of housing blocks that belong to the neighborhood presented below." The participants were then asked how pleasant or unpleasant it would feel to live in the 10 housing blocks marked with a white arrow (see Figure 1). The participants rated each housing block with the valence scale (9 points; 1 = *very unpleasant* to 9 = *very pleasant*) of the Self-Assessment Manikin (SAM; Bradley & Lang, 1994; see the appendix).

In the home condition, the park was replaced by one's home, which was simply marked with a blue dot (see Figure 1). The first slide of instruction stated, "Imagine the building marked by the blue dot is your home." To make sure that people felt positively attached to this building, the text carried on

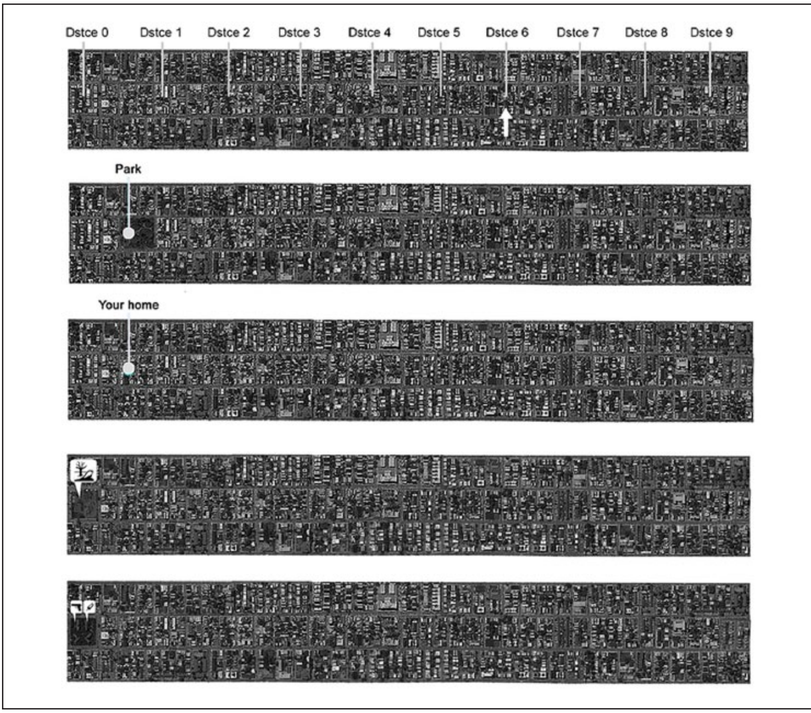


Figure 1. From top to bottom, example of neighborhoods shown in the control, park, home, unsafe housing block, and landfill conditions (Pretest 1).
Source. Copyright USGS Products.
Note. Dstce = Distance. Dstce 0 to Dstce 9 indicate the target locations rated by the participants. The white arrow example indicates to the participants the housing block to rate.

with "You were raised there. The house is in possession of your family for several generations. Imagine how it feels to live in a house owned by your family for decades. Remember how it was as you were a kid, then how it was as a teenager." The participants were urged to "take a moment to imagine the situation because it [is] really important at that point." The rest of the procedure was identical to the park condition.

In the unsafe housing block condition, a gun and a syringe indicated that "this housing block is rife with violence and drug trafficking." The unsafe housing block contained a set of buildings that looked different from the rest.[4] The instructions stated, "Two years ago, a public housing project was built in the neighborhood. See how it emerged at one of the end of the neighborhood. The gun and the syringe indicate that the housing block is rife with violence and drug trafficking."[5] The rest of the procedure was identical to the other conditions. In the landfill condition, the instruction stated, "Two years ago, old buildings were razed and a provisory landfill was built instead. See how it emerged at one of the end of the neighborhood. The dead tree and the dead fish indicate that the landfill harms the environment." In the control condition, the first slide stated, "This is a neighborhood," and the participants were directly asked how pleasant or unpleasant it would be to live in the 10 housing blocks marked with a white arrow, as in the other conditions.

In each condition, each participant rated the 10 target locations in a different random order. The neighborhoods were composed of the same background housing blocks in all conditions. The position of the hotspots at the left or at the right of the neighborhood was counterbalanced across participants. We averaged the ratings across the counterbalanced versions. To eliminate any bias due to side in the control condition, we averaged the ratings obtained in the symmetrical positions (Distance 1 with Distance 9, Distance 2 with Distance 8, Distance 3 with Distance 7, etc.) before analysis.

Results and discussion. In the following analyses, we used the Greenhouse-Geisser correction and rounded the corrected degrees of freedom to the nearest integer when the sphericity assumption was violated (Mauchly test, p < .001). To test whether the positive and the negative hotspots had the same level of influence at every measured distance, we conducted a 5 (hotspot: park, home, unsafe housing block, landfill, and control) × 9 (distance) mixed ANOVA on the valence ratings with a between-subjects planned comparison that contrasted the level of the control condition against the mean level of all other conditions (Helmert contrast). If the negative and positive hotspots have the same amount of influence, then the contrast should not significantly differ from zero. As expected, the Helmert contrast was not significantly different from zero, $t = 0.32$, $p = .75$ (see Figure 2).[6] The mixed ANOVA also revealed a significant distance × hotspot interaction effect, $F(15, 483) = 44.43$, $p < .001$, $\eta_p^2 = .59$. The interaction corresponds to the usual assimilation and contrast effects in spatial context (i.e., increasing ratings with increasing distance from negative hotspots; decreasing pleasantness ratings with increasing distance to positive hotspots; see Blaison et al., 2017; Blaison & Hess, 2016). As these effects are irrelevant for the present purpose, we will not elaborate on them. In sum, the amounts of positive and negative influence were roughly equivalent when we tested the hotspots separately.

Pretest 2

The second pretest investigated whether positive and negative hotspots sharing the same geographical space influence each other mutually. We compared

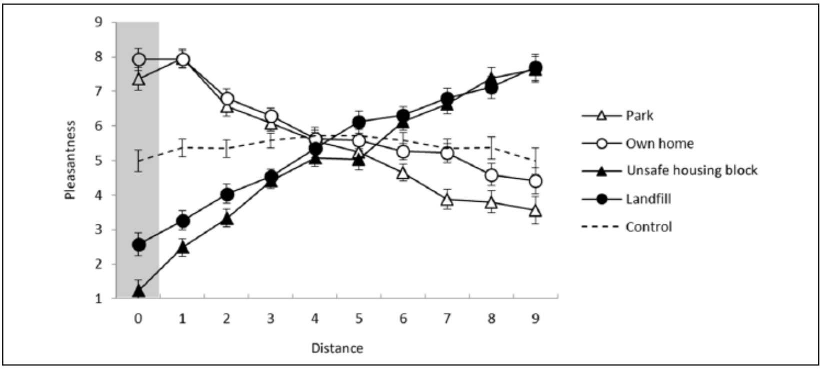


Figure 2. Mean valence ratings as a function of distance and condition (pilot study).
Note. The valence ratings ranged from 1 = *very unpleasant* to 9 = *very pleasant* (5 = midpoint). The data at Distance 0 are excluded from the main analyses. The error bars represent *SE*s.

the evaluation of the hotspots when they were taken in isolation with when they were paired (unsafe housing block + park, unsafe housing block + one's own home, landfill + park, and landfill + one's own home). Based on the available literature, the negative hotspots should be more likely to decrease the positivity of the positive hotspots than the converse, and one's own home should be less vulnerable to negative influence than the park.

Method

Participants and design. A power analysis indicated that to detect a one-sided difference between the means of independent samples with a medium effect size (d = .05), a power (1 − β) = .80, and an alpha (α) = .05 required 51 participants per condition (G*Power 3.1; Faul et al., 2007). We collected a total of 410 observations online via Amazon's Mechanical Turk. However, six participants participated more than once resulting in N = 404 (214 women, all U.S. residents) with a mean age of 36.50 years (SD = 12.26). The participants were randomly assigned to eight conditions. In four conditions, participants saw the park, one's own home, the unsafe housing block, and the landfill alone. The four other conditions showed either the park or one's own home next to the landfill or the unsafe housing block. Five participants were univariate outliers with scores $z > 3$ that were clearly detached from the scores of the rest of the sample. Therefore, N = 399 for the following analyses. The data were collected in two waves. All the following analyses included the wave as a covariate, which did not produce different results.

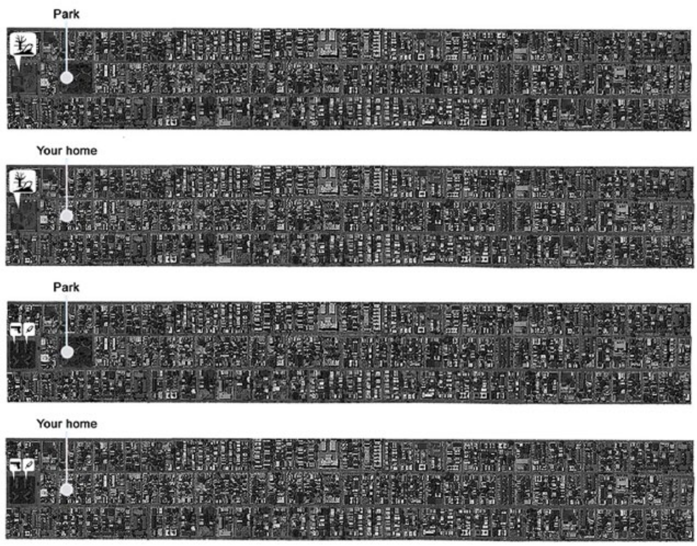


Figure 3. From top to bottom, example of neighborhoods shown in the landfill + park, landfill + home, unsafe housing block + park, and unsafe housing block + home (Pretest 2).
Source. Copyright USGS Products.
Note. The single hotspot neighborhoods are ignored here because they were the same as in Pretest 1.

Stimulus material and procedure. The neighborhoods with the single hotspots were identical to the ones used in Pretest 1, whereas the neighborhoods with the pair of hotspots were built based on the single hotspot neighborhoods (see Figure 3). The participants were asked to rate the pleasantness of each hotspot with the SAM valence scale (Bradley & Lang, 1994). At variance with Pretest 1, Pretest 2 asked the participants how it would feel to spend some time inside of each hotspot. As the evaluation of the hotspots was central to Pretest 2, we worried that the incongruity of living in a public park or a landfill compared with living in one's own home or an unsafe housing project would introduce a confounding factor. For example, some participants could equate living in a public park as being homeless, which is unpleasant to most people. In contrast, spending some time is unproblematic in any kind of hotspot. Pilot testing (81 German students; 41 women; M_{age} = 22.96 years, $SD = 4.95$) showed that the extent of (dis)pleasure to spend some time in a hotspot correlated highly positively with the extent of (dis)pleasure to live in an adjoining housing block—that is, for a park, $r(81) = .50$, $p < .01$;

for an unsafe housing block, $r(81) = .71, p < .01$; see also Study 2: correlation between rating of the park and the adjoining housing block, $r(130) = .59, p < .01$; correlation between rating of the unsafe housing block and the adjoining housing block, $r(130) = .57, p < .01$. In the unsafe housing block + park condition and in the landfill + park condition, the first slide showed a neighborhood with a park, which was accompanied by the following text: “This is a neighborhood with a nice park.” The next slides were identical to those in the unsafe housing block or landfill conditions of Pretest 1. The unsafe housing block + home or landfill + home conditions were built in a similar fashion. The first slide showed a neighborhood with a blue dot marking the participants’ own home, which was accompanied by the same description as in Pretest 1. The instructions for the single hotspot conditions were the same as in Pretest 1. After the instructions, the participants were asked to rate each hotspot, which occurred in a different random order for each participant for the paired hotspot conditions.

Results and discussion. We first tested whether the attitude toward the negative hotspots improved when they were paired with a positive hotspot. For this, we conducted a 2 (negative hotspot: unsafe housing block, landfill) × 3 (pair: negative hotspot + park, negative hotspot + one’s own home, negative hotspot alone) ANOVA on the pleasantness ratings of the negative hotspots. Only a main effect of negative hotspot emerged significantly, $F(1, 288) = 26.47, p < .001, \eta_p^2 = .08$, all other Fs < 1.74 and ps > .17. The unsafe housing block was rated more positively, $M = 2.39$, 95% confidence interval [CI] = [2.18, 2.61], than the landfill, $M = 1.58$, 95% CI = [1.35, 1.80]. In the absence of any significant pair effect, the attitude toward the negative hotspots did not improve through the pairing with a positive hotspot. This result was expected.

We then tested whether the attitude toward the positive hotspots decreased when paired with a negative hotspot. We conducted a 2 (positive hotspot: park, one’s own home) × 3 (pair: positive hotspot + unsafe housing block, positive hotspot + landfill, positive hotspot alone) ANOVA on the pleasantness ratings of the positive hotspots. The results showed significant main effects of positive hotspot, $F(1, 291) = 12.29, p = .001, \eta_p^2 = .04$, and of pair, $F(2, 291) = 76.12, p < .001, \eta_p^2 = .34$, as well as a significant positive hotspot × pair interaction effect, $F(2, 291) = 5.69, p = .004, \eta_p^2 = .04$. The pairing with a negative hotspot decreased the ratings of the positive hotspots, but not to the same extent. Simple effects analyses revealed that whereas participants’ attitude toward the park or one’s own home taken in isolation were similar, $M_{park} = 7.43$, 95% CI = [7.07, 7.79], $M_{home} = 7.27$, 95% CI = [6.91, 7.64], the unsafe housing block decreased the attitude toward the park more, $M_{park} = 3.60$, 95% CI = [3.04, 4.17], than it decreased the attitude toward one's own home, M_{home} = 5.24, 95% CI = [4.66, 5.81], $F(1, 103) = 16.22$, $p <$ .001, $\eta_p^2 = .14$. Similarly albeit less clearly, the landfill decreased the attitude toward the park more, M_{park} = 4.12, 95% CI = [3.47, 4.77], than it decreased the attitude toward one's own home, M_{home} = 4.95, 95% CI = [4.34, 5.57], $F(1, 90) = 3.43$, $p = .07$, $\eta_p^2 = .04$. Interestingly, the attitude toward the park became negative, whereas the attitude toward one's own home became essentially neutral (midpoint of the SAM valence scale = 5).

The results were as expected. Nearby positive hotspots did not improve participants' attitude toward the negative hotspots, whereas the negative hotspots decreased participants' attitude toward the positive hotspots. One's own home resisted negative influence better than the park.

Main Experiment

The main experiment tested the combined effect of a pair of nearby positive and negative hotspots. Pretest 1 showed that the park, one's own home, the unsafe housing block and the landfill all had influences of similar intensity when taken in isolation. When taken in pairs in Pretest 2, the negative hotspots tainted people's attitude toward the positive hotspots (the park more so than one's own home), yet the positive hotspots were unable to brighten up people's attitude toward the negative hotspots. As the positive hotspots are supposedly left with less positive influence to counter negative influence, they can at best mitigate negative influence in the main experiment. Pretest 2, especially the unsafe housing block condition, indicates that one's own home may be more impactful than a park in this respect because it is less devaluated. What is more, if we consider that people give more importance to negative or more intensely evaluative information than to positive or weaker evaluative information, the question arises whether positive hotspots, which should bear weaker positive influence, are able to mitigate any negative influence at all.

If mitigation nevertheless occurs, then pleasantness rating should increase more rapidly as distance to a pair of negative and positive hotspots increases compared with an isolated negative hotspot. This should be especially visible for the condition where the negative hotspot is paired with one's own home rather than a park. On top of this, the potential for mitigation should be highest where both positive and negative influences are substantial (i.e., closest to the hotspots).

Method

Participants and design. We aimed for the same statistical power as for Pretest 2. We kept only the first participation of seven participants who participated more than once. The final sample consisted of 343 participants (207 women, all U.S. residents) with a mean age of 34.99 years (*SD* = 11.45). All the participants were recruited online via Amazon's Mechanical Turk. They were randomly assigned to a 7 (condition: unsafe housing block + park, unsafe housing block + home, unsafe housing block alone, landfill + park, landfill + home, landfill alone, no hotspot) × 10 (distance) mixed design with condition as the between-subjects factor and distance as the within-subjects factor.

Stimulus material and procedure. The instructions and procedures for the different conditions were similar to the corresponding conditions described earlier in Pretest 1 and Pretest 2. As in Pretest 1, the participants were asked to tell a stranger how it would feel to live at the same 10 distances using the SAM valence scale. The analyses, however, will focus on Distance 1 to 9 because it is the area that is relevant to the mitigation hypothesis. Everything else was identical to Pretest 1.

Results and discussion. To test whether the positive hotspots mitigated negative influence or not, we conducted a 2 (negative hotspot: unsafe housing block, landfill) × 3 (pair: negative hotspot + park, negative hotspot + home, negative hotspot alone) × 9 (distance) mixed ANOVA on the SAM valence ratings. Evidence supporting mitigation would entail a significant pair main effect or a pair × negative hotspot or a pair × negative hotspot × distance interaction effect. The results showed significant main effects of pair, $F(2, 293) = 14.98$, $p < .001$, $\eta_p^2 = .09$, and of distance, $F(3, 927) = 403.98$, $p < .001$, $\eta_p^2 = .58$, a significant pair × distance interaction effect, $F(6, 927) = 6.72$, $p < .001$, $\eta_p^2 = .04$, and a significant pair × negative hotspot × distance interaction effect, $F(6, 927) = 3.00$, $p = .006$, $\eta_p^2 = .02$ (see Figure 4). To follow up on the three-way interaction, we conducted two 3 (pair: negative hotspot + park, negative hotspot + home, negative hotspot alone) × 9 (Distance 1 to 9) mixed ANOVAs separately for the unsafe housing block and landfill conditions. For the landfill, the results showed significant main effects of pair, $F(2, 150) = 7.12$, $p = .001$, $\eta_p^2 = .09$, and of distance, $F(3, 424) = 256.12$, $p < .001$, $\eta_p^2 = .51$, and a significant pair × distance interaction effect, $F(6, 424) = 3.84$, $p = .001$, $\eta_p^2 = .05$. Simple effects analyses showed that the slope in the landfill + home condition was significantly different from the one in the landfill alone condition, $F(3, 324) = 3.57$, $p = .012$, $\eta_p^2 = .04$, such that the pleasantness ratings were higher than in the landfill alone condition from Distance 1 to 4 ($p < .05$). Similarly, the slope in the landfill + park condition was significantly different than in the landfill alone condition, $F(3, 272) = 7.26$, $p < .001$, $\eta_p^2 = .07$, such that the pleasantness ratings were higher than in the landfill alone condition from Distance 1 to 3 and lower at

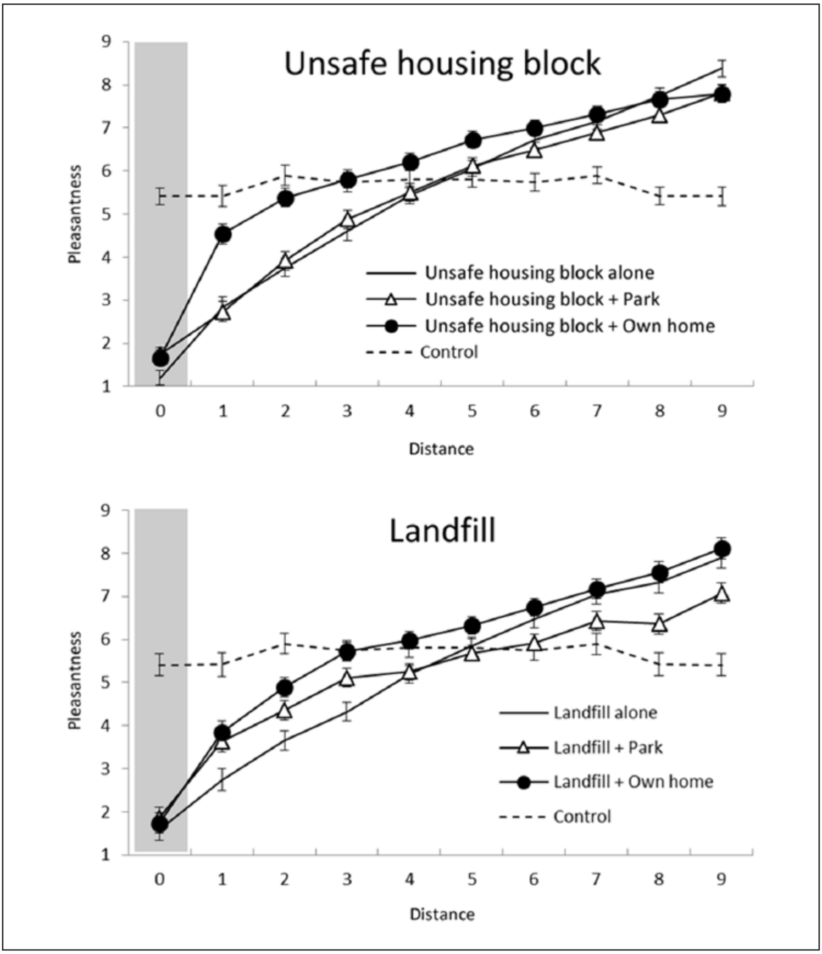


Figure 4. Mean pleasantness ratings as a function of distance and condition (Study 1, main experiment).

Note. The pleasantness ratings ranged from 1 = *very unpleasant* to 9 = *very pleasant* (5 = midpoint). The data at Distance 0 are excluded from the main analyses. The error bars represent *SE*s.

Distance 8 and 9 ($p < .05$). The slope in the landfill + home was similar to the one in the landfill + park, $F(3, 257) = 1.03$, $p = .37$, $\eta_p^2 = .01$. However, the ratings in the landfill + home were generally more pleasant than in the landfill + park condition, $F(1, 101) = 10.47$, $p = .002$, $\eta_p^2 = .09$. This result appears mainly due to the difference farther away from the pair of hotspots; at close distance (Distance 1-3), the difference was not significant ($p > .05$). Thus, both positive hotspots mitigated negative influence stemming from the landfill even though one's own home did slightly better than the park, as expected from the Pretest 2 results.

For the unsafe housing block, the results showed significant main effects of pair, $F(2, 143) = 7.95$, $p = .001$, $\eta_p^2 = .10$, and of distance, $F(4, 528) = 274.38$, $p < .001$, $\eta_p^2 = .66$, and a significant pair × distance interaction effect, $F(7, 528) = 6.42$, $p < .001$, $\eta_p^2 = .08$. Simple effects analyses showed that the slope in the housing block + home condition was significantly different than in the unsafe housing block alone condition, $F(4, 391) = 15.56$, $p < .001$, $\eta_p^2 = .14$, such that the pleasantness ratings were higher than in the unsafe housing block alone condition from Distance 1 to 5 and lower at Distance 9 ($p < .05$). The slope in the unsafe housing block + home was also different from the one in the unsafe housing block + park condition, $F(3, 321) = 4.9$, $p = .001$, $\eta_p^2 = .05$, such that the ratings were more pleasant from Distance 1 to 5 when the unsafe housing block was paired with one's own home rather than with the park ($p < .05$). In contrast, the slope in the unsafe housing block + park condition was similar to the one in the unsafe housing block alone condition, $F(4, 351) = 1.56$, $p = .19$, $\eta_p^2 = .02$. As expected from the devaluation results from Pretest 2, one's own home tended to mitigate negative influence better than the park, especially in the unsafe housing block condition.

To make sure that the observed effect is indeed mitigation and not neutralization, we conducted a 5 (condition: unsafe housing block + park, unsafe housing block + home, landfill + park, landfill + home, no hotspot = control) × 9 (distance) mixed ANOVA on the pleasantness ratings. Neutralization would entail similar levels of pleasantness rating at every measured distance in both the paired hotspots and the control condition. The results showed a significant main effect of distance, $F(3, 785) = 153.47$, $p < .001$, $\eta_p^2 = .39$, a significant main effect of condition, $F(4, 238) = 7.37$, $p < .001$, $\eta_p^2 = .11$, and a significant distance × condition interaction effect, $F(13, 785) = 11.48$, $p < .001$, $\eta_p^2 = .16$ (see Figure 4). To follow up on this result, we tested whether the slope in each paired hotspot conditions was different from the one in the control condition. To do so, we conducted a series of four 2 (condition: paired hotspots, control) × 9 (distance) mixed ANOVAs separately for each type of hotspot pair. For each pair, we found a significant neighborhood × distance interaction effect, all Fs > 18.96, all ps < .001, all η_p^2s > .17.[7] As can be seen in Figure 4, these results confirm that pleasantness rating increased significantly more with growing distance than in the control condition, which supports the hypothesis of mitigation rather than neutralization.

The results from the main experiment show that positive hotspots can at best mitigate negative influence; one's own home is more impactful in this respect

Figure 5. Example of stimuli used in Study 2 with an unsafe housing block at the top and a park with ponds at the bottom.
Note. The white dots mark the target blocks rated by the participants. Only the analyses for the horizontal target blocks from Distance 1 to 8 are reported. Dstce = distance.

than the park. This is in line with the results obtained in Pretest 2 regarding the negativity bias at the hotspot evaluation level. As one's own home retains more positivity than the park, it holds more mitigation potential.

Study 2

If nearby negative hotspots weaken the positive hotspots' capacity to counter negative influence, then increasing distance between them should, on the contrary, strengthen it. The main experiment of Study 1 showed that the park had no mitigation effect when it laid in immediate vicinity of the unsafe housing block. Study 2 tested whether increasing the distance between the park and the unsafe housing block improves the park's capacity to counter negative influence.

Unlike in Study 1, we thus expected participants to integrate positive influence along with negative influence in their evaluation of the surroundings. To test this, Study 2 adopted an individual differences strategy in a different experimental setting. Participants were shown the neighborhood depicted in Figure 5. On a pleasantness rating scale, participants were asked to rate their attitude toward every housing block marked with a white dot in Figure 5, as well as toward the park and the unsafe housing block. We expected the sample of participants to vary in their respective attitudes. If indeed both the park and the unsafe housing block have influence on the surroundings, then variations in attitudes toward the park and toward the unsafe housing block should both be correlated with variations of attitude toward the housing blocks marked with the white dot. In other words, if participants integrated positive influence along with negative influence, then variations in attitude toward both the park and the unsafe housing block should affect the slope of pleasantness rating across the measured distances. More precisely, if mitigation also occurs in Study 2, the pleasantness ratings should increase with increasing distance—the distance effect—and more positive attitudes toward the park or the unsafe housing block should both lead to a shrinking of the distance effect.

Method

Participants and design. To estimate the required statistical power, we conducted a power analysis for a 2 (attitude toward the park: low or high) × 2 (attitude toward the unsafe housing block: low or high) × 2 (distance: nearby or far away) mixed ANOVA with repeated measures on the last factor. To detect a medium effect ($f = .25$) with a power ($1 - \beta$) = .80, an alpha (α) = .05, four groups and two repeated measurements with an estimated correlation of $r = .50$[8] necessitates a sample of $N = 136$ (G*Power 3.1; Faul et al., 2007). One hundred thirty participants were recruited online via Amazon's Mechanical Turk (81 women; all U.S. residents; $M_{age} = 32.11$, $SD = 8.17$). The data collection took place in two waves; all the following analyses included the wave factor as a dummy variable (first wave = 0, second wave = 1), which did not produce different results.

Stimuli and procedure. A realistic bird's-eye view of a fictitious neighborhood was created with the PC game Simcity 4 (Maxis, 2003; see Figure 5). The neighborhood contained one negative hotspot composed of a set of buildings that were described as rife with violence and drug trafficking, one positive hotspot that consisted of a nice park with ponds, and housing blocks that were equidistant from the negative and positive but more or less distant to both of them. The participants were asked to rate the two hotspots as well as the target blocks marked with a white dot in Figure 5. For the hotspots, the participants used the SAM valence scale (Bradley & Lang, 1994) and rated how they would feel if they had to spend some time there. For the target blocks, participants used the SAM valence scale and rated how they would feel if they had to live there. The location of the two hotspots was counterbalanced across participants such that they appeared either on the left or on the right of the neighborhood and such that either the positive or the negative hotspot appeared in the top position. For each trial, a white arrow indicated which block to rate. The order of target block presentation was randomized within

Table 1. Model Parameter Estimates for the Pleasantness Ratings in Study 2.

				95% CI	
Parameter	Estimate	*SE*	*p*	Low	High
Constant	3.63	0.13	<.001	3.38	3.89
Wave	0.11	0.17	.54	−0.24	0.45
Distance	0.44	0.03	<.001	0.38	0.49
NH	0.39	0.07	.001	0.24	0.54
PH	0.21	0.05	<.001	0.12	0.31
Distance × NH	−0.10	0.02	<.001	−0.14	−0.07
Distance × PH	−0.02	0.01	.081	−0.04	0.00

Note. CI = confidence interval; NH = negative hotspot; PH = positive hotspot.

subjects. The ratings of the two hotspots were always collected before the ratings of the target blocks. We chose to report only the ratings of the target blocks in the middle row because they are the most relevant to our purpose (i.e., Distance 1 to 8; see Figure 5).

Results and Discussion

The data were analyzed via multilevel mixture modeling (Snijders & Bosker, 2012). Differences between the distances were modeled as a linear trend. The model consisted of the distance variable, the positive hotspot evaluation variable (grand-mean standardized; Aiken, West, & Reno, 1991), the negative hotspot variable (grand-mean standardized), as well as the distance x negative hotspot and the distance by positive hotspot interaction. Parameters were estimated using full maximum likelihood. The estimates together with their standard errors and 95% CIs are reported in Table 1.

As can be seen in Table 1, the results show that significant effects of distance (distance), positive hotspot (PH), and negative hotspot (NH), as well as a significant distance × NH interaction effect and a marginally significant distance × PH interaction effect emerged (see Table 1). The significant and positive distance parameter estimate means that the pleasantness ratings increase with growing distance at average levels of attitude toward the positive and the negative hotspot. The negative distance × NH and distance × PH parameter estimates mean that this distance effect shrinks with increasingly positive attitudes toward the negative and the positive hotspots, as expected (see Figure 6). Albeit the interaction effect between distance and PH is small, the results suggest that participants in Study 2 integrated the unsafe housing block's as well as the park's influence for judging the surroundings.

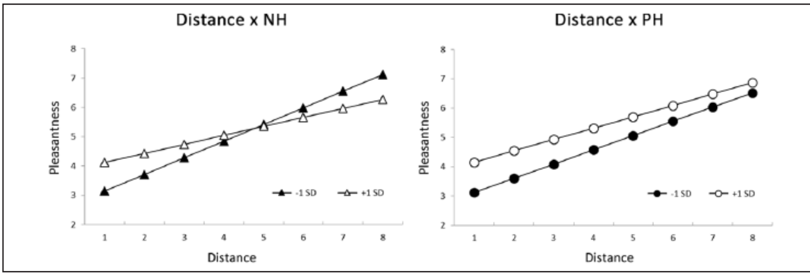


Figure 6. Mean pleasantness ratings of the target housing blocks as a function of distance and NH evaluation (left panel) or PH evaluation (right panel) (Study 2).
Note. The pleasantness ratings for both the target blocks and the hotspots ranged from 1 = *very unpleasant* to 9 = *very pleasant* (5 = midpoint). Low = −1 *SD*; High = +1 *SD*. NH = negative hotspot; PH = positive hotspot.

Increased distance between the unsafe housing block and the park provided better shielding for the park. Additional analyses show that the park was rated positively on average, $M = 6.27$, $SD = 2.43$; one sample *t*-test against the middle point of the scale (5), $t(83) = 4.80$, $p < .001$. This average rating is much higher than the rating of the park in Pretest 2 where the park laid in immediate vicinity of the unsafe housing block (i.e., $M = 3.60$). At the same time, the park was still less intensely positive than the unsafe housing block was intensely negative, $M = 8.08$, $SD = 1.28$; $t(83) = 6.03$, $p < .001$.[9] Thus, it seems that the unsafe housing block still tainted somewhat the park despite the distance between the two. This explains why the effect of the positive hotspot is so small and why the pleasantness ratings increase with growing distance to the hotspots in average.

Would then further increasing the distance separating the park from the negative hotspot lead to neutralization of negative influence? Alternatively, would a positive hotspot that is less vulnerable to negative influence neutralize negative influence at the distance used in Study 2? This is uncertain. Even if positive hotspot devaluation were excluded (negativity bias at the hotspot evaluation level), the possibility would remain that people weigh negative influence more heavily than positive influence all else being equal (negativity bias at the influence integration level). The fact that the participants' attitude toward the park had a weaker effect on their attitude toward the surroundings than their attitude toward the housing project supports this possibility (see Table 1: distance × NH estimate vs. distance × PH estimate). However, as the park was less intensely positive than the unsafe housing block was intensely negative, participants could have also simply lent more attention to the more intense evaluative information independently of valence (Fiske, 1980). Further research is needed to demonstrate the genuine existence of a negativity bias at the influence integration level while controlling for any bias due to influence intensity.

A different concern is that not just lack of safety but also high inhabitant density may have contributed to the particularly negative attitude toward the unsafe housing block. Which of these considerations really drove the negative influence? Whatever the answer to this question, we believe it does not impair the validity of our studies whose aim was to investigate whether positive hotspots can shield against negative influence irrespective of its origin. In any case, lack of safety is likely to weigh more heavily than high inhabitant density on decision making as it carries more serious consequences than the latter. Finally, the shape of our high-density buildings being typical of housing projects in deprived areas could have primed lack of safety because people tend to associate poverty with social disorder and crime (e.g., Sampson & Raudenbush, 2004).

General Discussion

We asked how the combined influences of negative and positive hotspots affect people's evaluation of the surroundings and, specifically, whether positive hotspots can shield the surroundings against the influence of negative hotspots. We proposed that when a negative as well as a positive hotspot influence the same target location, people integrate both influences such that positive influence may cancel out the effects of negative influence. We also raised the possibility that the negative hotspot could taint people's attitude toward the positive hotspot such that it wields less positive influence to oppose to negative influence. In this scenario, positive hotspots can at best hope to mitigate negative influence. Even where this is true, we speculated that positive hotspots could still lose all of their influence as people may pay less attention to influence that is weak and of positive valence than to influence that is intense and of negative valence.

The results of Study 1 supported the mitigation scenario. Due to a negativity bias at the hotspot evaluation level, positive hotspots were devalued in the presence of negative hotspots but not the converse. When the devaluation was severe, as when the park laid in immediate vicinity of the unsafe housing block, no mitigation effect was observed. One's own home did better than the park in this respect. Furthermore, Study 2 suggests that increasing the distance that separated the positive from the negative hotspot attenuated the positive hotspot's devaluation, which resulted in a trend in favor of the mitigation hypothesis.

Implications, Limits, and Future Research

The present results are in line with general theories about the integration of piecemeal evaluative information (Anderson, 1981, 2008; Wyer & Carlston, 1979) and about the weighting of incoming information as a function of its valence and intensity (Anderson, 2008; Baumeister, Bratslavsky, Finkenauer, & Vohs, 2001; Cacioppo, Gardner, & Berntson, 1997; Fiske, 1980; Rozin & Royzman, 2001; Taylor, 1991). The findings extend the new view introduced by Blaison and colleagues, which sees place evaluation as based on two important pieces of evaluative information: the one that ensues from the place's intrinsic properties and the one that ensues from the place's location relative to negative and positive hotspots. Previous research investigated how either an isolated negative hotspot (Blaison et al., in press; Blaison & Hess, 2016) or an isolated positive hotspot (Blaison et al., 2017) influenced people's evaluation of target locations in the surroundings. Here, we showed how target locations are evaluated when both a negative and a positive hotspot share the same geographical space. We also demonstrated that the evaluation of hotspots itself depends on their location relative to other hotspots: When in immediate proximity, negative hotspots devalue positive hotspots, whereas the converse is less likely; positive hotspots resist devaluation better when the distance separating them from negative hotspots increases.

The findings may also extend the existing literature about contagion (e.g., Rozin, Markwith, & McCauley, 1994; Rozin, Millman, & Nemeroff, 1986; Rozin, Nemeroff, Wane, & Sherrod, 1989), which investigates how brief contact with positive or negative objects influences the evaluation of target objects. Contagion research has shown that negative objects influence neutral or positive objects negatively (e.g., Rozin et al., 1986; Springer & Belk, 1994) and that positive objects influence neutral objects positively (e.g., Argo et al., 2008; G. E. Newman et al., 2011). To our knowledge, however, there has been no published research so far investigating people's evaluation of an object simultaneously in contact with both a positive and a negative object. Rozin and Royzman (2001) reported unpublished data in which when a sweater is worn first by a disliked person and then by a liked person (or vice versa), it receives more negative ratings than the algebraic sum of the ratings when taken in isolation. Our results confirm and clarify this idea in the domain of place evaluation. Target locations in the vicinity of both a positive and a negative hotspot feel more negative than in a control condition, yet under some circumstances, they can feel more positive than under negative influence only.

Given that almost everyone has a home to call their own, the fact that it had a more robust mitigating effect than a public park has important implications for the environment perception domain. It seems that one's own home forms a sort of protective bubble where negative influence hits less harshly than elsewhere. This might explain why people who are attached to their home or to their neighborhood perceive less risk from criminality and observe fewer incivilities (e.g., Billig, 2006; Brown, Perkins, & Brown, 2003; De Dominicis, Fornara, Cancellieri, Twigger-Ross, & Bonaiuto, 2015). In Study 1, we asked participants to think of their "own home" as one with strong attachment. Future research should further investigate the superior impact of homes compared with parks. Is it due to strong attachment, ownership, or familiarity? For example, would ownership without attachment (e.g., an apartment one rents to tenants) also mitigate negative influence?

Perhaps it is not homes that are particularly resistant to negative influence but rather parks that are particularly vulnerable to it. One could invoke defensible space theory (O. Newman, 1972), which suggests that public places (like public parks) feel less safe than private places (like homes) because they are more difficult to protect against criminal elements. Yet how does one reconcile the fact that the landfill also devalued the park more than one's own home although it carries no safety issue as such (as opposed to the unsafe housing block)? Then we are back to our initial hypothesis that homes carry some sort of protective powers after all. One's self is associated to one's possessions (Beggan, 1992; Gawronski et al., 2007), and self-protection is a common coping mechanism against threats to the self (e.g., Alicke & Sedikides, 2009). Thus, self-protection could generalize to one's possessions; it could shield the positive representation of one's home against too much devaluation.

As parks had no mitigation potential toward the negative influence of unsafe housing blocks in Study 1, should urban developers stop building parks to brighten up deprived areas? We do not think so. Although the effect was weak, Study 2 suggests that a park placed at some distance could recover some of its mitigation potential. Second, deprived areas are not to be equated with the extreme kind of negative hotspots used in our studies. Future research should investigate whether parks improve people's attitude toward milder negative hotspots and are able to mitigate or even neutralize any remaining negative influence.

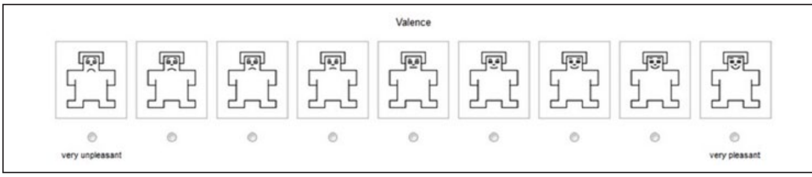
We used bird's-eye views of fictitious neighborhoods and not any other form of spatial representations. Does this affect the external validity of our results? Blaison and Hess (2016) showed that using bird's-eye views of a neighborhood produced the same results as when participants were immersed into a virtual neighborhood or when it was described verbally. Hence, the processes tapped by these authors possess some degree of generalizability; this could be the case here too. At the very least, we can apply these results to the use of online mapping services. Browsing online maps is part of everyday wayfinding, but it has extended to other domains like searching for a new home, looking for a place to go out, or locating potential dating partners, and forms the base of very popular augmented reality applications. This trend is illustrated by the fact that Google Maps has become the 10th most visited webpage in the world in 2016 (Statista, 2016a), and one out of two U.S. smartphone users had installed the Google Maps app in February 2016 (47.8%; Statista, 2016b), which translates into 115,350,000 U.S. smartphone users in July 2016 (Statista, 2016c). For that reason alone, our results possess obvious real-world implications.

A different concern involves the use of vignettes for the home condition in Study 1. Certainly, vignettes do not replace real life. Nevertheless, there is empirical evidence that vignettes are effective at simulating ownership. For example, studies show that imaginary ownership activates the medial prefrontal cortex (MPFC), a neural structure that also controls self-referential processing in real life (Kim & Johnson, 2012, 2014). At any rate, imaginary ownership worked in Study 1 as one's own home was shown to have positive influence; this would be difficult to explain without involvement of the self. A different question is whether someone who has never experienced such a thing can—through a vignette—imagine what it is like to live in a house "owned by [their] family for decades." If not through observational learning, most people likely gained a sense of it from vicarious learning conveyed by movies or books. Even if such a kind of indirect experience elicited smaller ownership effects than a direct one, random assignment to the experimental conditions prevented any systematic effect on the results.

Conclusion

Negative hotspots can taint whole areas, sometimes over large distances. The main idea of this research was to investigate whether a positive hotspot located in the vicinity could cancel out, or at least mitigate, the negative influence a negative hotspot has on the surroundings. As negative information weighs more heavily on judgment than positive information, the ability of positive influence to counter negative influence is not a given. We found that positive hotspots can mitigate but not neutralize entirely the influence of negative hotspots. Some positive hotspots mitigate negative influence better than others because they are less devalued under negative influence. Hotspots are essential elements of the spatial context where place evaluation occurs. To our knowledge, the present work is the first to uncover how the effects of these important elements interact to determine people's evaluation of the surrounding environment.

Appendix



Valence scale inspired from the SAM valence scale.
Note. SAM = Self-Assessment Manikin.

Declaration of Conflicting Interests

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Notes

1. Please note that we focus on the positive influence of one positive element on a negative element when both elements pertain to lateral categories (i.e., categories that have the same level in the categorization hierarchy; for example, Bless & Schwarz, 2010), and not on the phenomenon according to which a hierarchically super- or subordinate positive element influences a sub- or superordinate negative element, respectively.
2. Amazon's Mechanical Turk is an online source of high-quality data (Behrend, Sharek, Meade, & Wiebe, 2011; Berinsky, Huber, & Lenz, 2012; Paolacci, Chandler, & Ipeirotis, 2010). Furthermore, it allows the collection of large samples that are more diverse than student panels (Berinsky et al., 2012). Finally, several studies showed that Mturkers are at least as much attentive and honest than student panels (Behrend et al., 2011; Hauser & Schwarz, 2016; Paolacci et al., 2010).
3. The same selection rule was used in all experiments. We made sure that no Mturk worker participated more than once in the experiments.
4. The shape of the buildings resembled a housing project. We would like to stress that we do not think that housing projects are unsafe. However, partly due to media coverage (Macek, 2006), people generally hold stable negative attitudes toward them (MacLeod, 1995; Wacquant, 2008), which was also confirmed in Blaison and Hess (2016; Study 2). The fact that housing projects reliably elicit negative feelings and that they possess an identifiable shape and a clearly delimited surface area was important for our purpose.

5. The instructions were slightly different for the positive and the unattractive locations because it was important to use exactly the same instructions as in the main experiment for comparison purposes.
6. We also tested the following contrasts: control *versus* unsafe housing block + park, control *versus* landfill + park, control *versus* unsafe housing block + home, and control *versus* landfill + home. As expected, none emerged significantly, all ts < 1.19, all ps > .23.
7. Type I error is unlikely because the adjusted alpha level using the Bonferroni adjustment is $p = .013$.
8. This estimation is based on the high Cronbach alpha value of .82 obtained for the ratings at Distance 1 to 8 in the pilot study with the German students sample mentioned in the "Method" section of Pretest 2. These participants saw the same visual material as the participants in Study 2.
9. To test whether the hotspots were similarly intense, we recoded the ratings of the unsafe housing block such that higher scores indicate greater negativity.

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