



What catches the envious eye? Attentional biases within malicious and benign envy



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HIGHLIGHTS

- Early attention allocation is biased differently within malicious and benign envy.
- Malicious envy biases attention more toward envied persons than their advantages.
- Benign envy is associated with an attentional focus toward means to improve oneself.
- The results highlight the value of functional and process-focused approaches to envy.

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ABSTRACT

We investigated how early attention allocation is biased in envy. Recent research has shown that people experience envy in two distinct forms: malicious envy, which is associated with the motivation to harm the position of a superior other, and benign envy, which is associated with the motivation to improve oneself by moving upward. Based on a functional account of the two forms of envy, we predicted that within malicious envy the cognitive system is geared more strongly toward the other person than toward the superior fortune of the other. In contrast, only within benign envy the cognitive system should be geared toward opportunities to level oneself up. We investigated these hypotheses with dot probe tasks. In line with our reasoning, Experiments 1 ($N = 84$) and 2 ($N = 78$) demonstrate that within malicious envy, attention is biased more toward the envied person than toward the envy object, whereas in benign envy, this difference does not occur. Experiment 3 ($N = 104$) provides evidence that within benign envy, but not in malicious envy, attention is biased toward means to improve one's own outcome. The results suggest that within benign and malicious envy, early cognitive processing is tuned toward different stimuli and thus highlight the utility of functional and process-oriented approaches to studying envy.

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Introduction

"There be none of the affections which have been noted to fascinate or bewitch, but love and envy. They both have vehement wishes; they frame themselves readily into imaginations and suggestions; and they come easily into the eye, especially upon the presence of the objects; which are the points that conduce to fascination, if any such thing there be."

[(Francis Bacon, The Essays, IX Of Envy)]

Languages, scholarly thinking, as well as cultural beliefs suggest a strong relationship between envy and visual attention. Already in its

origin, the word *envy* is related to *seeing* other people and their superior fortunes: The word and its roman language counterparts derive from the Latin word *invidere*, which means "to look upon". Similarly, in Slavic languages the words for envy, as the Russian *savist*, share a root in the verb "to see". The connection of envy and visual attention also pervades historical discourse about this emotion (e.g., Elworthy, 1895/2004), as exemplified in the opening quote by Francis Bacon. In his treatise on envy, Bacon not only describes the power with which elicitors of envy have often been assumed to capture our attention, he also points to the belief in which the alleged connection between envy and visual attention culminates: the superstition that envy elicits the "evil eye." According to this culturally wide-spread belief, by looking at the targets of their envy, envious will involuntarily cast spells, causing bad luck and other forms of harm (Dundes, 1992; Foster, 1972).

In the current research, we investigate whether there is a cognitive basis to the belief that envy influences visual attention. We examine whether envy can bias attention at early stages of processing and, in

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particular, *where* it focusses attention. Which are, in Bacon's terms, "the points that conduce to fascination"? By linking recent evolutionary and motivational accounts of envy with a process-focused approach, we predicted that the answer to this question depends on whether people experience malicious envy or benign envy.

Motivational and cognitive consequences of envy

Envy is a painful emotion that may occur as a result of an unflattering social comparison with another person who is superior in terms of a valued possession, characteristic, or achievement (Parrott & Smith, 1993; Smith & Kim, 2007). Even though envy is usually portrayed as an undesirable and maladaptive emotion, recent theorizing and research has also highlighted its possible functional values. According to an evolutionary account of envy (Hill & Buss, 2008; Hill, DelPriore, & Vaughan, 2011), this emotion has offered selective advantages for survival and reproduction in competitive social environments marked by scarce resources. Envy may have evolved to alert us to being outperformed by other people and to motivate us to level these differences or even surpass our competitors. Relatedly, it has been argued (Johnson, 2012) that the pain we experience when being envious spurs us to mitigate the damaging effects of threatening social comparisons on our self-esteem, its maintenance being a fundamental human need (Tesser, 1988, 2000).

What are the emotional pathways in which envy may contribute to these goals? Recent research on the experiential content and the motivational consequences of envy episodes (Van de Ven, Zeelenberg, & Pieters, 2009, 2011a) shows that envious responses to superior others occur in two qualitatively distinct forms: malicious envy and benign envy. Both have several commonalities—they are highly negative emotions that are marked by strong feelings of inferiority and frustration and they appear to occur with similar frequency. Nevertheless, they are experienced differently and they have distinct motivational consequences. Malicious envy is characterized by hostile feelings toward the envied person and action tendencies intended to damage his or her position. In contrast, benign envy is characterized by a more positive regard of the other person, desire for the superior fortune and the action tendency to improve one's own position by moving upward (Van de Ven et al., 2009).

Malicious and benign envy may reflect distinct functional ways in which enviers react to and strive to even out a comparative disadvantage in order to protect their self-esteem and compete for scarce resources. Malicious envy emerges if the envier appraises the envied person's advantage as undeserved and personal control as low (Van de Ven, Zeelenberg, & Pieters, 2012). From a functionalist perspective, leveling the envied person down should be preferred if an outcome is difficult to change by effort. In contrast, benign envy emerges if the envier appraises the envied person's advantage as deserved and personal control as high (Van de Ven et al., 2012). Increasing one's effort should be more functional in those situations.

Here, we argue that if this reasoning is correct, the cognitive system should be tuned in different ways within malicious and benign envy. Recent research has begun to take a closer look at how envy and threatening social comparisons impact cognition. Hill and colleagues (2011) have proposed that envy motivates people to attend more carefully to information about advantaged others, who may provide valuable knowledge. In line with this prediction, they found that envious participants invested more time in reading fictitious interviews with upward comparison standards and, subsequently, had better memory about this information.

However, the other person is not the only stimulus that is central in envy. Each episode of envy, be it malicious or benign, is defined by a triangular structure: In addition to the envier, it consists of an envied person but also of an envy object—the superior possession, characteristic, or achievement of the envied person that the envier is lacking (e.g., Heider, 1958; Parrott & Smith, 1993). A central goal of the current

research is to shed light on the attentional effect of envy on this other central element. Does envy affect how enviers process information about envy objects or the means to attain it? Furthermore, we were interested in whether envy affects early cognitive processing—a question left open by Hill et al.'s (2011) findings which may reflect more intentional and strategic concerns.

Both possibilities are suggested by recent research. For example, it has been shown that threats to self-evaluation posed by co-actors cause a more focused attention to performance-related characteristics of the task in question (Muller & Butera, 2007). Also, envy can cause an impulsive inclination to approach envy objects (Crusius & Mussweiler, 2012). However, what is unclear from this research is a) whether malicious and benign envy may have different consequences for cognitive processing and b) whether the influence of malicious and benign envy on cognition differs for the various stimuli that may be important in envy situations. The aim of the present research is to reduce these gaps by investigating the impact of malicious and benign envy on early attention allocation.

Attentional bias toward motivationally relevant stimuli

It is well-established that emotional stimuli can shift human attention automatically at early stages of processing. Predominantly, such attentional biases have been documented with threatening environmental stimuli, such as fear-related words and pictures, or angry faces (Bar-Haim, Lamy, Pergamin, Bakermans-Kranenburg, & van IJzendoorn, 2007). Recent research suggests however, that generally, attention is shifted toward stimuli that are highly relevant to a person's needs and goals. For example, attentional biases have also been shown in response to positively valenced stimuli such as babies (Brosch, Sander, & Scherer, 2007) or objects of addiction (Mogg, Bradley, Field, & Houwer, 2003). Furthermore, attentional biases have been demonstrated to be highly flexible, such that the allocation of attention is influenced by temporary motivations, like activated romantic goals (Koranyi & Rothermund, 2012; Maner, Gailliot, Rouby, & Miller, 2007) or temporary goals set by current tasks (Moskowitz, 2002; Vogt, De Houwer, Crombez, & Van Damme, 2013). These findings dovetail with appraisal-theoretic (e.g., Ellsworth & Scherer, 2003), social-cognitive (e.g., Moskowitz, Li, & Kirk, 2004) and evolutionary conceptualizations (e.g., Neuberg, Kenrick, Maner, & Schaller, 2004) of how the cognitive apparatus is geared towards the attainment of important emotional, personal, and fitness-related goals.

Envy and attention allocation

Given that attentional prioritization is driven by the motivational relevance of environmental stimuli, the question arises what bears the most importance within episodes of malicious and benign envy? What will catch the envious eye?

Arguably, within malicious envy, the main motivational focus lies on the envied person. This notion follows from the functional argument that envied persons might offer information on how to level them down (Hill et al., 2011; Johnson, 2012). In contrast, from a functional perspective, the motivational relevance of envy objects should be comparatively low in episodes of malicious envy. Such episodes are caused by people's subjective feeling of low control to overcome their disadvantage (Van de Ven et al., 2012). Hence, focusing on the envy object should not have much adaptive value. In fact, malicious envy can go along with a devaluation of envy-eliciting consumer products (Van de Ven, Zeelenberg, & Pieters, 2011b, Exp. 3), a parallel to the finding that threatening social comparisons sometimes cause a diminished importance of compared achievement domains (Tesser & Campbell, 1980).

In principle, an extreme way to deal with a disadvantaged position in malicious envy is to destroy the envy object or to take it away from the envied person by force or other means. Note, however, that this strategy will only be possible for a small subset of the wide variety of

envy objects. More often than not, it will be very difficult if not impossible, to ruin or steal envy objects that include intangible possessions, internal characteristics, and past achievements. Furthermore, there is a manifold of easier strategies to level envied persons down. For example, enviers may target their social relations, impair their success in another domain, or reduce their status only mentally by switching to a more advantageous comparison dimension, to name a few. Thus—even though the envy object is a necessary and defining component in the elicitation of malicious envy (it is what enviers strived for initially)—a functional account predicts that, with regard to its motivational outcomes, it should be less relevant than the other person. Therefore, we hypothesized that in malicious envy the focus of attention will be more strongly on the envied person than on the envy object.

Conversely, in benign envy, the envy object should be highly relevant as it constitutes the enviers' attainable goal. This is suggested by several findings: Benign envy increases the willingness to pay (Van de Ven et al., 2011b) and, presumably, the impulsive desire for coveted consumer products (Crusius & Mussweiler, 2012), and improves upward persistence and performance (Van de Ven et al., 2011a). Nevertheless, we follow Hill et al.'s (2011) conjecture that the envied person is also of high relevance in benign envy, as it provides valuable information about how to succeed. Indeed, this is a central motive for comparing with upward standards (Taylor & Lobel, 1989; for a review, see Corcoran, Crusius, & Mussweiler, 2011). Therefore, we predicted that benignly envious participants would deploy attention toward envy objects and envied persons to an equal extent.

However, the envied person is not the only stimulus that might be instrumental in overcoming the disadvantage that has caused an episode of benign envy. Benign envy activates a goal to level oneself up (Van de Ven et al., 2009). Goals are desired end states that are mentally represented alongside means to attain them (Kruglanski et al., 2002). Means that are conducive to reach benign envy's goal should therefore become activated, get motivationally relevant, and, consequently, attention should be shifted toward them (Vogt, Lozo, Koster, & De Houwer, 2011). Hence, we predicted that within benign envy but not within malicious envy, attention should be biased toward stimuli that are instrumental in attaining an envy object.

The present research

We investigated these hypotheses in a series of three experiments. In all of them, we asked participants to recall, vividly re-experience, and describe a personal episode of either malicious or benign envy. To do so, we took advantage of the fact that in the German language (as, for example, in Dutch or Russian, cf. Van de Ven et al., 2009) there exist specific words referring to the two types of envy. The direct translation of the English word envy is *Neid*, which, as its English counterpart, encompasses both benign and malicious envy. However, *Missgunst*, a synonym of *Neid*, specifically refers to resentful, begrudging feelings toward the superior fortunes of another person (Duden, *Deutsches Universalwörterbuch*, 2011; Weigand, 1852). We used the corresponding verb *missgönnen* (i.e., the act of feeling *Missgunst*) to elicit malicious envy in our studies. To elicit benign envy, we used the verb *beneiden*.¹ Even though the root word of *beneiden* is the unspecific *Neid* (both words stem from the Old High German word *nidōn*, meaning “to hate” and/or “to envy”) its New High German meaning refers to feelings that are characterized by envious desire but not by hostile feelings against the other person (Weigand, 1852). To confirm that these words capture the intended differences in emotional responding among our German sample, we conducted a close replication of Van de Ven et al.'s (2009) Study 1. In line with the original findings and

corroborating the translation of the emotional terms, the study confirmed that benign and malicious envy differed from each other, but were also distinct from the neighboring emotions admiration and resentment (see the Supplementary Data; Study S1).

In our main experiments, after having re-experienced the emotional episodes of benign or malicious envy, participants completed a variant of the dot probe task (MacLeod, Mathews, & Tata, 1986) that is widely used to measure the deployment of attention (e.g., Bar-Haim, Lamy, Pergamin, Bakermans-Kranenburg & van IJzendoorn, 2007; Brosch & Van Bavel, 2012; Cooper & Langton, 2006; Trawalter, Todd, Baird, & Richeson, 2008; Vogt et al., 2011, 2013; Young & Claypool, 2010). In this paradigm, participants engage in the simple task of detecting whether a dot appears on the right or on the left side of the computer screen. Crucially, before the dot appears, a pair of cues is displayed at the potential locations of the dot. If participants shift their attention to one of the cues they should be able to react faster to the dot appearing at the location that is congruent rather than incongruent with the location of this cue.

In Experiment 1, we used the names of participants' envied persons along with their superior fortunes as idiosyncratic experimental stimuli in the dot probe task. Specifically, in each experimental trial, the name of the envied person and the envy object were presented as cues and they were thus put into direct competition for attentional resources. In order to target automatic attention allocation, we presented these cues in the dot probe task very briefly, namely for 100 ms (e.g., Brosch & Van Bavel, 2012; Cooper & Langton, 2006; Yiend, 2010). We expected that malicious, but not benign, envy would prioritize attention more strongly toward the envied person than toward the envy object. In Experiment 2, we sought to confirm these findings with standardized pictograms symbolizing the envied person and participants' envy objects. In addition, in this experiment, the envied person and the envy object were not presented simultaneously but alongside neutral stimuli to measure attentional effects when the experimental stimuli did not compete for attention. Finally, Experiment 3 was aimed at demonstrating that when they experience benign envy, people focus attention toward means that promote upward goal attainment. To this end, we asked participants to recall an episode of malicious or benign envy in an academic achievement situation. We predicted that benign envy but not malicious envy biases attention toward stimuli that are instrumental in improving one's own academic performance.

Experiment 1

Method

Participants

Ninety-six University of Cologne undergraduates with several different majors participated in Experiment 1. Ten participants had to be replaced during data collection and were thus deleted before data analysis. Contrary to our instructions, they either entered envy objects that were too long to be displayed on the screen during the dot probe task ($n = 1$), entered names of persons that we had also used in the filler trials ($n = 5$), or erroneously entered the same word for the envy object and the envied person ($n = 3$). Additionally, because of technical problems, the reaction times of one participant were not recorded. During data analysis, we excluded one participant because of extensive errors in the dot probe task, $z > 3.29$ (i.e., outside of the 99.9% CI, Tabachnick & Fidell, 2007) and one participant who did not describe an episode of envy.² The final sample size³ was 84. The mean age was 23.88 years ($SD = 4.22$, range: 18–40). Twenty-five were male. Participants received a chocolate bar or a coffee voucher as compensation.

¹ *Missgunst* (the noun of the verb *missgönnen*) and *beneiden* respectively translate to the Dutch words *afgunst* and *benijden* (Langenscheidt, *Taschenwörterbuch Niederländisch*, 2012) used by Van de Ven et al. (2009) to elicit malicious and benign envy in a Dutch sample. Both words translate to the English “(to) envy”.

² Including the participant with extensive errors and the participant who did not write about envy in the data analyses did not change the level of significance of any finding.

³ In all of the three experiments, the exclusion of participants was unrelated to the experimental conditions, $\chi^2(1) < 1.90$, $ps > .17$.

Materials and procedure

The experimenter approached participants in a campus building and invited them to take part in a study on emotional experiences. They were then led to separate cubicles. The experiment was presented on a PC with a 17 in. monitor. The distance between the participant and the screen was approximately 50 cm. After seating them, the experimenter left the room and the computer provided the instructions.

Participants were randomly assigned to one of two recall conditions (malicious envy vs. benign envy). After writing down their experience, participants performed the dot probe task, answered manipulation check items, and indicated their demographics. At the end, they were thanked, given the opportunity for an extensive debriefing, and received their compensation.

Recall task

The recall task was modeled after previous research in which specific emotions were elicited by having participants recall an emotional episode they previously went through (Roseman, Wiest, & Swartz, 1994). One half of the participants was asked to recall an episode in which they felt malicious envy (*missgönnen* in German), whereas the other half was asked to recall an episode of benign envy (*beneiden* in German). They were further instructed to close their eyes and to re-experience the situation as vividly and authentically as possible. Participants should try to recall the emotion and ask themselves how they felt when the experience was most intense. Then, we asked them to type the name of the person they envied, as well as what they envied this person for (i.e., the envy object) into the computer. We instructed participants to type in only one word for the name and the envy object with the first letter being upper case and the others being lower case. If they did not know the envied person's name or had difficulty labeling the envy object, they should invent a new word. Afterwards, participants were asked to describe their experience on a sheet of paper provided next to the computer. They should do so as if they would describe the episode to a good friend, using the envied person's name and the envy object label they indicated before.

Dot probe task

The dot probe task consisted of 60 trials of which four were practice trials to familiarize participants with the task. The remaining trials were ordered into 7 blocks in which there was one trial for each combination of a 2 (envied person left/envy object right vs. envied person right/envy object left) \times 2 (dot left vs. dot right) design, plus an equal number of filler trials. Within each block, the trials were presented in random order. We deliberately decided to use a relatively small number of trials because we suspected that the effect of the emotion elicitation procedure might wear off during a long dot probe task.

Each trial started with a fixation cross that was displayed for a randomly determined interval of 1000 to 3000 ms in order to prevent practice of the time course of the trials. Then, in each experimental trial, the envied person and the envy object were simultaneously displayed for 100 ms in black Arial font, size 20, on a white background at a visual angle of approximately 7° either left or right of the screen's midpoint. If the name appeared on the left side, the envy object appeared on the right side, and vice versa. In the filler trials, four different person names and objects were used. Immediately after the presentation of the words, a small, grey dot was displayed on the right or left side of the screen, replacing one of the cue words. The dot remained on the screen until the participants responded. Their task was to decide as quickly as possible whether the dot was presented on the right side or on the left side by pressing the right or left button of a response box, respectively.

We had anticipated that the person names ($M = 5.71$, $SD = 1.56$) would have fewer characters than the object labels ($M = 7.70$, $SD = 3.26$) which was the case, $t(83) = -5.01$, $p < .001$. Therefore, our filler names also had fewer characters ($M = 5.00$, $SD = 0.82$) than our filler objects ($M = 7.00$, $SD = 2.31$). Including the number of characters of

the experimental stimuli in each category as covariates in our analyses did not change the level of significance of any finding.

Manipulation check

Following the dot probe task, participants answered 22 randomly ordered manipulation check items. We instructed them that we would refer to the envied person as “the person” and to his or her quality, possession, or achievement as “the object” of their envy. For the full wording of the manipulation check items refer to the Supplementary Materials. The manipulation check included eight items measuring malicious envy (e.g., “I felt malicious envy toward the person about the object.”, “I would have liked to hurt the person.”; $\alpha = .87$) and eight items measuring benign envy (e.g., “I felt benign envy toward the person about the object.”, “I wanted to try harder to obtain the object as well”; $\alpha = .60$), which were taken from or inspired by the items used by Van de Ven et al. (2009). Furthermore, we included three items to measure how much the other person deserved his or her advantage (e.g., “The person did not deserve the object.”, reverse coded; $\alpha = .84$), as deservingness is a key appraisal that differentiates the two forms of envy (Van de Ven et al., 2009, 2012). Finally, we included three items to measure the intensity of negative affect participants had experienced in the situation (e.g., “To see the person with the object elicited intense negative feelings in me.”; $\alpha = .71$). Participants were asked to indicate how much these items apply to their situation on a scale from 1 *does not apply at all* to 7 *does apply very much*. Based on the theoretical distinction between malicious and benign envy, we expected higher values on the malicious envy scale for the malicious envy condition compared to the benign envy condition, the reversed pattern for the benign envy scale, lower deservingness ratings for the malicious envy condition than for the benign envy condition, and equal values for the intensity of negative affect.

Results

Manipulation check

We analyzed averaged scores of the rating items for malicious envy, benign envy, deservingness and the intensity of negative affect in a MANOVA with Envy Condition (malicious vs. benign) as the independent variable. The analysis resulted in a significant multivariate effect of Envy Condition, $F(4, 79) = 9.84$, $p < .001$, $\eta_p^2 = .33$. The pattern of results can be found in Table 1. As expected and confirmed by subsequent univariate analyses, the malicious envy condition was associated with significantly higher values on the malicious envy scale than the benign envy condition, $F(1, 82) = 30.35$, $p < .001$, $\eta_p^2 = .27$, and the reverse was true for the benign envy scale, $F(1, 82) = 16.26$, $p < .001$, $\eta_p^2 = .17$. Also, participants in the malicious envy condition rated the advantage of the envied person to be less deserved, $F(1, 82) = 26.24$, $p < .001$, $\eta_p^2 = .24$. Even though, descriptively, the malicious envy episodes received somewhat higher scores than benign envy episodes on

Table 1

Means (and standard deviations) of the manipulation check scales of Experiments 1, 2, and 3 by Envy Condition.

Envy Condition	Scale dimension			
	Malicious Envy	Benign Envy	Deservingness	Intensity of Negative Affect
<i>Experiment 1</i>				
Malicious	4.07 (1.15)	4.41 (0.86)	2.63 (1.54)	5.44 (1.18)
Benign	2.48 (1.47)	5.18 (0.87)	4.50 (1.78)	4.95 (1.59)
<i>Experiment 2</i>				
Malicious	3.99 (1.25)	4.25 (1.11)	2.35 (1.39)	5.44 (1.29)
Benign	2.90 (1.48)	4.99 (1.07)	3.62 (1.90)	5.38 (1.51)
<i>Experiment 3</i>				
Malicious	4.10 (1.55)	3.79 (1.23)	2.65 (1.33)	5.10 (1.49)
Benign	3.11 (1.49)	4.51 (1.18)	3.83 (1.81)	4.77 (1.36)

the scale measuring the intensity of negative affect, this difference was not statistically significant, $F(1, 82) = 2.49, p = .12, \eta_p^2 = .03$.

Dot probe task

Before we analyzed the results of the dot probe task, we removed trials in which participants incorrectly identified the location of the dot⁴ (2.2% of the reaction times) and reaction time outliers. Because of the relatively small number of trials, we made an a priori decision to remove outlier trials based on a conservative criterion, excluding those with a within person z -value exceeding ± 3.29 (i.e., those outside of the 99.9% CI, Tabachnick & Fidell, 2007). For this reason, we discarded 1.1% of the reaction times.⁵ We averaged reaction times for each participant for experimental trials in which the location of the dot was congruent with the location of the envied person's name (and therefore incongruent with the envy object) and congruent with the envy object (and therefore incongruent with the envied person's name).

Note that, in the dot probe paradigm, attentional bias can result in two ways: Participants may be faster to respond to trials in which the dot location is congruent with the location of an emotional "prime" stimulus. Participants may also be slower to respond to trials in which the dot location is incongruent with the emotional "prime's" location. These different patterns of biases have sometimes been related to attentional engagement (when a stimulus attracts attention) and attentional disengagement (when it is difficult to steer attention away from a stimulus) and variants of the dot probe paradigm have been designed to disentangle them (e.g., Fox, Russo, Bowles, & Dutton, 2001; Koster, Crombez, Verschuere, & Houwer, 2004). Nevertheless, how attentional engagement and disengagement contribute to attentional biases and how to trace them empirically is still a matter of much debate (see e.g., Grafton & MacLeod, in press; Sheppes, Luria, Fukuda, & Gross, 2013). In our research, we had no differential predictions with regard to the effect of malicious and benign envy on these components of attention. Therefore—in parallel with most other research using the dot probe paradigm—our hypotheses in all three experiments relate to how differences between congruent and incongruent trials vary across the experimental conditions and stimulus types—in other words, the interaction of congruency with the other factors of the design. For the sake of completeness, we always report the results on this analytical level. In the interest of comprehensibility, we also report the results on attentional bias scores computed by subtracting the reaction time to congruent trials from the reaction times of incongruent trials, which are fully equivalent to the results of the full design.

Crucially, as hypothesized and as confirmed by a planned contrast, malicious envy led to faster latencies for trials in which the dot was congruent with the envied person (and incongruent with the envy object; $M = 389$ ms, $SD = 62$) than for trials in which the dot was congruent with the envy object (and incongruent with the envied person; $M = 405$ ms, $SD = 67$), $F(1, 82) = 14.30, p < .001, \eta_p^2 = .15$. Conversely, and also in line with our prediction, the contrast within the benign envy condition was not significant, $F(1, 82) = 0.77, p = .38, \eta_p^2 = .01$.

⁴ To investigate the distribution of errors, we reran the main analyses of the three experiments with errors instead of reaction times. The experimental factors did not affect the error rates in main effects nor interactively, $F_s < 1.88, p_s > .16$. The only exception is Experiment 2, in which there was a strong main effect of Congruency, $F(1, 76) = 20.70, p < .001, \eta_p^2 = .21$. Participants made more errors when the dot was congruent with the object or the person symbol ($M = 3.5\%$, $SD = 6.5$) than when it was congruent with the neutral stimuli ($M = 1.2\%$, $SD = 3.3$). This finding matches the reaction time main effect for this factor.

⁵ The number of outliers was not related to the experimental conditions in Experiments 1 and 2, $t_s < 0.51, p_s > .60$. In Experiment 3, there was a non-significant trend toward more outliers in the benign envy condition ($M = 1.3\%$, $SD = 1.0$) than in the malicious condition ($M = 0.9\%$, $SD = 1.2$), $t(102) = -1.85, p = .07$. Including the number of outliers in the main analysis of Experiment 3 as a covariate does not alter the significance of any reported effect. When analyzing the dot probe results of Experiments 1–3 without excluding these outliers, the pattern of results remains the same, and the level of significance of the predicted contrasts are unaffected. However, for Experiments 2 and 3 the p -values of the interactions are reduced to $p = .15$ and $p = .06$, respectively.

In this condition, participants were equally fast in responding to the dot regardless of whether it was congruent with the envied person ($M = 377$ ms, $SD = 53$) or with the envy object ($M = 381$ ms, $SD = 46$). The data pattern corresponded to a significant interaction effect, $F(1, 82) = 4.39, p = .04, \eta_p^2 = .05$, in an ANOVA on the reaction times with Envy Condition (malicious vs. benign) and Trial Type (congruent with envied person/incongruent with envy object vs. congruent with envy object/incongruent with envied person) as independent variables with repeated measures on the last factor. The interaction qualified a main effect of Trial Type, $F(1, 82) = 11.01, p = .001, \eta_p^2 = .12$ (faster reaction times for trials in which the dot was congruent with the envied person). The main effect of Envy Condition was not significant, $F(1, 82) = 2.30, p = .13, \eta_p^2 = .03$.

To illustrate the results (also see Fig. 1), we additionally computed bias scores subtracting the reaction times of trials in which the dot was congruent with the person from the trials in which it was congruent with the object. Thus, larger bias scores mean more bias toward the person than toward the object. The results show a mean bias of 16 ms ($SD = 31$) toward the person compared to the object in the malicious envy condition, which, commensurate with the contrast test in this condition, is statistically different from zero. Conversely, in the benign envy condition, there was no significant bias toward the person compared to the object ($M = 4$ ms, $SD = 23$). Furthermore, the interaction in the full design is equivalent to a significant difference between the bias scores within the malicious versus benign envy conditions.

Discussion

The results of Experiment 1 showed that attention is deployed differently within malicious and benign envy. Maliciously envious participants shifted their attention more strongly toward the person they envied rather than to the object they envied this person for. In contrast, benignly envious participants attended to the envied person and the envy object to an equal extent. In line with a functional account of envy, these results point to the different motivational relevance of the envied person and the envy object in benign and malicious envy.

Experiment 2

We found the results of Experiment 1 by displaying participants' labels for the envied person's name and the envy object as idiosyncratic stimuli in the dot probe task. A downside of their idiosyncratic nature was the reduced experimental control over them and, consequentially,

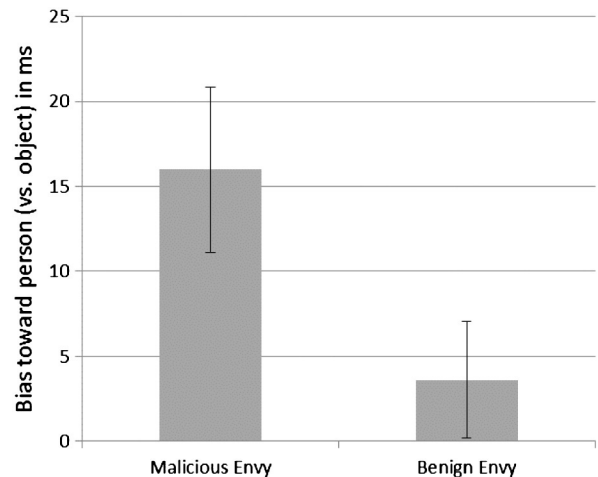


Fig. 1. Mean attentional bias toward the person vs. the object (computed by subtracting trials that were congruent with the person/incongruent with the object from trials that were incongruent with the person/congruent with the envy object) in ms ± 1 SE for the malicious envy and benign envy conditions of Experiment 1.

a relatively high exclusion rate. In Experiment 2, we sought to conceptually replicate these results with more standardized stimuli. Furthermore, instead of putting the envied person and the envy object in direct competition for attentional resources by presenting them simultaneously, we presented person and object stimuli in separate trials alongside neutral stimuli in Experiment 2.

Method

Participants

Eighty-one University of Cologne undergraduates with several different majors completed the experiment in exchange for a chocolate bar or a coffee voucher. Before data analysis, we omitted the data of one participant who had a physically impaired arm and had, therefore, difficulties completing the reaction time task. Additionally, we excluded one participant who produced extensive errors in the dot probe task ($z > 3.29$) and one participant who did not write about an episode of envy.⁶ Hence, the final sample consisted of 78 participants. Their mean age was 23.14 years ($SD = 3.06$; range: 19–32). Twenty-eight of them were male.

Materials and procedure

The method was largely identical to the method of Experiment 1. Thus, only changes are explained in more detail.

Recall task and manipulation check

Participants again recalled an experience in which they felt malicious envy or benign envy towards another person. This time, participants did not type in the name of the person they envied and the object this person had. Instead, they were presented with two icons after having written down their stories, depicting the shape of an upper body and a treasure chest (see Fig. 2). They were instructed to imagine that the first icon symbolizes the person they envied, and that the second one symbolizes the object of their envy. To create a strong association of the icons with their intended meaning, participants afterwards answered the 22 manipulation check items of Experiment 1 in which the terms 'Person' and 'Object' were replaced by the two icons. The icons for 'Person' and 'Object' appeared equally often among the manipulation check items. Reliabilities of the scales were again acceptable ($\alpha = .86$, $\alpha = .74$, $\alpha = .82$, and $\alpha = .73$ for the malicious, benign, deservingness, and intensity of negative affect scales, respectively). To test whether participants could easily imagine that the symbols represented their envy object and the envied person, we conducted a complementary validity check which we report as Study S2 in the Supplementary Materials. The study shows that the vast majority of the participants considered it to be easy to associate the symbols with their intended meanings. Furthermore, the extent to which they did was not affected by whether they reported an episode of either malicious or benign envy.

Dot probe task

After completing the manipulation check items, participants proceeded with the dot probe task. The task consisted of 75 trials including 3 practice trials. In each of 6 blocks, there was one trial for each combination of a 2 (envied person trial vs. envy object trial) \times 2 (prime location left vs. prime location right) \times 2 (dot location left vs. dot location right) design. The two icons were used as stimuli for the envied person and the envy object, respectively, with a width and length of approximately 2 cm. In these trials, one of the icons was presented simultaneously with one of eight neutral stimuli (see Fig. 2). Additionally, each block contained four filler trials in which only neutral stimuli were presented. As in Experiment 1, a fixation cross was presented for

a) Stimuli used in Experiment 2



b) Sample manipulation check item



Fig. 2. a) Icons used as stimuli in Experiment 2. The first icon on the left represented the envied person, the second represented the envy object, and the last three are a subset of the neutral stimuli used in the dot probe task. b) The envied person icon and the envy object item were also used in the manipulation check items. The sample manipulation check item translates to "I would have liked to take [the envy object] away from [the person].".

1000 to 3000 ms, followed by the symbols for 100 ms which were replaced by the dot until participants made a response.

Results

Manipulation check

A MANOVA revealed a significant multivariate effect of Envy Condition (malicious vs. benign) on the malicious envy, benign envy, deservingness and the intensity of negative affect scales, $F(4, 73) = 5.06$, $p = .001$, $\eta_p^2 = .22$. The pattern of results can be found in Table 1. The malicious envy condition was associated with significantly higher values on the malicious envy scale than the benign envy condition, $F(1, 76) = 12.47$, $p = .001$, $\eta_p^2 = .14$, and the reverse was true for the benign envy scale, $F(1, 76) = 9.00$, $p = .004$, $\eta_p^2 = .11$. Also, participants in the malicious envy condition rated the advantage of the envied person to be less deserved, $F(1, 76) = 11.20$, $p = .001$, $\eta_p^2 = .13$. However, the envy conditions did not differ in terms of the intensity of negative affect, $F(1, 76) = 0.04$, $p = .85$, $\eta_p^2 < .001$.

Dot probe task

Reaction times were averaged after excluding incorrect responses (2.5% of the reaction times; for their distribution see footnote 4) and within person outliers (z larger than ± 3.29 ; 0.8% of the reaction times; see footnote 5). We calculated mean reaction times within each combination of a 2 (Stimulus: envied person vs. envy object) \times 2 (Congruency: congruent vs. incongruent) design. A trial was denoted as congruent if the dot appeared at the location of the envied person or the envy object and it was denoted as incongruent if the dot appeared at the location of a neutral stimulus. The pattern of reaction times can be inspected in Table 2.

We predicted that within the malicious envy condition (but not within the benign envy condition), there should be a stronger bias toward the envied person than toward the envy object. In other words, participants in this condition should be responding faster in trials in which the dot was congruent (relative to incongruent trials) with the envied person than when the dot was congruent with the envy object. This hypothesis corresponds to a planned contrast that tests the interaction between Stimulus (envied person vs. envy object) and Congruency (congruent vs. incongruent) within the malicious envy condition. As predicted, this contrast was significant, $F(1, 76) = 18.41$, $p < .001$, $\eta_p^2 = .20$. Conversely, and also in line with our prediction, there was no significant interaction in the benign envy condition, $F(1, 76) = 0.83$, $p = .37$, $\eta_p^2 = .01$. This pattern of results corresponds to a significant Envy Condition \times Stimulus (envied person vs. envy object) \times Congruency (congruent vs. incongruent) interaction, $F(1, 76) = 5.71$, $p = .02$, $\eta_p^2 = .07$ in an ANOVA with reaction times as dependent variables

⁶ Including these participants did not change the level of significance of any finding.

Table 2

Mean reaction times (and standard deviations) in ms of Experiment 2 as a function of Trial Type, Congruency, and Envy Condition.

Congruency			
Trial Type	Congruent ^a	Incongruent ^b	Attentional Bias Score ^c
<i>Malicious Envy Condition</i>			
Envied Person	363 (32)	344 (36)	–19 (35)
Envy Object	387 (31)	345 (35)	–42 (28)
<i>Benign Envy Condition</i>			
Envied Person	374 (39)	345 (36)	–29 (25)
Envy Object	389 (42)	355 (37)	–34 (23)

^a Congruent trials refer to trials in which the dot replaced the stimulus mentioned under Trial Type and not a simultaneously presented neutral stimulus.

^b Incongruent trials refer to trials in which the dot did not replace the stimulus mentioned under Trial Type but a simultaneously presented neutral stimulus.

^c Attentional bias scores were calculated by subtracting the mean reaction time on congruent trials from the corresponding mean reaction time on incongruent trials.

and Envy Condition (malicious vs. benign), Stimulus (envied person vs. envy object) and Congruency (congruent vs. incongruent) as independent variables with repeated measures on the last two factors.

This interaction qualified several lower order effects. First, there was a significant main effects of Stimulus, $F(1, 76) = 56.25, p < .001, \eta_p^2 = .43$, resulting from, on average, faster reaction times for envied person trials ($M = 357 \text{ ms}, SD = 32$) than envy object trials ($M = 369 \text{ ms}, SD = 34$). Furthermore, there was an unexpected main effect of Congruency, $F(1, 76) = 156.13, p < .001, \eta_p^2 = .67$. Participants generally responded more quickly when the dot appeared at the location that was congruent with the location of a neutral stimulus (and was thus incongruent with one of the envy stimuli; $M = 347 \text{ ms}, SD = 34$) than when it was congruent with one of the envy stimuli ($M = 379 \text{ ms}, SD = 34$). (Post-hoc analyses confirmed that this difference between congruent and incongruent trials was significant for all individual comparisons concerning the envied person and the envy object within the malicious and benign envy conditions, $t_s > 3.38, p_s < .05$) Finally, there was an interaction between Stimulus and Congruency, $F(1, 76) = 13.52, p < .001, \eta_p^2 = .15$, because the latter effect was somewhat stronger for the envy object trials ($M_{\text{congruent}} = 388 \text{ ms}; SD = 37; M_{\text{incongruent}} = 350 \text{ ms}; SD = 36$) than for envied person trials ($M_{\text{congruent}} = 369 \text{ ms}; SD = 36; M_{\text{incongruent}} = 345 \text{ ms}; SD = 36$). The main effect of Envy Condition, the interaction between Envy Condition and Stimulus and the interaction between Envy Condition and Congruency were not significant ($F_s < 1$).

For ease of comprehension, we also computed bias scores by subtracting the mean reaction time of congruent trials from the mean reaction time of incongruent trials for each type of trials. Thus, larger bias scores represent more attentional bias toward the stimulus in question. The results are displayed in Fig. 3. As predicted, and corresponding to the significant contrast in the full model, in the malicious envy condition, the bias score for the envied person was larger than the bias score for the envy object. In contrast, and also in line with our prediction, there was no significant difference in the benign envy condition. Descriptively, the data pattern suggests a trend for the malicious envy condition to show a stronger bias towards the envied person than the benign envy condition. This difference was not significant, $F(1, 76) = 2.27, p = .14, \eta_p^2 = .03$. Also, the reversed tendency for the bias toward the envy object was not statistically significant, $F(1, 76) = 2.09, p = .15, \eta_p^2 = .03$. The unexpected Congruency main effect of the full model is reflected in the fact that all bias scores are negative.

Discussion

The results of Experiment 2 confirm the finding of Experiment 1 that attention is deployed to different stimuli within malicious and benign envy. Again, within malicious envy attention was focused more strongly

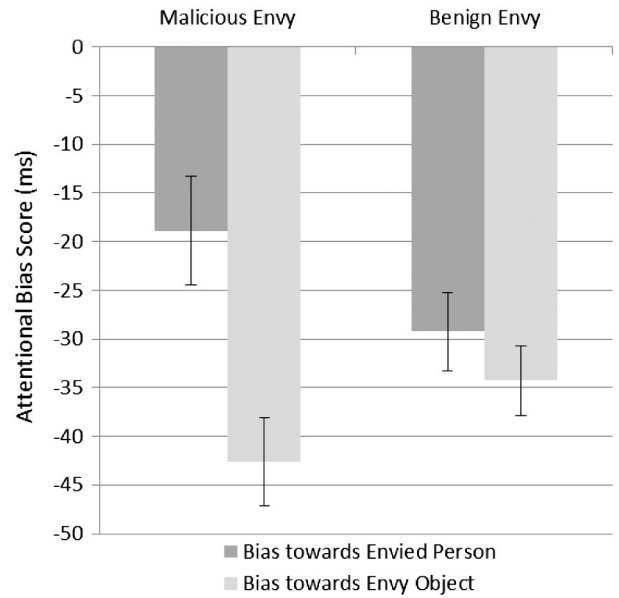


Fig. 3. Mean attentional bias scores (computed by subtracting the mean reaction time for congruent trials from the mean reaction time for incongruent trials) in $ms \pm 1 SE$ for trials in which the envied person was paired with a neutral stimulus and the envy object was paired with a neutral stimulus, separately for the malicious and benign envy conditions of Experiment 2.

on the envied person than on the object of participants' envy. As in Experiment 1, within benign envy attention was not deployed differently. This time, we found these results with stimuli that were standardized stimuli for all participants. They had been associated with the envied person and the envy object during the instruction and by the manipulation check that participants had completed before the dot probe task. Furthermore, we found these results when the envied person and the envy object were competing for attentional resources with other stimuli—unlike in Experiment 1, in which they were competing against each other. Together, Experiments 1 and 2 offer converging support for the notion that the motivational relevance of the envied person and the envy object differ in episodes of malicious and benign envy.

Unexpectedly, participants were faster in identifying the location of the dot when it was congruent with the location of one of the neutral stimuli (and therefore incongruent with one of the envy stimuli). One might be tempted to interpret this finding as evidence that envy stimuli attract less attention than other environmental stimuli or that they may even lead to attentional avoidance. We caution against such an interpretation for two reasons. One reason is that, previously, attentional avoidance has only been shown when stimuli were presented for much longer durations (at least 500 ms). Attentional avoidance is thus thought to occur at later stages of processing, when people start to regulate their emotional response (e.g., Koster, Verschuere, Crombez, & Van Damme, 2005; Mogg, Bradley, Miles, & Dixon, 2004). This literature would thus be at odds with an attentional avoidance interpretation. The second reason is that the comparison of the envy stimuli and the neutral stimuli is, unfortunately, plagued by confounding variables. For one, participants were exposed to the neutral stimuli less frequently than the envy stimuli (they were part of the manipulation check and presented about two times more often during the dot probe task). Thus, the neutral stimuli might have attracted attention because they were novel (Sokolov, 1963). Additionally, the envy stimuli may have slowed down the identification of the small grey dot because they had a stronger forward masking effect than the less complex, and thus perceptually less noisy neutral stimuli (cf. Breitmeyer & Ögmen, 2006). This explanation is in line with the additional finding that participants made more errors when the dot was congruent with the envy stimuli (see footnote 5). For these reasons, we advise against drawing strong conclusions

from this unexpected effect. More importantly, note that this result does not affect our focal predictions. These pertain to bias differences between the envied person and the envy object⁷ within the two envy conditions.

Experiment 3

We have argued that within malicious envy attention is focused more strongly on the envied person than on the envy object because this should be more functional in situations that elicit malicious envy. Focusing on the envied person might offer information on how to level this person down. Focusing on the envy object should be less functional in such situations. In contrast, in upward-motivating episodes of benign envy, both attending to the envied person and the envy object should be functional because both are instrumental to an envier's goal. If this reasoning is correct, then benign envy should also bias attention toward other *means* to move upward (similar to the finding that disgust biases attention toward cleanliness-related stimuli, Vogt et al., 2011). Because moving upward is not the main motivational focus of malicious envy, this should not be the case for such episodes of envy.

We tested these predictions in Experiment 3 by asking undergraduates to recall and re-experience an episode of either malicious or benign envy they had gone through in an academic achievement situation. We then presented words of typical means that should be instrumental in improving one's academic achievement as stimuli in a dot probe task. We expected that attention would be biased toward these means to achievement only in the benign, but not in the malicious envy condition. In order to allow a valid test of the hypothesis that envy can bias attention toward envy-related stimuli over and above the attention devoted toward competing environmental stimuli, we presented these means alongside neutral words that were matched in word length and presentation frequency.

Method

Participants

One-hundred and nine University of Cologne undergraduates of several different majors participated in Experiment 3 and were compensated with a chocolate bar or a coffee voucher. During data collection, we had to replace two participants because of equipment malfunction. Additionally, we excluded two others because they produced extensive errors ($z > 3.29$) and one participant who did not write about an episode of envy.⁸ Hence, the final sample consisted of 104 participants. Their mean age was 22.87 years ($SD = 3.24$, range: 18–33). Forty participants were male.

Materials and procedure

The method was largely identical to the methods of Experiments 1 and 2, thus only changes are explained in more detail.

Recall task

Participants again recalled, described, and re-experienced an event in which they felt either malicious or benign envy and they were randomly allocated to one of these two conditions. In contrast to the

⁷ In both Experiments 1 and 2, participants could freely select an envy episode they had experienced in past. An interesting possibility is that malicious and benign envy episodes contained envy objects that were different in a way that could be related to their power to grab attention. To investigate this possibility, we performed a content analysis of the envy objects (refer to the Supplementary Data for details of the rationale and the results). The analysis showed that the envy objects in both conditions were similarly often tangible possessions and similarly often internal attributes. They were also not significantly different in terms of their abstractness and fell equally often into the varied taxonomy of envy objects created by DelPriore, Hill, and Buss (2012).

⁸ Including these three participants did not change the level of significance of the planned contrasts. The level of significance of the Trial Type \times Envy interaction, however, decreased to $p = .07$.

previous studies, we asked participants to write about an envy episode related to their academic achievements.

Dot probe task

The task consisted of 64 trials of which four were practice trials. The remaining trials were presented in random order within one block. There were 2 trials for each combination of a 2 (prime location left vs. prime location right) \times 2 (dot location left vs. dot location right) \times 5 (experimental stimulus 1 to 5) design. The remaining 20 trials were filler trials in which only neutral stimuli were presented.

Our reasoning was that participants who reported a benign envy experience related to academic achievement would adopt an achievement goal. They should therefore focus their attention toward means to reach this goal. To come up with stimuli that would represent typical means, we conducted a pilot study in which we asked 25 undergraduates to list objects, places, or people that are necessary or helpful to their learning success. Content analyses of participants' open ended responses led us to the following most frequent means: *Buch* (book), *Stift* (pen), *Folien* (slides), *Bibliothek* (library) and *Schreibtisch* (desk). These words were used as experimental stimuli during the dot probe task. As neutral stimuli, we used length-matched words that are unrelated to academic achievement (e.g., *Bild* [picture] or *Schuh* [shoe]).

As in Experiments 1 and 2, a fixation cross was presented for 1000 to 3000 ms, followed by the cue stimuli presented for 100 ms which were replaced by the dot until participants made a response.

Manipulation check

After the dot probe task, participants responded to the same manipulation check questions as in Experiments 1 and 2. Some items were slightly rephrased to fit the academic context. Reliabilities of the scales were again acceptable ($\alpha = .90$, $\alpha = .79$, $\alpha = .71$, and $\alpha = .63$ for the malicious, benign, deservingness, and intensity of negative affect scales, respectively).

Results

Manipulation check

Envy Condition (malicious vs. benign) had a significant multivariate effect on the scales measuring malicious envy, benign envy, deservingness and the intensity of negative affect in a MANOVA, $F(4, 99) = 5.08$, $p = .001$, $\eta_p^2 = .17$. The pattern of results can be found in Table 1. Univariate analyses confirmed that the malicious envy condition was associated with significantly higher values on the malicious envy scale than the benign envy condition, $F(1, 102) = 11.09$, $p = .001$, $\eta_p^2 = .10$, and that the reverse was true for the benign envy scale, $F(1, 102) = 9.47$, $p = .003$, $\eta_p^2 = .09$. Also, participants in the malicious envy condition rated the advantage of the envied person to be less deserved, $F(1, 102) = 14.37$, $p < .001$, $\eta_p^2 = .12$. The envy conditions did not differ in terms of the intensity of negative affect, $F(1, 102) = 1.38$, $p = .24$, $\eta_p^2 = .01$.

Dot probe task

Reaction times were averaged after excluding incorrect responses (2% of the reaction times; for their distribution see footnote 4) and within participant outliers (z larger than ± 3.29 ; 1.1% of the reaction times; see footnote 5). We calculated mean reaction times for experimental trials in which the dot was congruent with words representing means to improve academic achievements and for experimental trials in which the dot was incongruent with such words.

Most importantly, as hypothesized and as confirmed by a planned contrasts, within the benign envy condition, trials in which the dot appeared at a location that was congruent with means to improve academic achievement led to faster reaction times ($M = 357$ ms, $SD = 36$) than incongruent trials ($M = 364$ ms, $SD = 39$), $F(1, 102) = 5.55$, $p = .02$, $\eta_p^2 = .05$. In contrast, there was no difference within the malicious envy condition ($M_{congruent} = 371$ ms, $SD = 49$; $M_{incongruent} = 370$ ms,

$SD = 48$), $F(1, 102) = 0.32$, $p = .57$, $\eta_p^2 = .003$. This pattern of results corresponded to a significant interaction, $F(1, 102) = 4.32$, $p = .04$, $\eta_p^2 = .04$ in a 2 (Envy Condition: malicious vs. benign) \times 2 (Trial Type: congruent vs. incongruent) ANOVA with repeated measures on the last factor. The analysis produced no main effect for Envy Condition, $F(1, 102) = 1.43$, $p = .24$, $\eta_p^2 = .01$, nor Trial Type, $F(1, 102) = 1.65$, $p = .20$, $\eta_p^2 = .02$.

To illustrate the results (see Fig. 4), we also computed bias scores subtracting the reaction times of trials in which the dot was congruent with the means to improve academic achievement from trials in which it was incongruent with them. Thus, larger scores mean more bias toward these means. Malicious envy led to no bias towards means for academic achievement ($M = -1$ ms, $SD = 20$). Conversely, benign envy led to bias for academic achievement ($M = 7$ ms, $SD = 18$), which, as reflected by the planned contrast in the full model, was statistically different from zero. Furthermore, the significant interaction in the full model is equivalent to a significant difference between these bias scores for malicious versus benign envy.

Discussion

Participants who were benignly envious about an academic achievement were biased toward stimuli that represented objects conducive to improving academic performance. In contrast, this was not the case for participants who had recalled an episode in which they were maliciously envious about the academic achievement of another person. Thus, the results of Experiment 3 are in line with the hypothesis that in benign envy attention is focused towards stimuli that serve as means to attain an envy object.

General discussion

The current research investigated how envy affects early attentional processing. Recent work suggests that envy exists in two experientially and motivationally distinct forms, malicious envy, which is directed at pulling a superior other down, and benign envy, which is directed at improving oneself by moving upward (Van de Ven et al., 2009). Based on a functional account of envy, we predicted that within malicious and benign envy, attention is biased selectively toward particular environmental stimuli depending on their adaptive value. The results of three experiments employing dot probe tasks are in line with this hypothesis. Experiment 1 showed that within malicious envy, attention is biased more strongly toward an idiosyncratic reminder of an envied person

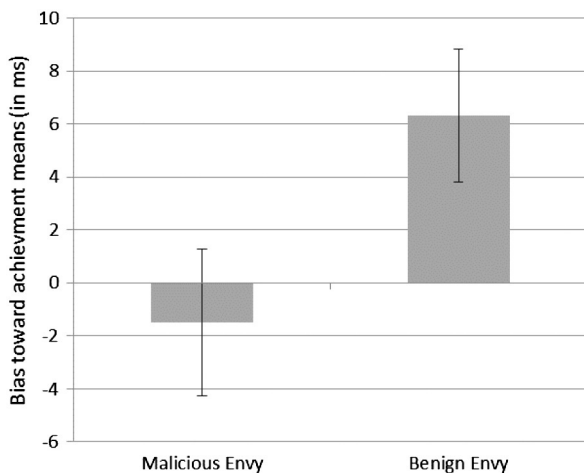


Fig. 4. Mean attentional bias toward means for academic achievement (the envy object), computed by subtracting trials congruent with means for academic achievement from trials incongruent with academic achievement in $ms \pm 1$ SE for the malicious and benign envy conditions of Experiment 3.

when it competed for attentional resources with a reminder of the envy object. In contrast, this difference did not emerge for benign envy. Experiment 2 replicated and extended these results by showing the same effect with standardized icons representing the envied person and the envy object in a task in which these icons did not compete against each other for attentional resources. Finally in Experiment 3, only benign envy biased attention toward means that are conducive to the goal of improving one's own outcome. These results contribute to an emerging literature about how complex social emotions (e.g., DeWall, Maner, & Rouby, 2009; Maner et al., 2007) and situational goals (Vogt et al., 2011, 2013) modulate attention.

Our findings broaden our knowledge about envy in several important ways. Recent research has begun to shed light on the cognitive consequences of threatening social comparisons and envy. For example, envy caused participants to attend more carefully to information about superior performing peers (Hill et al., 2011) as evidenced in longer reading time and better memory about this information. The current studies complement these findings by showing that envy can shift attention at early levels of processing.

Furthermore, our results show that when looking at the cognitive consequences of envy it is crucial to take the different forms of envy into account. Even though benign and malicious envy may bear similar cognitive consequences for the processing of some envy-related stimuli, they may differ for others. Here, we have argued that such differences can be predicted from evolutionary (Hill & Buss, 2008; Hill et al., 2011) as well as self-protective (Johnson, 2012; Tesser, 1988, 2000) motives that should have diverging consequences in malicious and benign envy. Our findings support the notion that the different forms of envy go along with distinct effects not only on how people attend to superior others, but also on how they process information about their qualities, achievements, or possessions, along with the means to attain these superior fortunes.

Future research may investigate whether these differences hold for other cognitive processes such as the increased memory performance for envy-related information (Hill et al., 2011). Additionally, taking the distinction between malicious and benign envy into account may inform research about other cognitive consequences of threatening social comparisons. For example, the results of Hill and colleagues (2011) suggest that envy depletes self-regulatory resources. Both malicious and benign envy should instigate the exertion of self-control because of their painful and self-threatening nature (Crusius & Mussweiler, 2012). Nevertheless, one might suspect that malicious envy should take a heavier toll on self-regulatory resources. Presumably, it is the socially more undesirable emotion, which should cause the need to control overt emotional responses more strongly. As a final example, the distinction of malicious versus benign envy may also contribute to research showing that threatening social comparisons can lead to a narrowed attentional focus on task-related characteristics (Muller & Butera, 2007). Given the present studies, such a focusing effect should be particularly likely in benign envy.

An important aspect of the current research is that it aimed at the effects of envy on automatic attention allocation. This property is related to features of the experimental set up. Specifically, we presented envy-related stimuli as cues in the dot probe task only very briefly, namely for 100 ms (e.g., Brosch & Van Bavel, 2012; Cooper & Langton, 2006; Yiend, 2010). Additionally, the experimental paradigm ensured that these stimuli were irrelevant to participants' task. Even though future research may investigate additional features of automaticity (cf. Moors & De Houwer, 2006), these characteristics of the task suggest that the current findings are the result of automatic processes and do not reflect participants' strategic and intentional considerations. Thus, our findings offer a glimpse into how envy affects more immediate motivational inclinations shown on an indirect measure. This is a particularly important characteristic of this research because, as alluded to above, envy is an emotion that is subject to strong self-presentational concerns and thus often not acknowledged publicly and privately

(Foster, 1972; Silver & Sabini, 1978; Smith & Kim, 2007). Furthermore, employing an indirect measure of attention also addresses the concern that malicious and benign envy may be associated with differences in social desirability. Because our findings most likely reflect automatic responses, differences in social desirability between the two forms of envy cannot account for them.

Notwithstanding, future research might also benefit from an investigation of the more strategic components of attentional deployment in envy. Insights could be gained by varying the length of the exposure to envy-eliciting stimuli in the dot probe task. For example, research on the attentional effects of threatening stimuli has demonstrated that a longer stimulus duration can go along with attentional avoidance (Koster et al., 2005; Mogg et al., 2004). In other words, if participants are given more time to perceive a threatening stimulus, they may decide to strategically turn their gaze away from it to avoid exposure. In envy, such a response may be particularly likely when maliciously envious people encounter the superior fortune of another person. In malicious envy situations, the envy object should mainly represent a reminder of the enviers' relative inferiority. However, it should seldom offer much information about how to offset the disadvantage and may thus best be avoided. Such a tendency might be less pronounced in benign envy situations, as the envy object represents people's attainable goal. Similarly, avoiding to look at the envied person may be a coping strategy that is particularly useful in malicious envy as this may allow one to escape the socially undesirable consequences of this subtype of envy.

The perhaps most striking element of our results is that episodes of malicious envy were associated with less attentional focus on the envy object than on the envied person, reflecting their different motivational relevance in such episodes. This is the case even though the envy object is a defining element of each envy episode and, along with the person, the central emotion-eliciting stimulus. It represents, what the envier (at least originally) desired but lacks in comparison to the other. Investigating the psychological factors that determine and mediate this shift in motivational focus, may—ultimately—result in the identification of strategies that help to alter the course of envious responding from socially destructive ones to another that is motivating in more beneficial ways.

On a more general level, the present research may speak to the debate on what the substance of envy is and whether it is useful to distinguish malicious from benign envy or not. Recently, Tai, Narayanan, and McAllister (2012) have discussed whether the distinction between malicious and benign envy may conflate the behavioral consequences of envy with its core characteristics, and have called for research that investigates the psychological processes that are involved in envious responding. According to their analysis, malicious and benign envy may merely reflect different, i.e., socially negative as well as positive behavioral effects of the same underlying emotion. Therefore, Tai et al. (2012) have argued in favor of a unitary envy construct conceptualizing envy as the pain in response to another person's good fortune. Furthermore, they hypothesized that envy may activate challenge-oriented action tendencies (which lead to self-raising, and thus benign actions) and threat-oriented action tendencies (which lead to malicious actions aimed at undermining the envied person) in parallel and to an equal extent. The effects of envy may indeed be driven by strong negative affect, independent of the kind of envy experienced. Notably, in the experiments reported here, we found that malicious and benign envy episodes were experienced as equally intense, negative emotions. Nevertheless, we found that malicious and benign envy episodes selectively bias attention to different envy stimuli, presumably reflecting the specific motivational orientation of such episodes and their action tendencies. These results thus represent a first answer to the call for more process-based evidence of the distinction between malicious and benign envy. Even though the question on the substance of envy awaits further empirical scrutiny, our findings demonstrate the utility of the distinction between malicious and benign envy in generating new hypotheses.

In conclusion, the current findings highlight the advantages of conceptualizing envy and its subtypes as adaptive emotional responses that can serve important evolutionary and self-protective functions. In the present research, we have combined such a conceptualization with an approach that is focused on basic social-cognitive processes that may link these motives with behavioral outcomes in envy-eliciting situations. We are optimistic that such an approach will further contribute to a more complete understanding of envious eyes and envious minds.

Acknowledgments

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Appendix A. Supplementary data and materials

Supplementary data to this article can be found online at <http://dx.doi.org/10.1016/j.jesp.2014.05.007>.

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Supplementary Data and Materials

Study S1: Replication of Van de Ven, Zeelenberg, and Pieters' Study 1 (2009)**Rationale**

To confirm that the German terms for malicious and benign envy capture similar emotional episodes as the terms used by Van de Ven et al. (2009), we replicated their Study 1. In this study, Van de Ven et al. asked Dutch participants to recall an episode of either malicious envy, benign envy, admiration, or resentment. Participants then rated their experience on items assessing different aspects of their thoughts, feelings, action tendencies, and emotivational goals (Roseman, Wiest, & Swartz, 1994). Van de Ven et al. (2009) found that the experiential content of malicious envy was different from benign envy, benign envy was different from admiration, and malicious envy was different from resentment in predicted ways. Furthermore, as indicated by content analyses, the emotional episodes predictably differed in terms of the similarity to the other, the relevance of the comparison domain, the amount of perceived control, and perceived unfairness.

We conducted a direct replication of their study. However, our procedure was different in that we conducted the study as an online study instead of being based on in-class data collection. To deal with the higher likelihood of careless survey responses in online studies, we followed the suggestion of Meade and Craig (2012) to include the item "In your honest opinion, should we use your data in our analyses in this study?" at the end of the study. As *a priori* criterion, we discarded the data of all participants who responded with "no" to this item.

Methods

Participants. Participants were members of an online subject pool and mailing lists mainly comprising students and former students with different majors of the University of Cologne. They were invited via email and offered a 1 to 20 chance to win a voucher with the value of 20 Euros. Of the 182 people who participated, 13 indicated that their data should not be used in the analyses of our study (Meade & Craig, 2012). Their distribution was unrelated to the experimental conditions, $\chi^2(3) = 4.33, p = .23$. Furthermore, we discarded the data of 3 participants (also unrelated to the experimental conditions, $\chi^2[3] = 3.28, p = .24$) because they could not recall an episode of the respective emotion. The final sample size was 166 (126 women, 39 men, 1 missing value, age 17-69, $M = 26.24, SD = 6.65$).

Procedure. Participants were invited to take part in an online survey on emotional experiences. At the beginning of the survey, they were randomly assigned to recall and describe a situation in which they felt a strong experience of either malicious envy (*missgönnen*), benign envy (*beneiden*), admiration (*bewundern*), or resentment (*entriüsten*). Then, they rated how intense the experience had been (0 = *not at all*, 8 = *very*), how long ago it had happened (0 = *a very long time ago*, 8 = *only a short while ago*), and how easy it was to recall the experience (0 = *very difficult*, 8 = *very easy*). Then participants rated their experience on items that

related to different aspects of their feelings, thoughts, action tendencies, actions, and emotivational goals. The items are listed in Table S1.

Results

Missing value analysis. Sixteen participants omitted a small number of responses for the questionnaire items (in total 0.5% of the data). Little's Missing Completely At Random Test was not significant, $\chi^2(282) = 259.56, p = .83$, implying that systematic bias in the distribution of the omitted responses is unlikely. Because the multivariate analyses of this study are conducted on the level of single item responses, these missing values would have led to list-wise exclusion of these participants and thus, potentially, loss of statistical power. Therefore, we used expectation maximization (Schafer & Graham, 2002) to estimate the missing data. The following analyses include these estimated data. We also reran the analyses excluding participants with missing values. This did not change the level of significance of any finding.

Potential covariates. We submitted the ratings for the intensity of the emotional experience, the ease of recalling it, and how long ago it had happened as depended variables to a multivariate analysis of variance (MANOVA) with Emotion Condition (malicious envy vs. benign envy vs. admiration vs. resentment) as a between-subjects variable, resulting in a marginal effect of Emotion Condition on the ratings, Pillai's Trace $V = 0.10, F(9, 486) = 1.90, p = .051, \eta_p^2 = .03$. Univariate follow-up analyses revealed that participants experienced the emotions to be different in intensity, $F(3, 162) = 4.77, p = .003, \eta_p^2 = .08$. In particular, resentment was experienced as more intense ($M = 6.75, SD = 1.12$) than benign envy ($M = 5.78, SD = 1.48$), malicious envy ($M = 5.95, SD = 1.32$), and admiration ($M = 5.76, SD = 1.81$), as indicated by post-hoc pairwise comparisons, $F_s(1, 162) > 6.71, p_s < .02$. In contrast, benign envy, malicious envy, and admiration were comparably intense, post-hoc pairwise comparisons $F_s(1, 162) < 0.37, p_s > .54$. The emotional experiences did not differ in how long ago they happened, $F(3, 162) = 0.50, p = .69, \eta_p^2 = .01$, overall $M = 4.77, SD = 2.48$. However, there was a marginal effect of condition on how easy it was to recall an episode of the respective emotion, $F(3, 162) = 2.38, p = .07, \eta_p^2 = .04$. Participants considered it to be somewhat easier to recall an experience of resentment ($M = 6.96, SD = 1.62$) than of benign envy ($M = 6.19, SD = 2.01$), malicious envy ($M = 5.90, SD = 2.01$), or admiration ($M = 6.17, SD = 2.29$), $F_s(1, 162) > 3.14, p_s < .08$. In contrast, benign envy, malicious envy, and admiration were comparably easy to recall, as suggested by post-hoc pairwise comparisons, $F_s(1, 162) < 0.41, p_s > .52$.

Because of these results, we included intensity and ease of recall as covariates in a preliminary analysis of the experiential content ratings. However, neither intensity, Pillai's Trace $V = 0.09, F(20, 141) = 0.78, p = .78, \eta_p^2 = .01$, nor ease of recall, Pillai's Trace $V = 0.16, F(20, 141) = 1.34, p = .17, \eta_p^2 = .16$, were related to the ratings. That is why, for clarity of presentation and for comparability with the descriptive results of Van de Ven et al. (2009) who did not include these covariates in their analyses either, we present the results without them. Including the covariates in these analyses yields virtually identical findings.

Experiential content. We submitted responses on the items assessing the experiential content of the emotional episodes to a MANOVA with emotion condition as between-subjects variable. The analysis revealed the expected multivariate effect of emotion condition, Pillai's Trace $V = 1.44$, $F(60, 429) = 6.57$, $p < .001$, $\eta_p^2 = .48$. Next, we performed univariate follow-up analyses of the individual items with contrasts comparing benign to malicious envy, benign envy to admiration, and malicious envy to resentment. These analyses and the means and standard deviations of the ratings can be found in Table S1.

As expected, the emotions were strongly different with regard to self-reported feelings, thoughts, action tendencies, actions, and emotivational goals. Furthermore, the pattern of results is highly similar to the one found by Van de Ven et al. (2009) and consistent with their reasoning. For example, compared to malicious envy, benign envy was characterized by more admiration, positive thoughts, and compliments toward the other person, more thoughts of improving the own situation, but less perceived injustice and less action tendencies, actions, and goals aimed at leveling the other person down. Furthermore, benign envy was markedly different from admiration in that it was experienced as a highly negative emotion involving frustration, shame and negative thoughts about the self, and the motivation to improve oneself. Malicious envy differed from resentment in that it was more strongly associated with shame and negative thoughts about the self, but somewhat more positive thoughts about the other, and the action tendencies to take something away from the other and to improve their own position.

The most notable differences to the results of Van de Ven et al. include that, in our study, malicious and benign envy were experienced as equally frustrating and unpleasant emotions. In addition, on some individual items the predicted effect is somewhat weaker than in the original study, resulting in marginal or non-significant differences. Very seldom, the effects are inconsistent with those of Van de Ven et al. (2009), for example, the item "I reacted actively" was significantly less endorsed in the benign envy condition than in the admiration condition which was unexpected and may point to a different meaning of the item in German.

Content analysis. Two independent judges who were blind to hypotheses and conditions coded the written descriptions of the emotional episodes. As Van de Ven et al. (2009), we asked them to indicate whether the participant (a) made an explicit comparison with another person, (b) indicated to be similar to the other, (c) indicated that the domain was relevant for his or her self-view, (d) indicated to have little control over the situation, and (e) thought something was unfair or undeserved. The judges agreed in 78% of their judgments. They discussed and resolved the remaining differences.

The results of the content analysis can be found in Table S2. The most notable difference to the results of Van de Ven et al. is that the overall percentage of content present in our data is much smaller. This is likely the result of the fact that our online participants were less inclined to write detailed reports of their emotional episodes—the majority of them was rather short. Nevertheless, our findings replicate Van de Ven et al.'s results to a very high degree. They show that, compared to admiration and resentment, malicious and

benign envy are characterized by explicitly mentioned social comparisons and similarities between self and other. Furthermore, in contrast to admiration, they more often involve a self-relevant domain and low perceived control. Malicious envy differs from benign envy in that participants in this condition more often mentioned perceptions of unfairness. Descriptively, they also more often reported low perceived control than benignly envious participants. However, in contrast to Van de Ven et al. (2009), this difference was not statistically significant in our study.

Discussion

The results of participants' ratings with regard to the experiential contents of their emotions and the content analyses of their descriptions show that the German emotion words we used in the main studies succeed in capturing the intended emotional episodes. The findings closely replicate those of Van de Ven et al. (2009) and provide converging support for their predictions. Even though malicious and benign envy are both highly negative emotions, they differ systematically in terms of their experiential content. Malicious envy is more strongly characterized by thoughts about unfairness and the motivation to pull the other person down. In contrast, benign envy is characterized by more positive regard and admiration for the other person and the motivation to improve the own situation. Even though benign envy is similar to pure admiration in some ways, it is different in others. In particular, other than admiration, benign envy is experienced to be a highly negative emotion linked to social comparisons in self-relevant domains. Likewise, malicious envy is different from the related emotion resentment. In particular, malicious envy is characterized by negative thoughts about the self and self-relevant comparisons with the other, which resentment does not contain, even though it is also associated with (sometimes even stronger) hostility against the other person.

Manipulation Check Items of Experiments 1-3

In all of the three studies, the introduction to the following items explained that they would refer to the envied person and the envy object ("his or her superior possession, achievement, or characteristic"; for Experiments 1 & 2) they had described in their emotional episode. In Experiment 2, "the object" was replaced by the object symbol and in Experiment 3 by "the achievement". In Experiment 2, "the person" was replaced by the person symbol.

Malicious Envy. I felt malicious envy toward the person about the object (*Ich habe der Person das Objekt missgönnt*); I wished that the other person would no longer have the object (*Ich habe mir gewünscht, dass die Person das Objekt nicht mehr hat*); I would have liked to damage the object (*Ich hätte das Objekt am liebsten beschädigt*); in Experiment 3, the item was rephrased as "I would have liked to bad-mouth the achievement" [*Ich hätte die Leistung am liebsten schlecht geredet*]; I felt coldness toward the person (*Ich habe Kälte gegenüber der Person gefühlt*); I wished that the other person would fail at something (*Ich habe mir gewünscht, dass die Person bei einer anderen Sache scheitert*); I would have liked to hurt the person (*Ich*

hätte der Person am liebsten weh getan); I had negative thoughts about the person (*Ich hatte negative Gedanken gegenüber der Person*); I would have liked to take the object away from the person (*Ich hätte der Person gern das Objekt weggenommen*)

Benign Envy. I felt benign envy toward the person about the object (*Ich habe die Person um das Objekt beneidet*); I admired the person (*Ich habe die Person bewundert*); I wanted to try harder to obtain the object as well (*Ich wollte mich mehr anstrengen, um das Objekt auch zu erreichen*); I felt inspired to also attain the object (*Ich fühlte mich inspiriert, das Objekt auch zu erreichen*); I wished to have the object too (*Ich habe mir gewünscht, das Objekt auch zu haben*); I considered the person to be likable (*Ich fand die Person sympathisch*); I wanted to be like the person (*Ich wollte wie die Person sein*); I desired the object (*Ich habe das Objekt begehrt*).

Deservingness. The person did not deserve the object (*Die Person hatte das Objekt nicht verdient*, reverse coded), It felt unfair that the person was in the possession of the object and I was not (*Es fühlte sich ungerecht an, dass die Person über das Objekt verfügte und ich nicht*, reverse coded), It felt unfair that the person was in the possession of the object (*Dass sich die Person im Besitz von dem Objekt befand, fühlte sich unfair an*, reverse coded)

Intensity of negative affect. It hurt not to have the object (*Es hat weh getan, das Objekt nicht zu haben*); To see the person with the object elicited intense negative feelings in me (*Die Person mit dem Objekt zu sehen, hat eine intensive negative Emotion bei mir ausgelöst*); It was frustrating that I did not have the object (*Es war frustrierend, dass ich das Objekt nicht hatte.*)

Study S2: Ease of associating symbols with envied person and envy object

Rationale

In Experiment 2 of the main text, participants completed a dot probe task entailing symbols for the envied person and the envy object as stimuli. This experiment rests on the assumption that the participants can associate the symbols with their intended content and the ease, in which they can do that, does not differ for malicious or benign envy. To test this precondition, we asked an independent sample of participants to recall an episode of malicious or benign envy. Then, they completed the tasks of Experiment 2 that were intended to form the association of the symbols with their respective content. Finally, participants rated the ease of imagining that the symbols represent the envied person and envy object.

Method

Participants. For recruitment, we advertised the survey to German-speaking participants on Crowd-Flower, a crowd-sourcing platform similar to Amazon's Mechanical Turk. Ninety people participated. They received 1 Euro as compensation. Fifteen of them indicated that their data should not be used in the analyses of our study (Meade & Craig, 2012). Their distribution was unrelated to the experimental conditions, $\chi^2(1) =$

.57, $p = .45$. Furthermore, we discarded the data of 4 additional participants, who did not write about an episode of envy (also unrelated to condition, $\chi^2[1] = .001, p = .98$). The final sample size was 71 (24 women, 46 men, 1 missing value, age 18-69, $M = 38.72, SD = 12.34$).

Procedure. The initial procedure was identical to the procedure of Experiment 2 of the main text. Participants were asked to recall, re-experience, and describe an episode of either malicious or benign envy. Then, they were asked to imagine that the envied person and the object of their envy would be represented by an icon depicting a person and an icon depicting a treasure chest (cf. Figure 2 of the main text). To strengthen this association, the icons were then used as symbols in the 22 manipulation check items to which participants responded. Reliabilities of the manipulation check scales were again acceptable ($\alpha = .93, \alpha = .76, \alpha = .83$, and $\alpha = .72$ for the malicious, benign, deservingness, and intensity of negative affect scales, respectively). Finally, participants were asked to indicate how easy it was to imagine that the symbols would represent the envied person and the envy object using 7-point scales (1 = *very difficult*, 7 = *very easy*). The order of the two questions was counterbalanced. In a preliminary analysis, order did not affect the ratings in a main effect or in interactions with the other factors, $F_s < 1.79, p_s > .19$. Therefore, we dropped this factor from the main analysis.

Results

Manipulation check. A MANOVA revealed a significant multivariate effect of Envy Condition (malicious vs. benign) on the malicious envy, benign envy, deservingness, and the intensity of negative affect scales, $F(4, 66) = 3.33, p = .015, \eta_p^2 = .17$. The malicious envy condition was associated with significantly higher values on the malicious envy scale ($M = 5.24, SD = 1.33$) than the benign envy condition ($M = 4.30, SD = 1.58$), $F(1, 69) = 7.39, p = .008, \eta_p^2 = .10$. Conversely, for the benign envy scale, the malicious envy condition was associated with significantly lower values ($M = 4.59, SD = 1.21$) than the benign envy condition ($M = 5.25, SD = 0.90$), $F(1, 69) = 6.78, p = .01, \eta_p^2 = .09$. Also, participants in the malicious envy condition rated the advantage of the envied person to be less deserved ($M = 2.68, SD = 1.76$) than those in the benign envy condition ($M = 3.56, SD = 1.63$), $F(1, 69) = 4.88, p = .03, \eta_p^2 = .07$. However, in terms of the intensity of negative affect, the malicious ($M = 5.19, SD = 1.50$), and the benign envy condition ($M = 5.00, SD = 1.38$) did not differ significantly, $F(1, 69) = 0.31, p = .58, \eta_p^2 < .005$.

Ease of association. We submitted the ratings on the ease of which participant could imagine that the object symbol and the person symbol represented the envy object and the envied person to a 2 (Condition: malicious vs. benign) \times 2 (Stimulus: envied person vs. envy object) repeated-measures ANOVA with condition as a between-subjects factor and stimulus as a within-subjects factor. A significant main effect of Stimulus emerged, $F(1, 69) = 5.85, p = .02, \eta_p^2 = .08$. Participants judged it to be somewhat easier to imagine that the person symbol would represent the envied person ($M = 6.17, SD = 1.16$) than that the object symbol would represent the envy object ($M = 5.89, SD = 1.28$). More importantly, however, there was neither a main

effect of Condition, $F(1, 69) = .90, p = .35, \eta_p^2 = .01$, nor a Condition \times Stimulus interaction, $F(1, 69) = 0.04, p = .84, \eta_p^2 < .001$. Note that the majority of the participants considered it to be easy to associate the symbols with their intended content. Both the mean ratings for the envied person, $t(70) = 15.77, p < .001, d = 1.87$, and for the envy object, $t(70) = 12.40, p < .001, d = 1.47$, were strongly different from 4, the midpoint of the scale. For the person symbol, only 7% of the participants indicated a value below the midpoint of the scale, whereas 93% selected a rating above the midpoint of the scale. Similarly, for the object symbol, only 4% of the participants indicated a value below the midpoint of the scale and 86% selected a value above the midpoint of the scale.

Discussion

The results confirm that, for both the object and the person symbol, the vast majority of participants found it easy to imagine that they represented the envy object and the envied person of their experience. Most importantly, the extent to which they did was unaffected by emotion condition. Thus, differences in the ease of which people can associate the symbols with their intended meaning are unlikely to have resulted in the findings of Experiment 2.

Content Analyses of Experiments 1 and 2

Rationale

In the studies of the main text, we asked participants to re-experience and recount an episode of either malicious or benign envy. In contrast to Experiment 3—in which we specifically requested that the envy experience should be about an academic achievement—participants could report an envy episode with any type of envy object in Experiments 1 and 2 of the main text. To investigate whether specific types of envy objects might be related to our experimental conditions and their effects on attention, we analyzed the content of the envy episodes reported in these studies.

A fundamental quality in which envy objects might differ is whether they are an alienable possession or not. For example, one way to deal with an episode of malicious envy might be to take the envy object away from the envied person. However, this is only possible for episodes involving objects with transferable ownership. If malicious envy would be occurring more frequently with inalienable objects, this might explain why there is a stronger focus on the person in malicious envy. Furthermore, a subset of inalienable envy objects is comprised of internal attributes of the envied person, such as personality traits, talents, or certain skills. Because these are often difficult, if not impossible to attain for the envier, comparisons on such domains may more frequently lead to malicious envy. Being bound to the envied person, these internal attributes might contribute to an attentional focus on the envied person rather than attracting attention in isolation. Envy objects might also differ in how abstractly they are construed. Because it may be easier to form action plans to attain concrete goals, benign envy might more often involve concrete envy objects. If one

supposes that it is easier to focus attention on a concrete object, this difference might also be an explanation for the attentional effects that we found. To investigate these hypotheses, we conducted a content analysis of participants' descriptions of their envy objects, assessing whether these objects were alienable or not, internal or external, and estimating the abstractness of their description. In addition, to get a general sense of the types of reported envy objects within the different experimental conditions, we also categorized them according to the taxonomy of envy objects that was created by DelPriore, Hill, and Buss (2012, Study 1) by means of an inductive content analysis of recounted envy episodes.

Method

We asked two independent judges who were blind to condition and unaware of the background and hypotheses of the present research to a) indicate whether the envy object was an alienable possession, that is, whether its ownership can be transferred to another person or not, b) to indicate whether the envy object was an internal characteristic of the person, such as a talent, skill, or a certain personality trait, c) to code the envy object according to the categories of envy objects identified by DelPriore, et al. (2012, Study 1), and d) to rate the abstractness of the description of the envy object on a 7-point scale ranging from 1 (*concrete*) to 7 (*abstract*). On average, the raters agreed on 81% of the discrete categorization judgments. They resolved the remaining differences through discussion. The abstractness rating proved to be more difficult as indicated by the interrater agreement, $r(162) = .44, p < .001$. We averaged the abstractness ratings of the two raters for exploratory analyses.

Results

In the following, we report the results of the content analyses of the envy objects collapsing over Experiments 1 and 2 of the main text. Separate analyses led to the same conclusions. Counter to what might be expected, malicious envy involved alienable envy objects somewhat more frequently (31% of $n = 80$) than benign envy (21% of $n = 82$). However, this difference did not approach statistical significance, $\chi^2(1) = 2.33, p = .13$. Descriptively, malicious envy also involved internal attributes less frequently (9%) than benign envy (15%), which was also not significant, $\chi^2(1) = 1.35, p = .25$. Likewise counter to expectations, envy objects tended to be more abstract in the benign envy condition ($M = 2.77, SD = 1.37$), than in the malicious envy condition ($M = 2.45, SD = 0.95$), $t(160) = 1.75, p = .08$.

To analyze whether these differences were related to our measures of attentional focus in Experiments 1 and 2 of the main text, we included these three variables as covariates in the respective analyses. None of the variables proved to be a significant covariate in these analyses, $F_s < 1.5, p_s > .22$. Most importantly, including the covariates did not influence the level of significance of their respective predicted interactions, $F(1, 79) = 4.49, p = .04, \eta_p^2 = .05$ for Experiment 1 and $F(1, 73) = 6.68, p = .01, \eta_p^2 = .08$ for Experiment 2.

Finally, we analyzed whether the percentage of envy objects falling in the categories identified by DelPriore et al. (2012) were different for benign and malicious envy. The frequency of the different types of envy objects (see Table S3) did not differ significantly for the two types of envy, $\chi^2(16) = 17.79, p = .34$.

Discussion

Our content analyses did not identify specific classes of envy objects that may have contributed to our findings in Experiments 1 and 2 of the main text. The frequency of envy objects that were alienable and the frequency of envy objects that were internal attributes was similar in both the benign and the malicious envy conditions. There was a non-significant trend for benign envy objects to be slightly more abstract than malicious envy objects. However, this difference seemed to be unrelated to our findings. Furthermore, the content analysis revealed that the reported envy episodes featured a wide variety of envy objects that did not differ across the envy conditions.

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Tables

Table S1

Experiential Content of Benign Envy, Malicious Envy, Admiration, and Resentment in Study S1

Experiential Content	<i>M (SD)</i>				Overall difference <i>F</i> (3, 166)	Contrast significance levels		
	Benign Envy A	Malicious Envy B	Admiration C	Resentment D		A vs. B	A vs. C	B vs. D
Feelings								
Felt frustrated	5.88 (2.09)	5.63 (2.50)	1.95 (2.12)	5.69 (2.41)	27.93***		***	
Felt shame for my thoughts	3.49 (2.62)	2.98 (2.90)	0.93 (1.85)	1.19 (1.75)	12.51***		***	***
Felt admiration for the other person	4.24 (2.90)	1.86 (2.16)	7.29 (1.49)	0.44 (1.24)	97.22***	***	***	**
Felt pleasant	1.29 (1.64)	1.48 (1.84)	5.44 (1.78)	0.73 (1.50)	68.65***		***	*
Thoughts								
Thought of injustice being done to me	3.49 (3.26)	5.80 (2.45)	0.80 (1.42)	6.08 (2.73)	39.41***	***	***	
Thought negatively about myself	4.78 (2.39)	3.40 (2.74)	2.12 (2.29)	1.83 (2.26)	12.52***	*	***	**
Thought positively about other	3.65 (2.25)	1.50 (1.75)	6.77 (1.98)	0.75 (1.50)	89.24***	***	***	†
Thought of improving my situation	5.32 (2.15)	2.95 (2.58)	4.51 (2.85)	3.73 (2.60)	6.17***	***		
Action tendencies								
Wanted to take something from other	2.62 (2.80)	4.07 (3.08)	0.51 (1.42)	2.13 (2.74)	13.03***	*	***	***
Wanted to degrade other	1.89 (2.50)	3.88 (2.95)	0.39 (1.30)	3.46 (2.83)	16.89***	***	**	
Wanted to improve own position	5.59 (2.23)	4.96 (2.48)	3.46 (2.81)	3.85 (2.81)	5.65 **		***	*
Wanted to be near other	2.44 (2.37)	1.38 (2.06)	5.15 (2.46)	1.23 (2.21)	26.78***	*	***	
Actions								
Tried to hurt the others' position	1.54 (2.33)	3.00 (2.83)	0.22 (0.76)	2.81 (2.89)	12.21***	**	*	
Talked negatively about other	1.59 (2.36)	3.50 (2.96)	0.15 (0.42)	4.88 (2.93)	32.01***	**	**	**
Complimented the other sincerely	3.51 (2.84)	1.38 (2.05)	5.98 (2.45)	0.71 (1.77)	46.43***	***	***	
Reacted actively	2.83 (2.60)	2.63 (2.38)	4.06 (2.46)	4.98 (2.61)	8.29***		*	***
Emotivational Goals								
Hoped the other would fail in something	2.86 (2.68)	4.48 (3.13)	0.46 (1.55)	3.69 (3.12)	16.86***	*	***	
Hoped for justice to be done	4.79 (2.77)	5.95 (2.69)	2.09 (2.79)	6.33 (2.43)	21.94***	†	***	
Hoped the other would do well	4.08 (2.54)	1.82 (2.09)	6.52 (2.13)	1.00 (1.50)	61.74***	***	***	†
Hoped to remain/become friends with other	5.41 (2.46)	3.70 (3.38)	5.76 (2.76)	3.35 (3.10)	7.03***	*		

Note. Responses were given on a 9-point scale and coded from 0 (*not at all*) to 8 (*very much so*). The contrasts compare benign to malicious envy (AB), benign envy to admiration (AC), and malicious envy to resentment (BD). †*p* < .10, **p* < .05, ***p* < .01, ****p* < .001.

Table S2

Content Analysis of Recalled Emotional Episodes in Study S1

Present in story?	%				$\chi^2(3)$	<i>p</i>
	Benign envy (<i>n</i> = 37)	Malicious envy (<i>n</i> = 40)	Admiration (<i>n</i> = 41)	Resentment (<i>n</i> = 48)		
Explicit comparison	86.5 ^a	67.5 ^b	24.4 ^c	8.3 ^d	67.26	<.001
Similar to other	59.5 ^a	60.0 ^a	24.4 ^b	29.2 ^b	18.39	<.001
Self-relevance of domain	67.6 ^a	52.5 ^{ab}	22.0 ^c	41.7 ^b	17.53	<.001
Low perceived control	40.5 ^a	50.0 ^a	4.9 ^b	54.2 ^a	26.98	<.001
Perceived unfairness	24.3 ^a	67.5 ^b	2.4 ^c	79.2 ^b	67.17	<.001

Note. The numbers are the percentages of the stories in which the statement was judged to be present. Different superscripts indicate significant differences between the emotion conditions, $p < .05$.

Table S3

Envy Object Types Collapsed Across Experiments 1 and 2

	%		
	Total (<i>n</i> = 162)	Benign Envy (<i>n</i> = 82)	Malicious Envy (<i>n</i> = 80)
Achieving greater academic success	19.8	19.5	20.0
Owens a status item that I desire	14.2	12.2	16.3
Is in a committed romantic relationship	12.4	9.8	15.0
Is more popular/has a better social life	7.4	8.5	6.3
Has an easier life than I do (e.g., works less, has easier classes)	6.8	7.3	6.3
Is in a position of status or authority	6.2	8.5	3.8
Has greater access to financial resources	6.2	3.7	8.8
Receives more parental investment	4.9	3.7	6.3
Is more sophisticated, worldly	4.9	6.1	3.8
Is more talented than I am in a domain of self-importance (e.g., piano playing, painting)	4.9	7.3	2.5
Is more athletically talented	3.7	2.4	5.0
Is more physically attractive	3.1	6.1	0
Has more success attracting romantic partners	1.9	1.2	2.5
Has better/more attractive clothes	1.2	1.2	1.3
Is more socially at ease than I am	1.2	2.4	0
Comes from a more socially/financially prominent family	0.6	0	1.3
Other	0.6	0	1.3

Note. The numbers are the percentages of stories falling in the respective category.