The painful duality of envy: Evidence for an integrative theory and a meta-analysis on the

relation of envy and schadenfreude

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Abstract

Despite envy's importance as a driver of social behavior, scholars disagree on its conceptualization. We review the literature and distinguish three incongruent theories: (a) Malicious Envy Theory (i.e., envy as uniform and malicious), (b) Dual Envy Theory (i.e., envy as taking on two forms, benign and malicious), and (c) Pain Theory of Envy (i.e., envy as uniform and driven by pain). Moreover, within and across theories, operationalizations of envy have included various different components. We integrate these conceptualizations using a data-driven approach, deriving a comprehensive theory of envy in five studies (total $N =$ 1,237)—the Pain-driven Dual Envy (PaDE) Theory. Exploratory and confirmatory factor analyses of an exhaustive set of envy components (Studies 1-4) suggest that envy consists of three factors: Pain (i.e., *preoccupation with the envy-eliciting situation*, *inferiority*), predicts both benign envy (i.e., *desire for the envy object*, *improvement motivation*, *emulation of the other*), and malicious envy (i.e., *communication about the other*, *directed aggression*, *non-directed aggression*). An experience-sampling study (Study 5) suggests that pain constitutes a quickly fading reaction, whereas benign and malicious envy are enduring attitudinal constructs. We apply this theory in a meta-analysis on the controversial relation of envy and schadenfreude ($N =$ 4,366), finding that envy and schadenfreude are more strongly and positively correlated to the extent that the respective research operationalizes envy as malicious, compared to as pain or benign envy. We discuss how the PaDE Theory can illuminate research on envy in diverse settings, and envy's relation to other distinct emotions.

Keywords: envy; benign and malicious envy; pain of envy; data-driven approach

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Scholars from a variety of fields concur that envy is among the most powerful emotional forces of human nature. The significance of envy in determining behavior in individuals, relationships, and society is not only emphasized by philosophers (D'Arms, 2013), religious thinkers (Aquaro, 2004), historians (Aly, 2014), sociologists (Schoeck, 1969), economists (Mui, 1995), and anthropologists (Foster, 1972), it is also supported by wide-ranging psychological evidence (for reviews see Miceli & Castelfranchi, 2007; Smith, 2008; Smith & Kim, 2007). Envy impacts consumer behavior (Belk, 2011), social structures of organizations (Duffy, Scott, Shaw, Tepper, & Aquino, 2012), morality (Parks, Rumble, & Posey, 2002), the perception of one's body (Pila, Stamiris, Castonguay, & Sabiston, 2014), the emotional life in the digital world (Appel, Gerlach, & Crusius, 2016), the development of stereotypes (Cuddy, Fiske, & Glick, 2007; Fiske, 2010) or psychopathology (Gold, 1996), and many other domains of human psychology. Sometimes, people even describe entire societies as shaped by envy, reflected in the German term *Neidgesellschaft* (envy society; Bolzano, 2007).

Despite its importance, the diverse research efforts directed at envy are characterized by a severe limitation, one that undermines their very utility—that is, scholars are in striking disagreement about how they conceptualize envy. In fact, some theories define envy as purely hostile (Miceli & Castelfranchi, 2007; Smith & Kim, 2007), others distinguish benign and malicious forms (Lange & Crusius, 2015a; Van de Ven, Zeelenberg, & Pieters, 2009), and others model envy as a uniform emotion driven by pain (Cohen-Charash & Larson, 2016, 2017; Tai, Narayanan, & McAllister, 2012). These diverging ideas about the nature of envy necessarily manifest in its measures, as investigators use remarkably different components (e.g., thoughts, feelings, and action tendencies) of envy to operationalize it. This may be a reason for conflicting findings regarding envy which pervade the literature (e.g., the

relationship of envy and schadenfreude, Van de Ven et al., 2015) leaving the field in an undesirable state.

In light of envy's importance, it is imperative to develop a comprehensive and consensual theoretical model of envy. To facilitate this goal, in the current manuscript we (a) review the prevailing conceptualizations of envy. Subsequently, we (b) empirically derive an integrative theory of envy. Finally, we (c) provide evidence for the structure and process proposed in this novel theory of envy, and demonstrate its utility in a meta-analysis about one of the most prominent disagreements in research on envy—its relationship with schadenfreude, the pleasure at another's misfortune.

A Review of Existing Conceptualizations of Envy

Across theories, scholars agree that envy occurs in a triad including an envier, an envy object (an achievement, characteristic, or possession), and an envied person. In this triad, envy is a negative affective state following from an upward comparison of the envier to the envied person with respect to the envy object (Miceli & Castelfranchi, 2007; Smith & Kim, 2007). Research supports that envy is enhanced when the envy object is relevant for social status (Crusius & Lange, 2016; Fiske, 2010; Lange, Blatz, & Crusius, in press; Lange & Crusius, 2015b; Silver & Sabini, 1978) and when the envier perceives the envied person to be similar to the self (Henniger & Harris, 2015; Schaubroeck & Lam, 2004). Envy is not necessarily a short-term affective state but has been hypothesized to evolve (Hoogland, Thielke, & Smith, 2016) and transmute into other emotions (Smith, 2004) over time. It manifests in a variety of diverse affective, cognitive, and motivational consequences (Parrott & Smith, 1993) theorized to be aimed at leveling the difference between the envier and the envied person (Van de Ven et al., 2009).[1]

Beyond these common features, the prevailing theories of envy are widely discrepant (see Figure 1). One theory conceptualizes envy as a uniform emotion with malicious consequences (e.g., Smith & Kim, 2007). We call this the *Malicious Envy Theory*. Another

theory conceptualizes envy as taking on two distinct forms, of which one is benign and one is malicious (e.g., Van de Ven et al., 2009). We call this the *Dual Envy Theory*. A third theory conceptualizes envy as a uniform emotion driven by pain that can simultaneously lead to constructive and destructive consequences (e.g., Tai et al., 2012). We call this the *Pain Theory of Envy*. Thus, it is unclear (a) whether envy is a uniform construct or has two distinct forms and (b) whether or how envy is fueled by a distinct pain component.

Next to these theoretical disagreements, there are also methodological contradictions. Specifically, studies designed under the same theoretical framework operationalized envy via different components. Thus, specific operationalizations of envy within each theory—as reflected in self-report items—are inconsistent across studies. In Table 1, we present each theory and the diverse operationalizations they include (see also Figure 2). What is the evidence for each theory?

The Malicious Envy Theory

Theoretical background. Much of the initial research on envy was inspired by its characterization as a deadly sin (Aquaro, 2004). Indeed, much research has documented adverse outcomes of envy (for reviews see Miceli & Castelfranchi, 2007; Smith & Kim, 2007). It relates to counterproductive work behaviors (Cohen-Charash & Mueller, 2007), cheating (Gino & Pierce, 2009a, 2009b), deception (Moran & Schweitzer, 2008), and social undermining in groups (Duffy et al., 2012) among many other negative outcomes.

This evidence has been integrated into a prominent theoretical account of envy (Smith & Kim, 2007; see also Miceli & Castelfranchi, 2007) which we designate here as the Malicious Envy Theory (see Figure 1, left model). It posits three key components of envy— namely *inferiority*, *hostility*, and *resentment*—which are caused by someone else's desirable advantage. Notably, components that would characterize a more benign type of envy such as *longing for the envy object*, *admiration for the other*, or *emulation of the other* were explicitly not included in this definition of envy. Envy only including such components without hostility

would not be seen as constituting *envy proper*, as conceptualized in the Malicious Envy

Theory (Smith & Kim, 2007). As displayed in Table 1, most of the research on envy has

relied on this theory.

   Operationalizations. We identified 20 different operationalizations of envy under

the Malicious Envy Theory (see Table 1 and Figure 2, left cloud). Fifteen of these included

items referring to envy's proposed core component *inferiority*, nine also referred to

resentment, and six referred to *hostility*. In addition, operationalizations included components

such as *injustice*, *shame*, *avoidance*, *negative thoughts about the other*, *anxiety*, *frustration*,

preoccupation, *depression*, *arousal*, *uncomfortableness*, or *schadenfreude*. Directly

contradicting the Malicious Envy Theory, envy was measured with *emulation*, *desire*, or

improvement motivation in 11 operationalizations. Finally, envy has often been assessed only

with the general terms *envious*, *envy*, *jealous*, or *jealousy*.

   Discussion. The Malicious Envy Theory has sparked most of the research on envy. It

has proven its predictive power in various domains of human behavior. By focusing on

inferiority and *resentment* in the operationalizations, research conducted under this theory can

account for envy's malicious consequences.

   Nevertheless, one may criticize the diversity and inconsistency of these

operationalizations, and in turn question whether envy is in fact a unitary emotion. From the

existing data alone it appears impossible to decide which specific components to retain in a

strictly unidimensional conceptualization of envy. If anything, multiple clusters or factors

have emerged in previous research (Parrott & Smith, 1993; Salovey & Rodin, 1986),

suggesting that envy may not be uniform. This thought underlies the Dual Envy Theory.

The Dual Envy Theory

   Theoretical background. Various scholars argue that envy may be fruitfully

conceptualized into two separate forms, one benign and one malicious. Indeed, research

supports that when participants recall envy situations, they report two qualitatively distinct

kinds of experiences (Falcon, 2015; Van de Ven et al., 2009). Some situations correspond to malicious envy as conceptualized in the Malicious Envy Theory. However, other situations describe a more benign form of envy. Specifically, in benign envy, instead of wanting to harm the envied person, enviers want to improve personal standing (see Figure 1, middle model).

Although benign and malicious envy both feel negative (Van de Ven et al., 2009), evidence supports their distinctiveness. For instance, research suggests that the two envy forms are linked to distinct appraisal patterns (Lange, Crusius, & Hagemeyer, 2016; Van de Ven, Zeelenberg, & Pieters, 2012). Benign envy is elicited when the envier evaluates the envied person's status as deserved and perceives high control to attain it as well. In contrast, malicious envy is elicited when the envier evaluates the envied person's status as undeserved and perceives low control. Furthermore, benign and malicious envy have been linked to different consequences. For instance, benign envy is associated with an attentional focus on means for self-improvement (Crusius & Lange, 2014) and performance increments in achievement tasks (Lange & Crusius, 2015b; Van de Ven, Zeelenberg, & Pieters, 2011). In contrast, malicious envy is associated with an attentional focus on the other person (Crusius & Lange, 2014) and behaviors directed at undermining the envied person's success (Lange & Crusius, 2015b). Collectively, the evidence suggests that benign and malicious envy are distinct emotions, each explaining parts of envy's diversity.

Operationalizations. Overall, we identified 11 different operationalizations of envy covering a range of components under the Dual Envy Theory (see Table 1 and Figure 2, middle cloud). Benign envy was measured with items referring to *emulation*, *improvement motivation*, *positive thoughts about the other person*, and *admiration* in nine operationalizations. Notably, *emulation* and *improvement motivation* are also often part of operationalizations of envy in research relying on the Malicious Envy Theory. Four operationalizations of benign envy included items related to *desire*, *self-focus*, (some) *positive affect*, and *closeness*.

Within Dual Envy Theory research, malicious envy has been measured via *hostility* and *negative thoughts about the other* in nine operationalizations. Although malicious envy in the Dual Envy Theory and the Malicious Envy Theory are theoretically overlapping, the former theory includes no operationalization covering the components *inferiority* and *resentment* that were most frequent in the latter. More seldom, operationalizations of malicious envy in the Dual Envy Theory included items related to *injustice*, *communication about other*, *other-focus*, *frustration*, and *shame*. These components were also part of some operationalizations of the Malicious Envy Theory.

Even when the Dual Envy Theory formed the theoretical background, envy was sometimes measured with a single scale with the goal to include both forms at the same time. Such a scale covered either the general terms *envious* or *jealous* or items related to *negative affect* and *frustration* given that benign and malicious envy were both conceptualized as negative emotions. Furthermore, in other studies, the envy forms were assessed with specific terms for *benign* and *malicious envy* in different languages (e.g., *beneiden* and *missgönnen* in German).

Discussion. The Dual Envy Theory intends to broaden the understanding of envy by proposing that envy can be disentangled into two distinct forms—benign and malicious envy. It therefore conceptualizes a benign manifestation of envy next to the malicious manifestation that is focal in the Malicious Envy Theory. Furthermore, research investigating the distinction between benign and malicious envy has related envy to specific antecedent cognitions (e.g., appraisals) and an extended range of consequences each mapping onto only one of the two envy forms. Thus, under the Dual Envy Theory, benign and malicious envy are conceptualized as independent emotions of partly opposing nature. This suggests that they should be negatively correlated which is supported by empirical evidence (e.g., Crusius & Lange, 2014; Lange & Crusius, 2015b).

However, the negative correlation between benign and malicious envy might by an artefact resulting from its operationalizations. Specifically, some operationalizations of the Dual Envy Theory include components that should lead to opposing loadings on the respective other envy form (i.e., components of malicious envy that should negatively relate to benign envy, or vice versa). First, *injustice* (deservingness) has been conceptualized as an appraisal dimension contributing to the elicitation of benign versus malicious envy (Lange et al., 2016; Van de Ven et al., 2012). If the other's advantage is appraised as deserved, benign envy should be elicited. If the other's advantage is appraised as undeserved, malicious envy should be elicited. Thus, *injustice* should load positively on malicious envy and negatively on benign envy, leading to a negative correlation between the two envy forms. Second, some operationalizations of benign envy included *positive thoughts about the other person* and some operationalizations of malicious envy included *negative thoughts about the other person*. These components should of course be negatively correlated.

Furthermore, one may criticize the Dual Envy Theory on the grounds that conceptualizing benign and malicious envy as entirely distinct conflicts with the notion that they constitute two forms of one class of emotional experiences. Research indeed implies that they share certain features. First, benign and malicious envy derive from common underlying mechanisms, such as social comparison (Lange & Crusius, 2015a) and counterfactual thinking (Van de Ven & Zeelenberg, 2015). Second, if the envy forms are manipulated (e.g., via different words such as the German terms *beneiden* and *missgönnen*), they both feel equivalently negative (Crusius & Lange, 2014; Lange & Crusius, 2015b). Such findings imply a common affective core that drives envy's diversity. In fact, the Dual Envy Theory was recently extended on a theoretical level such that benign and malicious envy are conceptualized as subtypes of *general envy*, which is defined as the pain at the good fortune of others (Van de Ven, 2016). The latter construct is focal in the Pain Theory of Envy.

The Pain Theory of Envy

Theoretical background. The Pain Theory of Envy posits that envy is the pain following an upward comparison, which then leads to various action tendencies (Cohen-Charash, 2009; Cohen-Charash & Larson, 2016, 2017; Tai et al., 2012). According to this approach, pain—theorized to include *inferiority* and *frustration* (Tai et al., 2012)—is a precursor of a diverse motivational construct entailing constructive as well as destructive tendencies (see Figure 1, right model). Contrary to Dual Envy Theory, but similar to Malicious Envy Theory, the Pain Theory of Envy predicts that the motivational tendencies underlying envy constitute a uniform factor. Thus, benign and malicious envy—as conceptualized in the Dual Envy Theory—are collapsed into a single construct instead of being defined as distinct pathways. Moderators subsequently determine which action tendencies prevail. For example, perceiving a specific situation as a challenge rather than a threat should reinforce constructive over destructive consequences of the uniform motivational construct (Tai et al., 2012). The Pain Theory of Envy, therefore, conceptualizes envy's motivational consequences as evolving from a separate pain construct.

Operationalizations. Overall, we identified three different operationalizations of envy under the Pain Theory of Envy (see Table 1 and Figure 2, right cloud). Pain included items referring to *inferiority*, *frustration*, *resentment*, *shame*, and *injustice*. These components overlap with operationalizations of malicious envy in the other two theories but not with operationalizations of benign envy in the Dual Envy Theory. In only one operationalization, however, pain was measured separately, despite its theoretical conceptualization as a distinct element of envy. According to the Pain Theory of Envy, the action tendencies entail (a) a *comparison component* operationalized via *desire* and an *unfavorable comparison* and (b) a *feeling component* operationalized via *aggression*, *anger*, and *resentment* (Cohen-Charash, 2009). Notably, these components largely map onto benign and malicious envy as operationalized in the Dual Envy Theory. However, the comparison and feeling components were both considered parts of a uniform motivational construct and were eventually integrated

into a single scale (e.g., Cohen-Charash, 2009; Cohen-Charash & Mueller, 2007; Khan, Quratulain, & Bell, 2014). Moreover, once the action tendencies included only *desire* and *emulation*, reflecting the constructive comparison component while foregoing the destructive feeling component proposed under the Pain Theory.

Discussion. The Pain Theory of Envy deviates from the Malicious Envy Theory and Dual Envy Theory by conceptualizing a separate pain construct underlying envy's motivational diversity. The theory posits that pain may lead to various action tendencies depending on a variety of moderators. It contradicts the Dual Envy Theory by regarding the constructive comparison component and destructive feeling component (which are conceptually similar to benign and malicious envy, respectively) as parts of a uniform motivational construct, instead of separate factors.

One may criticize the Pain Theory of Envy on the grounds that pain has not always been measured separately in all studies adopting this theory even though it is conceptualized as a separate component. Furthermore, it remains unclear how the Pain Theory of Envy can explain the findings collected under the Dual Envy Theory that envy takes on two distinct forms. Proponents of the Pain Theory of Envy argue that measures of benign and malicious envy capitalize on evaluative differences, such that benign envy measures are socially desirable whereas malicious envy measures are socially undesirable (Cohen-Charash & Larson, 2017). They propose that, controlling for social desirability, benign and malicious envy should be highly positively correlated. However, both of these explanations imply a dimensional approach to the envy forms. If conceptualizations of benign and malicious envy in the Dual Envy Theory capitalize on social desirability, they should be strongly negatively correlated. Being part of a uniform construct as conceptualized under the Pain Theory of Envy, benign and malicious envy should be strongly positively correlated across contexts and individuals. This notion is contradicted by cluster and taxometric analyses that find two orthogonal categories of envy (Falcon, 2015; Van de Ven et al., 2009). Thus, the Pain Theory

of Envy cannot explain findings on the relationship of benign and malicious envy and appears to be inconsistent with the observed empirical relationship between the two.

Consequences of the Heterogeneity in Operationalizations of Envy

The different operationalizations of envy reflect the theoretical disagreement, methodological heterogeneity, and empirical inconsistency that characterize the field. Overall, across three distinct theories, 34 distinct empirical operationalizations of envy have been used (Table 1), which presents several challenges for research on envy.

First, the reliance on different theories and operationalizations of envy likely underlies empirical discrepancies in the literature. A striking example is research on the relation of envy and schadenfreude. Initial evidence supported that envy elicits schadenfreude (e.g., Smith et al., 1996; Van Dijk, Ouwerkerk, Goslinga, Nieweg, & Gallucci, 2006), whereas subsequent research contested this conclusion (e.g., Feather & Sherman, 2002; Hareli & Weiner, 2002). The Dual Envy Theory predicts that the inconsistency can be unraveled by taking the two forms of envy into account. Given that malicious envy is associated with a motivation to decrease superior others' status (Lange & Crusius, 2015b), it positively predicts schadenfreude (Van de Ven et al., 2015; Van Dijk, Ouwerkerk, Smith, & Cikara, 2015). In contrast, as the benignly envious may sometimes regard the envied person as a means to improve themselves, benign envy should negatively predict schadenfreude (e.g., Feather, Wenzel, & McKee, 2013). However, other findings suggest that even malicious envy can be unrelated to schadenfreude (Feather et al., 2013). Each study that has tested the link between envy and schadenfreude has relied on different conceptualizations of envy within either the Malicious Envy Theory or the Dual Envy Theory. Thus, theoretical disagreement and diverging operationalizations may have fostered empirical inconsistency. Of note, pain as conceptualized in the Pain Theory of Envy has not yet been linked to schadenfreude. Given that pain is predicted to relate to both constructive and destructive consequences of envy, one would predict that it will be unrelated to schadenfreude.

Second, so far, no measure comprehensively captures the whole complexity of envy, including (a) its common core, and (b) its diverse motivations. Such a scale could be used to investigate the relative validity of the envy theories and accelerate progress toward understanding envy's complexity. The most frequent approach used to measure envy includes only the general terms *envious*, *envy*, *jealous*, or *jealousy* (see Table 1). This indirectly implies that envy is a uniform emotion.

Third, several theories and operationalizations include other distinct emotions as envy components. This might be reasonable as envy has been argued to be closely related to or transmute into other emotions (Smith, 2004). However, conceptualizing envy via emotions such as *jealousy*, *resentment*, *admiration*, *anger*, *frustration*, *shame*, *anxiety*, or *schadenfreude* (see Table 1), confounds envy with these emotions at the measurement level. Therefore, it is difficult to assess whether any emotional correlate of envy reflects transmuted envy or another distinct emotion.

The Present Research: Toward an Integrative Theory of Envy

Decades of theory-driven research on envy leave us with a conflicted field without a comprehensive theory of envy that simultaneously accounts for both (a) the shared emotional core of envy and (b) envy's diverse motivational elements. So far, no systematic research has attempted to compare and integrate all conceptualizations of envy and to distill its core components. This state has led to several challenges in research on envy. Here we argue that to overcome these challenges, it is beneficial to take a data-driven approach.

Data-driven approaches have several advantages that make them ideal tools to derive a comprehensive theory of envy (for a review see Dhami, Hertwig, & Hoffrage, 2004). First, they allow researchers to investigate a multitude of information simultaneously. Second, data-driven approaches reduce researcher's a priori biases. Finally, data-driven approaches may provide converging evidence from multiple sources from which stimulus material can be sampled. For these reasons, they have allowed insights into phenomena such as the structure

of personality (John, Naumann, & Soto, 2008), stereotypes (Koch, Imhoff, Dotsch,

Unkelbach, & Alves, 2016), or the structure of a multitude of positive emotions (Weidman &

Tracy, 2017), as well as specific emotions such as pride (Tracy & Robins, 2007) and humility

(Weidman, Cheng, & Tracy, in press).

To utilize these advantages, we pursued two complementary strategies. In Study 1,

we simultaneously investigated all the different ways in which envy was operationalized in

previous research. In Study 2, we representatively sampled components from envy episodes

experienced by naïve participants. Subsequently, with the help of a newly developed scale, we

tested the structure of envy in Studies 3 and 4 and the distinct temporal unfolding of its

interrelated elements in Study 5.

Study 1

The goal of Study 1 was to lay the groundwork for a novel theory of envy by

simultaneously integrating all envy components previously proposed by envy researchers. We

included a representative set of items from all prior empirical articles on envy (see Table 1)

and asked participants to rate their envy experience on these items. We subsequently used

exploratory factor analysis to infer the underlying mental representation of envy.

Method

Participants. Two hundred seventy[2] US workers from Amazon's Mechanical Turk

(MTurk) participated in Study 1 ($M_{age} = 34$, $SD = 11$, range: 19–78; 41% male).

Materials and procedure. In a first step, we created a representative set of self-

report items used by previous envy researchers. To construct the set, we started a search with

the term *envy* in PsycARTICLES, PsycEXTRA, and PsycINFO in November 2015. The

search produced 2,251 hits. We considered all empirical articles measuring components of

state envy. We also included scales that measured envy as repeating episodes of state envy

towards certain individuals (e.g., Cuddy et al., 2007; Vecchio, 2000). We did not include

scales if they measured dispositional envy, if participants had to decide whether something

(e.g., a facial expression) signals envy in another person, when envy was reported with only one item for single domains (e.g., "How much do you envy others for their body"), if envy was indirectly inferred based on behavior in the study, if envy was measured with general negative affect, if only items were used that could not be translated into English (e.g., in Dutch "How much *benign envy* do you feel"), if qualitative responses were coded, or if the article was neither in German nor English.

This resulted in 85 articles involving 141 studies with 193 scales relating to envy from which we extracted all items (all articles are cited in Table 1; the entire list of items is available on OSF). After deleting redundant items from the same article and duplicate items from repeatedly used validated scales, we extracted 399 items and adapted them for the current purpose. We excluded items representing other emotions (e.g., anger, jealousy) as we aimed at identifying items distinctly related to envy. This list included *frustration*, as it is often used as a synonym for anger. We also excluded items measuring *arousal* and general *negative affect* as these are dimensions broadly related to emotional experience and could be measured with other scales (Barrett & Russell, 1998).

Afterwards, we grouped all items into categories reflecting components of envy. We derived these categories in extended discussions among the first and second author (similar to Parrott & Smith, 1993; Smith, Parrott, Ozer, & Moniz, 1994). The final set of categories was composed of 185 items related to *envy*, *uncomfortableness*, *communication*, *directed aggression*, *non-directed aggression*, *closeness to the other*, *preoccupation with the situation*, *inferiority*, *positive thoughts about other*, *desire for the envy object*, *improvement motivation*, *emulation of the other*, and *injustice*. Categories included an average of 14.23 items ($SD =$ 11.36; range: 1 – 37; all items and their corresponding categories are available on OSF). Nevertheless, within each category, most of the items were redundant. For instance, items related to *envy* included "I felt envy", "I was envious", or "I experienced envy". Moreover, within categories, several items were conceptually similar. For instance, items in the *desire*

category included "I wished to have X too", "I would have liked to have X", or "I desired X".

Thus, for each category we picked non-redundant items collectively representing the

frequency and breadth of the category. This led to the final set of 29 items representative of

the 13 categories listed above. The items are displayed in Table 2.

In the main study, participants recalled a recent situation in which they felt envy.

They were instructed to close their eyes and try to imagine the situation as vividly as possible.

Afterwards, they were asked to describe the situation as if they were talking to a good friend

(Roseman, Wiest, & Swartz, 1994). Subsequently, participants indicated their agreement on

the 29 items on a scale from 1 (*does not apply at all*) to 7 (*applies very much*). The items were

presented in random order. We referred to the envied person as *Person* and to the envy object

as *X*.

Results

Descriptive statistics for all items are displayed in Table 2. We ran an exploratory

factor analysis, using principal components analysis with oblimin rotation to extract factors

(delta = 0). This produced six factors with eigenvalues > 1. To determine the optimal number

of factors, we conducted parallel analysis (Russell, 2002). We generated 1,000 data sets using

permutations of the raw data set as some variables were skewed. We used the stricter 99th

percentile as a cutoff, given that a large number of items can cause trivial factors to produce

high eigenvalues (Russell, 2002). Four factors surpassed the criterion, explaining 54% of the

variance. Their eigenvalues were 6.84, 4.87, 2.33, and 1.55, respectively. The factor loadings

taken from the factor pattern matrix are displayed in Table 2.

Factor 1 included items belonging to *communication*, *directed aggression*, *non-

directed aggression*, *injustice*, and negative loadings on *positive thoughts about the other*.

This factor corresponds to malicious envy as conceptualized in prior research. Factor 2

included items belonging to *closeness*, *positive thoughts about the other*, *improvement

motivation*, and *emulation of the other*. This factor corresponds to benign envy as

conceptualized in prior research. Factor 3 included only four items with loadings > |.50|

belonging to *envy* and *desire*. This factor was not conceptualized in previous research and is

difficult to interpret. Factor 4 comprised items with loadings belonging to *uncomfortableness*,

preoccupation with the situation, and *inferiority*. This factor corresponds to pain as

conceptualized in prior research. Factors 1 (malicious envy) and 2 (benign envy) were

negatively correlated, $r = -.11$. Factors 1 (malicious envy), $r = .21$, and 2 (benign envy), $r =$

.25, were both positively correlated with Factor 4 (pain).[3] Factor 3 (uninterpretable factor)

showed positive correlations with Factors 1 (malicious envy), $r = .16$, 2 (benign envy), $r =$

.07, and 4 (pain), $r = .27$.

Discussion

   The factor structure revealed in Study 1 supports a theory with (at least) three factors

underlying the mental representation of envy in previous research. In line with the Malicious

Envy Theory and the Dual Envy Theory, Factors 1 and 2 describe malicious and benign

manifestations of envy, respectively. Furthermore, in line with the Pain Theory of Envy,

Factor 4 describes the pain of envy. Nevertheless, Study 1 points at limitations of previous

theories. First, benign and malicious envy constitute separate envy factors, inconsistent with

the Malicious Envy Theory and the Pain Theory of Envy. Second, pain was born out in an

independent factor distinct from benign and malicious envy, yet positively correlated with

both, inconsistent with the Malicious Envy Theory and the Dual Envy Theory. Thus, the

current factor structure better accounts (a) for envy's common emotional core as well as (b)

its motivational diversity, compared to existing theories of envy.

   Two additional findings of Study 1 are noteworthy. First, Factor 3 is difficult to

interpret. Only four items loaded strongly on the factor, so we refrain from interpreting it as

meaningful. Second, *positive thoughts about the other* loaded negatively on the malicious

envy factor and positively on the benign envy factor. This is in line with the criticism that

such items may be ill-suited for measures that intend to distinguish between benign and

malicious envy if these are indeed conceptualized as two forms of the same emotion rather than as two distinct emotions.

One strength of Study 1 may, at the same time, represent one of its limitations: we collapsed across all previous conceptualizations of envy attempting to identify its essential nature. Thus, it could be that we found a pain factor, a benign envy factor, and a malicious envy factor because we included items from conceptualizations that previously measured pain, benign envy, and malicious envy. To overcome this limitation, we next sampled items from envy episodes experienced by naïve participants. If the three factors replicate in an independent sample, this would provide converging evidence for their usefulness.

Study 2

The goal of Study 2 was to replicate the factor structure of Study 1 with a new set of items. To do so, we sampled items from a separate group of participants and used them in a study identical to Study 1.

Method

Participants. Two hundred eighty-five US workers from MTurk participated in Study 2 (see Footnote 2 for exclusions; M_{age} = 35, SD = 11, range: 18–73; 51% male)

Materials and procedure. In a first step, items were generated in a separate study with 45 US workers from MTurk. Participants' task was to think back to a situation when they felt envy and report up to 10 elements they associated with it. We explicitly mentioned that they could report thoughts, feelings, desires, behaviors, bodily symptoms, expressions, and verbalizations (Weidman & Tracy, 2017).

Participants generated 354 elements in total, after excluding clearly irrelevant elements as well as other emotions and their facial expressions. For each of these, we formulated items. Afterwards, we proceeded as in Study 1. After deleting identical items we grouped them into categories of components (five items did not fit any of these categories). The categories overlapped to a large extent with the categories of Study 1. Nevertheless, some

were new, namely *emotion regulation*, *entitlement*, and *boasting intention*. For other

categories of Study 1 participants did not generate elements, namely *negative affect*,

uncomfortableness, and *positive thoughts about the other*. Finally, instead of *closeness to the*

other participants mentioned items belonging to *avoidance of the other*. In sum, there were

149 items related to 14 categories, namely *envy*, *communication*, *directed aggression*, *non-*

directed aggression, *avoidance of the other*, *preoccupation with the situation*, *inferiority*,

desire for the envy object, *improvement motivation*, *emulation of the other*, *injustice*, *emotion*

regulation, *entitlement*, and *boasting intention* ($M = 10.64$ items per category; $SD = 6.64$;

range: $3 – 26$). Finally, we selected all non-redundant items covering the frequency and

breadth of each category, yielding a final set of 40 items (see Table 3). The full list including

all mentioned elements and respective items is available on OSF.

In the main study, the procedure was identical to Study 1. Participants vividly

recalled one recent envy episode. Subsequently, they indicated how much the 40 items

applied to their recalled situation on a scale from 1 (*does not apply at all*) to 7 (*applies very*

much). The items were presented in random order.

Results

Descriptive statistics of all items are displayed in Table 3. We ran an exploratory

factor analysis, using principal components analysis with oblimin rotation to extract factors

(delta = 0). This produced seven factors with eigenvalues > 1. To determine the optimal

number of factors, we conducted parallel analysis. We again generated 1,000 data sets using

permutations of the raw data and used the 99th percentile as threshold. Three factors surpassed

the criterion, explaining 52% of the variance. Their eigenvalues were 13.77, 4.66, and 2.34,

respectively. The factor loadings taken from the factor pattern matrix are displayed in Table 3.

Factor 1 included items belonging to *communication*, *directed aggression*, *non-*

directed aggression, *avoidance of the other*, *injustice*, and *boasting intention*. This replicates

the malicious envy factor from Study 1. Factor 2 included items belonging to *desire for the*

envy object, *improvement motivation*, *emulation*, and *entitlement*. This replicates the benign envy factor from Study 1, this time including *desire*. Factor 3 included items belonging to *envy*, *preoccupation with the situation*, *inferiority*, and *emotion regulation*. This replicates the pain of envy factor from Study 1. *Preoccupation with the situation* also loaded on Factors 1 and 2, and *emulation* also loaded on Factors 1 and 3. Factors 1 (malicious envy) and 2 (benign envy) were positively correlated, $r = .19$. Factor 3 (pain) correlated positively with Factors 1 (malicious envy) and 2 (benign envy), both rs = .36. This also replicates the correlations from Study 1. The only difference is that Factors 1 (malicious envy) and 2 (benign envy) were slightly negatively correlated in Study 1. Thus, across studies, malicious envy and benign envy appear to be relatively independent.

Discussion

The factor structure revealed in Study 2 supports a theory with three factors underlying the mental representation of envy in naïve participants. This structure—although based on different participants judging a different set of items—closely replicated the factor structure revealed in Study 1. Factor 1 again reflects malicious envy as conceptualized in previous research, Factor 2 reflects benign envy, and Factor 3 reflects pain. The findings also again suggest that items covering negative affect are not necessary to distinguish benign and malicious envy. Notably, Study 2 did not replicate the uninterpretable factor that emerged in Study 1, bolstering the conclusion that this factor was artefactual.

Deriving an Integrative Theory and a Comprehensive Scale of Envy

Studies 1 and 2 converge in their data-driven conclusions that three factors underlie envy: pain, benign envy, and malicious envy. We found highly similar factor structures when using all envy components proposed by envy researchers and when using envy components sampled from episodes experienced by naïve participants. Across studies, the benign and malicious factors were orthogonal. Furthermore, both envy forms were positively related to the pain factor, suggesting that pain is a common core that underlies both envy experiences.

This finding is in line with the notion that benign and malicious envy are two forms of a common class of emotional experiences. Thus, we propose to conceptualize envy in two forms—benign and malicious envy—that are both related to a third factor—pain. We call this the *Pain-driven Dual Envy* (*PaDE*) *Theory* (see Figure 3).

One central limitation of previous theories is that although pain, benign envy, and malicious envy were conceptualized on an abstract level, there is a lack of precise articulation of which concrete components (e.g., *inferiority*, *emulation*, or *directed aggression*) collectively form each element. This led to (a) theoretical confusion about whether different elements across theories actually overlap conceptually (e.g., malicious envy was often operationalized differently under the Malicious Envy Theory and the Dual Envy Theory) and (b) the diversity of operationalizations under each theory (see Table 1). In contrast, our data-driven approach allows us to define core components of each envy element by taking the results of Studies 1 and 2 into account. This yielded an evidence-based theory of envy, and provided concrete operationalizations of each envy element, which lays the foundation to develop scales that capture the nature of envy comprehensively.

Which components should be included in operational definitions of the pain, benign envy, and malicious envy elements of the PaDE Theory? To identify these three elements by a set of cohesive components that are specific to them, we specified the following criteria: We selected components loading on the respective factor in factor analyses in Study 1 and/or Study 2 and showing no consistent cross-loadings on other factors. We excluded components with strong positive loadings on either malicious or benign envy, but simultaneously strong negative loadings on the other form of envy. This accounts for the categorical nature of benign and malicious envy as opposed to a dimensional approach. Furthermore, we specified that components had to be conceptually distinct from other constructs. Based on the components that fulfill these criteria, we afterwards selected items that represent the breadth and frequency of components related to pain, benign envy, and malicious envy.

For pain, *preoccupation with the situation* and *inferiority* fulfill these criteria. In contrast, we had to exclude *uncomfortableness* and *emotion regulation* because they occurred in only one of the previous studies and also referred more to meta-perceptions than situationally relevant envy components. To operationalize the pain element in a self-report scale, we selected three items. Specifically, we selected one *preoccupation* item. As the item initially assessed more of a meta-perception of how envy affects the person instead of a feeling in the situation, we slightly altered it ("I felt tormented"). Moreover, we selected two *inferiority* items ("I felt inadequate", "I felt depressed").

For benign envy, the components *desire for the envy object*, *improvement motivation*, and *emulation* fulfill the specified criteria. In contrast, we had to exclude *closeness to the other person*, because in Study 2, the reverse component *avoidance of the other person* was part of malicious envy. This could lead to high negative loadings for *closeness* on malicious envy. In addition, we had to exclude the component *positive thoughts about the other* as it showed opposing loadings on the benign and malicious factors in Study 1. To operationalize the benign envy element in a self-report scale, we selected four items. Specifically, we selected one *desire* item. To reduce the positive skewness of the *desire* item, we increased its item difficulty by asking for a more intense manifestation of longing ("I felt deep longing for X"). Furthermore, we selected two *improvement motivation* items and one *emulation* item. We slightly altered the improvement motivation items ("I wanted to work harder to also obtain exactly X", "I devised a plan to obtain X as well") and the emulation item ("The Person motivated me to become just like him/her") to focus them on the specific comparison domain.

Finally, for malicious envy, the components *communication*, *directed aggression*, and *non-directed aggression* fulfill the specified criteria. In contrast, we had to exclude *avoidance*, again because in Study 1, *closeness* was part of benign envy. This could have led to negative loadings of *avoidance* on benign envy. Furthermore, research usually

conceptualized *injustice* (undeservingness) as an appraisal dimension fostering malicious

envy (Lange et al., 2016; Van de Ven et al., 2012) instead of conceptualizing it as a core

component of it. Thus, we excluded the *injustice* component to avoid confounding malicious

envy with its appraisal dimension. Moreover, we excluded *boasting* as it is synonymous with

hubristic pride (Tracy & Robins, 2007). To operationalize the malicious envy element in a

self-report scale, we selected four items. Specifically, we selected one *communication* item ("I

complained to someone else about the Person"), two *directed aggression* items ("I felt hostile

towards the Person", "I secretly wished that the Person would lose X"), and one *non-directed*

aggression item ("I felt hatred"). All 11 items capturing pain, benign envy, and malicious

envy are displayed in the appendix (Table A1).

Thus, based on the results of the data-driven approach, we derive the PaDE Theory

hypothesizing that pain—composed of *preoccupation* and *inferiority*—predicts two

independent envy forms, namely benign envy—composed of *desire*, *improvement motivation*,

and *emulation*—and malicious envy—composed of *communication*, *directed aggression*, and

non-directed aggression. The PaDE Theory integrates all three earlier theories of envy and

overcomes their limitations. It contains malicious envy as conceptualized in the Malicious

Envy Theory. Moreover, it holds that envy is not always malicious but can, in another form

also entail benign motivational inclinations, in line with the Dual Envy Theory. Note that the

PaDE Theory resembles the recent theoretical reformulation of the Dual Envy Theory, in

which *general envy*—defined as the pain at another's misfortune—represents a hierarchically

more abstract construct with integrated benign and malicious envy subtypes (Van de Ven,

2016). The PaDE Theory extends the Dual Envy Theory and its reformulation by

conceptualizing pain as a separate—instead of an integral—construct predicting the two forms

of envy. This pain construct was also conceptualized in the Pain Theory of Envy. However,

the PaDE Theory suggests that the elements benign and malicious envy characterize two

separate forms of envy instead of forming a uniform motivational construct. Finally, the PaDE

Theory clarifies which components relate to the respective factors, thereby overcoming the previously inconsistent conceptualizations across theories.

The PaDE Theory may also contribute to explaining why envy is, on one hand, considered to be a short-term emotion, but, on the other hand, is theorized to evolve temporally over extended periods of time (Hoogland et al., 2016) and may even transmute into other emotions (Smith, 2004). We hypothesize that pain, benign envy, and malicious envy are characterized by different temporal profiles. Pain is more akin to a short-lived affective state. Therefore its intensity should decrease quickly. In contrast, benign and malicious envy are more akin to attitudes, that is, a positive attitude towards the envy object or a hostile attitude towards the envied person, respectively. Such attitudes are temporally stable. Thus, benign and malicious envy should be more enduring. This would explain why envy has a shared negative emotional core but can nevertheless diverge into different motivational tendencies or other emotions over extended periods of time.

The goal of Studies 3 to 5 was to validate the PaDE Theory. First, we investigated the structural characteristics of the PaDE Theory in Studies 3 and 4. Second, we set out to investigate the temporal characteristics of the envy elements in Study 5.

Study 3

The goal of Study 3 was twofold. First, we tested the different theories of envy directly against each other (for all measurement models see Figure 4). Specifically, the Malicious Envy Theory hypothesizes that all envy components load on a uniform latent variable. Although most conceptualizations focus on malicious and pain components, several operationalizations of envy within the Malicious Envy Theory included benign components. Therefore, this theory predicts that the pain, benign, and malicious indicators load on one uniform latent variable.[4] The Dual Envy Theory hypothesizes that the benign and malicious envy components load on separate latent variables, which are negatively correlated. The Dual Envy Theory conceptualized both benign and malicious envy as negative emotions. Therefore

it is unclear how the pain components should be modeled. As negative affect distinguished

benign (more positive) and malicious envy (more negative) in some previous research

(Falcon, 2015; Van de Ven et al., 2009), we added all pain indicators to the malicious envy

factor.[5] The Pain Theory of Envy hypothesizes that a latent variable for pain predicts a

uniform latent variable consisting of benign and malicious indicators. The PaDE Theory

hypothesizes that a latent pain variable predicts two separate latent benign and malicious envy

variables.[6]

Second, we investigated whether the factors identified in Studies 1 and 2 indeed map

onto benign and malicious envy. To this end, we included measures of hope for success and

fear of failure. In benign envy, the envier aims at improving personal status (Van de Ven et

al., 2009) and should therefore optimistically approach the standard set by the envied person.

Thus, we predicted that hope for success is correlated with benign envy. In malicious envy,

the envier aims at preventing the envied individual from continuing to achieve success (Van

de Ven et al., 2009) and should therefore try to avoid falling short of the standard set by the

envied person. Thus, we predicted that fear of failure is correlated with malicious envy. These

hypotheses are in line with findings on dispositional benign and malicious envy (Lange &

Crusius, 2015a; Lange et al., 2016).

Method

Participants. Two hundred eighty-two US workers from MTurk participated in

Study 3 (see Footnote 2 for exclusions; M_{age} = 36, SD = 12, range: 18–74; 52% male).

Materials and procedure. First, participants responded to a short form of the

Achievement Motives Scale (Lang & Fries, 2006) measuring hope for success (α = .87) and

fear of failure (α = .85) on a scale from 1 (*strongly disagree*) to 4 (*strongly agree*).

Subsequently, participants vividly recalled an envy situation and indicated how much the 11

items in our new envy scales applied to it. The items were presented in random order. The

pain (α = .78), benign envy (α = .71), and malicious envy scales (α = .86) were all reliable.

Results

Descriptive statistics and zero-order correlations are displayed in Table 4.

To test the theories of envy against each other, we used structural equation modeling (see Figure 4 for measurement models). The model consistent with the Malicious Envy Theory did not fit the data, $\chi^2(44) = 495.2$, $p < .001$, $CFI = .65$, $RMSEA = .191$ CI90%[.176; .206]. The model consistent with the Dual Envy Theory did not fit the data, $\chi^2(43) = 260.83$, $p < .001$, $CFI = .83$, $RMSEA = .134$ CI90%[.119; .150]. The model consistent with the Pain Theory of Envy did not fit the data, $\chi^2(43) = 394.41$, $p < .001$, $CFI = .72$, $RMSEA = .171$ CI90%[.155; .186]. The model consistent with the PaDE Theory showed acceptable fit to the data, $\chi^2(41) = 140.02$, $p < .001$, $CFI = .92$, $RMSEA = .093$ CI90%[.076; .110]. Indeed, pain positively predicted both benign, $B = 0.15$, $SE = 0.04$, $p < .001$, and malicious envy, $B = 0.69$, $SE = 0.07$, $p < .001$. Benign and malicious envy were independent, $r = -.14$, $p = .11$.

We proceeded with the analyses regarding achievement motivation. To control for the shared variance of hope for success and fear of failure, we regressed benign envy on hope for success and fear of failure simultaneously. Contrary to predictions, hope for success was unrelated to benign envy, $B = 0.19$, $SE = 0.15$, $p = .23$, as was fear of failure, $B = 0.21$, $SE = 0.13$, $p = .11$. Repeating the analysis with malicious envy as criterion, revealed, as predicted, a relationship with fear of failure, $B = 0.27$, $SE = 0.15$, $p = .07$, but not with hope for success, $B = 0.01$, $SE = 0.18$, $p = .94$.

Discussion

Study 3 provided evidence for the PaDE Theory. Specifically, models corresponding to the Malicious Envy Theory, the Dual Envy Theory, and the Pain Theory of Envy did not fit the data, whereas a model corresponding to the PaDE Theory had acceptable fit to the data.

The results for the relations of hope for success and fear of failure to benign and malicious envy were mixed. We found weak evidence for an association between fear of failure and malicious envy, yet, no evidence for an association between hope for success and

benign envy. This stands in contrast to previous research in which hope for success and fear of failure correlated with dispositional benign and malicious envy, respectively (Lange & Crusius, 2015a; Lange et al., 2016). A reason for this discrepancy might be that to find a correlation between achievement motivation and state envy, achievement-motivated individuals need to frequently enter into envy situations and, among all their envy experiences, be more likely to just happen to report the respective benign or malicious envy story in a recall task. Investigations with dispositional envy rest only on the first assumption, thereby increasing the likelihood to find an effect (for a similar problem see Lange et al., 2016). We, therefore, examined the validity of the scales again in Study 4.

Study 4

The goal of Study 4 was twofold. First, we again investigated the fit of the four models testing the theories of envy, this time with a sample of German individuals. Reaching the same conclusions in another country would provide strong evidence for the usefulness of the PaDE Theory. These analyses were identical to those in Study 3.

Second, we tested the convergent and discriminant validity of the scales. To this end, we used them in a sample of participants whose native language—German—encompasses two words for envy that map onto the benign-malicious distinction. If the scales indeed capture the two forms, asking participants to recall either a benign or a malicious envy situation should lead to higher values on the benign or malicious envy scale, respectively. In addition, if the pain of envy indeed underlies both forms, manipulating the kind of envy recalled should have no effect on this scale. Finally, we included two dispositional measures. If both benign and malicious envy are emotional states that result from social comparisons with high-status others, the scales should be positively correlated with a questionnaire measuring the chronic tendency to compare. The same should apply to pain if it constitutes the initial emotional response following an upward status comparison. Furthermore, we assessed approach and avoidance motivation. These constitute specific motivations driven by

hope for success and fear of failure (Elliot & McGregor, 2001). In light of the results of Study 3, we therefore predicted that approach motivation is correlated with benign envy and avoidance motivation is correlated with malicious envy. We preregistered these additional predictions on AsPredicted.org (https://AsPredicted.org/bhnnq.pdf).

Methods

Participants. Two hundred and fifty German University students participated in Study 4 (see Footnote 2 for exclusions; $M_{age} = 24$, $SD = 5$, range: 14–62; 30% male).

Materials and procedure. Participants first completed the German translation of the Iowa-Netherlands Comparison Orientation Measure (INCOM; Gibbons & Buunk, 1999; Schneider & Schupp, 2011) to measure their dispositional tendency to compare themselves with others ($\alpha = .81$) using a scale from 1 (*I disagree strongly*) to 5 (*I agree strongly*). The scale consists of two subscales (Gibbons & Buunk, 1999). They measure the tendencies to compare one's abilities ($\alpha = .78$) and opinions ($\alpha = .72$). As abilities are more competitive than opinions, we predicted that benign and malicious envy should be more strongly correlated with the ability subscale (for a similar finding with dispositional envy see Lange & Crusius, 2015a; Lange et al., 2016). Afterwards, participants completed the German version of the Achievement Goals Questionnaire (AGQ; Bachmann, 2009; Elliot & McGregor, 2001) on a scale from 1 (*not at all true*) to 7 (*very much true*). It includes separate scales for mastery approach ($\alpha = .79$), mastery avoidance ($\alpha = .73$), performance approach ($\alpha = .92$), and performance avoidance ($\alpha = .76$). However, the distinction between mastery and performance was not relevant for our predictions because mastery and performance both motivate the reliance on central social comparison standards (Van Yperen & Leander, 2014) and an inclination to engage in social comparisons relates to both achievement goals (Régner, Escribe, & Dupeyrat, 2007). Therefore, we predicted that both mastery and performance approach are related to benign envy, whereas both mastery and performance avoidance should be related to malicious envy.

Subsequently, participants vividly recalled an envy experience, as in the previous studies. However, in contrast to Studies 1 to 3, we manipulated the kind of envy they recalled. We took advantage of the fact that in German there are two different words related to envy mapping onto the benign-malicious distinction (Crusius & Lange, 2014). Thus, we assigned participants randomly to a condition in which they either recalled a benign (*beneiden*; $n = 139$) or malicious envy (*missgönnen*; $n = 111$) situation. Finally, they responded to German translations of the benign envy ($\alpha = .66$), malicious envy ($\alpha = .79$), and pain ($\alpha = .78$) scales listed in Table A1. The items were presented in random order.

Results

Model fit. All measurement models are depicted in Figure 4. The modeling results were replicated. The model consistent with the Malicious Envy Theory did not fit the data, $\chi^2(44) = 414.01$, $p < .001$, *CFI* = .52, *RMSEA* = .184 CI90%[.168; .200]. The model consistent with the Dual Envy Theory did not fit the data, $\chi^2(43) = 254.26$, $p < .001$, *CFI* = .73, *RMSEA* = .140 CI90%[.124; .157]. The model consistent with the Pain Theory of Envy did not fit the data, $\chi^2(43) = 254.03$, $p < .001$, *CFI* = .73, *RMSEA* = .140 CI90%[.124; .157]. The model consistent with the PaDE Theory showed satisfactory fit to the data, $\chi^2(41) = 85.62$, $p < .001$, *CFI* = .94, *RMSEA* = .066 CI 90%[.046; .086]. Indeed, pain predicted both benign, $B = 0.06$, $SE = 0.03$, $p = .096$, and malicious envy, $B = 0.43$, $SE = 0.08$, $p < .001$. Benign and malicious envy were negatively correlated, $r = -.34$, $p = .01$.

Primary analysis. We conducted a MANOVA with Condition (benign envy vs. malicious envy) as independent variable and the benign and malicious envy scales as dependent variables. We predicted higher benign envy in the benign envy condition than in the malicious envy condition. The reversed should occur for the malicious envy scale. The multivariate effect was significant, $F(2, 247) = 13.27$, $p < .001$, $\eta_p^2 = .10$, and our predictions were fully confirmed (see Table 5).

Secondary analyses. First, we conducted an ANOVA with Condition (benign envy vs. malicious envy) as independent variable and the pain of envy scale as dependent variable. We predicted no difference between the conditions. As can be seen in Table 5, this prediction was confirmed, supporting the notion that both envy forms are equally painful.

Second, we investigated the relationship of the envy elements with personality. Descriptive statistics and zero-order correlations of all measures are displayed in Table 6. To control for the shared variance of the subscales of the social comparison scale, we regressed benign envy, malicious envy, and pain simultaneously on the ability and opinion subscales. The results are displayed in Table 7. Benign envy correlated with both the ability but also the opinion subscale. Malicious envy correlated positively with the ability subscale but negatively with the opinion subscale. Pain correlated positively with the ability subscale but not with the opinion subscale.

We also regressed benign envy, malicious envy, and pain on the achievement goals scales (see Table 7). As displayed in Table 6, the correlation between the performance subscales was very high. Therefore, any conclusions including these subscales need to be taken with caution. Benign envy correlated with mastery approach but not with any other scale. Malicious envy correlated positively with mastery avoidance and negatively with mastery approach but not with both performance subscales. Pain correlated positively with mastery avoidance but not with any other subscale.

Discussion

Study 4 corroborates the validity of the PaDE Theory. First, a model capturing the PaDE Theory again provided the best fit to the data. Second, manipulating the type of envy that participants recalled showed the predicted pattern of results on the benign and malicious envy scales. Third, pain was unaffected by the manipulation, consistent with the notion that both benign and malicious envy involve similar levels of pain. Fourth, benign envy, malicious envy, and pain were all correlated with a dispositional tendency toward social comparison, in

line with the idea that they are triggered by the same process. Fifth, benign envy correlated with mastery approach, whereas malicious envy correlated with mastery avoidance, in line with prior theory and research. Unexpectedly, performance approach and avoidance did not correlate with benign and malicious envy, respectively, in regression analyses, which may have been due to the unpredicted high correlation of the performance subscales with each other. Finally, benign and malicious envy were somewhat negatively correlated in Study 4, whereas they were independent in Study 3. This may be because in Study 4 we manipulated the envy forms. This should increase the frequency of recalled experiences that are high on one form of envy and simultaneously low on the other, fostering a negative correlation.

Studies 3 and 4 support that pain, benign envy, and malicious envy constitute separate elements of envy that are driven by comparative processes and are related to specific motivational inclinations as implied by their theoretical conceptualizations. Moreover, in line with the PaDE Theory, a model in which pain predicts both benign and malicious envy fits the data. Next to this structural advantage over the existing envy theories, these results also underline the value of the scales we developed to assess the nature of envy comprehensively.

In Study 5, using a longitudinal experience sampling design, we sought evidence for our temporal predictions. Specifically, we predicted that the intensity of pain decreases more quickly over time than the more enduring benign and malicious envy. Such evidence would further highlight the conceptual value of differentiating the three elements.

Study 5

The goal of Study 5 was to investigate the temporal unfolding of envy. Specifically, we predicted that pain is a temporally fleeting element of envy, whereas benign and malicious envy are more enduring. We expected that all envy elements decrease in intensity over time. We initially conducted an exploratory study (Study S1; see Supplementary Material on OSF) in which participants recalled envy experiences and rated how they felt immediately after it was elicited and at later time points. The goal of Study 5 was to replicate Study S1 with an

event-contingent experience-sampling design. This allowed us to assess envy as it occurred.

To this end, participants rated their pain, benign envy, and malicious envy repeatedly

following a situation when they experienced envy. Studies S1 and 5 produced highly similar

results. Therefore, we report only Study 5 in the main text. We preregistered our predictions

and analysis plan for Study 5 following the results of Study S1 on AsPredicted.org

(https://aspredicted.org/hifka.pdf).

Method

Participants. One hundred and fifty students of different social sciences majors

participated in Study 5 (see Footnote 2 for exclusions; M_{age} = 22, SD = 4, range: 17–36; 12%

male).

Materials and procedure. We invited students in various lectures to take part in a

study on envy. We stressed that envy is a common everyday experience and that we were

interested in its development over time. Therefore, we asked participants to complete the first

questionnaire of the study immediately once they experienced an episode of envy during the

upcoming days. Moreover, they would receive two additional questionnaires, namely 1 hour

after they finished the first one, and 24 hours after they finished the second one. Again, we

emphasized that participants needed to work on these questionnaires immediately. We

compensated participants with 10€ for completing the study. We did not provide a definition

of envy. All rated experiences therefore constituted envy according to participants'

understanding.

After enrolling in the study by providing demographic information, participants

received a link to the first questionnaire via e-mail. They were instructed to complete this

survey immediately after experiencing envy, at which point they rated how much the 11 pain,

benign envy, and malicious envy items applied to them at that moment using a scale from 1

(*not at all*) to 7 (*very much*). The original items "I devised a plan to obtain X as well" and "I

complained to someone else about the Person" were changed to "I would like to devise a plan

to obtain X as well" and "I would like to complain to someone else about the Person" (translations from German) to adapt them to the current context. The items were presented in random order. One hour after finishing the questionnaire, participants automatically received the second questionnaire, and they received the third questionnaire 24 hours after finishing the second. At time point 1, we also asked participants how many minutes had elapsed since the envy situation they were describing. At time points 2 and 3, we also asked participants how many minutes had elapsed since they had received the latest questionnaire. As required by our preregistered criteria (see also Footnote 2), we excluded all participants who failed to rate their envy experience within 30 minutes after it was elicited, 60 minutes after they received the second questionnaire, and 12 hours after they received the third questionnaire. The results were identical without these exclusions. The median time the remaining participants started working on the first questionnaire after envy was elicited was 5 minutes (range: 0 – 30). The median time elapsed after receiving the second questionnaire was 10 minutes (range: 0 – 60), and it was 12.5 minutes after receiving the third questionnaire (range: 0 – 720). The reliabilities of all items separately for each time point were satisfactory for pain (αs = .72 – .83), benign envy (αs = .65 – .86), and malicious envy (αs = .83 – .86).

Results

Means of all three scales for each time point are depicted in Figure 5. We conducted growth curve analysis with REML estimation and Satterthwaite approximation to determine the degrees of freedom. Confidence intervals were estimated with bootstrap re-samples. The seven time points were nested within participants. Time was specified as a fixed effect, whereas participants was specified as a random effect. As predicted, pain, $B = -0.85$, $SE = 0.05$, CI95%[-0.96; -0.74], $p < .001$, benign envy, $B = -0.4$, $SE = 0.05$, CI95%[-0.51; -0.29], $p < .001$, and malicious envy, $B = -0.48$, $SE = 0.05$, CI95%[-0.58; -0.38], $p < .001$, all decreased linearly. In line with our hypothesis that benign and malicious envy are more enduring than pain, a contrast comparing the slope of pain to the slopes of benign and malicious envy was

significant, B = -0.82, SE = 0.16, CI95%[-1.14; -0.47], p < .001, whereas an orthogonal

contrast comparing the latter two was not, B = -0.08, SE = 0.09, CI95%[-0.25; 0.13], p = .38.

Discussion

Study 5 supports our temporal predictions in an event-contingent experience

sampling study. Specifically, benign and malicious envy were more enduring than pain across

one day.

Studies 3 to 5 support the structural and temporal characteristics of the PaDE Theory,

lending support to its validity. In a final step, we investigated whether the theory can also

contribute to unraveling conflicting findings in the field. This would speak to its predictive

power. Specifically, we investigated whether the theory can resolve an old debate in research

on envy: Does envy lead to schadenfreude?

Meta-Analysis on the Relation of Envy and Schadenfreude

Schadenfreude is often portrayed as a central consequence of envy (Van Dijk et al.,

2015). This relationship may reflect that schadenfreude can be functional for an envier's

situational needs. Specifically, schadenfreude undermines the envied person's status if

schadenfreude is publicly expressed (Lange & Boecker, 2017)—the key social goal of

malicious envy (Lange & Crusius, 2015b). Thus, malicious envy should be correlated with

schadenfreude. However, the evidence for this relationship is rather mixed.

The present reasoning suggests that this confusion may have resulted from

conceptual and methodological discrepancies. Previous research that supported a link between

envy and schadenfreude (Smith et al., 1996) relied on the Malicious Envy Theory.

Consequently, it measured envy via *hostility*, *resentment*, and *inferiority*. Based on our

reasoning, these components are either part of malicious envy (*hostility*), they are possible

correlates of it (*resentment*), or they belong to the pain of envy (*inferiority*). Research

challenging these initial findings (Feather & Nairn, 2005; Feather & Sherman, 2002; Hareli &

Weiner, 2002) also relied on the Malicious Envy Theory. Nevertheless, it measured envy via

emulation and *desire* in addition to the general terms *envious* and *jealous*. Based on our reasoning, these components are either part of benign envy (*emulation*, *desire*) or more likely to relate to both envy forms (*envious*). Subsequent research relying on the Dual Envy Theory, linked malicious envy to schadenfreude, but not benign envy (Van de Ven et al., 2015). These studies included the components *hostility* and *other-focus*. Based in our reasoning, these are indicative of malicious envy (*hostility*) or related to it (*other-focus*). However, the correlation between malicious envy and schadenfreude *did not* emerge in other research that also sought to separate the envy forms (Feather et al., 2013). We speculate that this was the case because malicious envy was measured only via the general terms *envious* and *jealous*. These general terms are not specifically related to either benign or malicious envy; rather, they likely capture both, along with pain of envy. Thus, research based on the Dual Envy Theory could not clarify the relationship of envy and schadenfreude conclusively.

To investigate whether the operationalization of envy in previous research affected the correlation of envy and schadenfreude, we conducted a meta-analysis. We predicted that if the measure of envy included more components of malicious envy (compared to components of pain or benign envy), the correlation of envy and schadenfreude would be more strongly positive. Although a similar prediction can be derived from the Dual Envy Theory, the PaDE Theory has at least two advantages: First, the PaDE Theory leads to the prediction that pain will have a different link with schadenfreude than benign and malicious envy. This is because pain relates positively to benign *and* malicious envy, but these two theoretically have opposing effects on the pleasure at another's misfortune. Thus, pain itself should have no relationship with schadenfreude. In contrast, various conceptualizations in the Dual Envy Theory included pain components in malicious envy, indirectly predicting that it relates positively to schadenfreude. The separation of envy into pain, benign envy, and malicious envy—as conceptualized by the PaDE Theory—allows to clarify these relationships. Second, the PaDE Theory explicitly states the components which should be used to operationalize

benign and malicious envy. Thus, it makes clear predictions whether an envy measure relates to schadenfreude or not, precluding a scenario in which different studies relying on the same theory produce conflicting results because of distinct operational definitions (as occurred with the Dual Envy Theory, Feather et al., 2013; Van de Ven et al., 2015).

Method

Study selection. We included every article identified in Study 1 in which envy and schadenfreude were measured. Furthermore, we included all unpublished data sets we had access to from our own research and from others provided to us after requesting them on the mailing list of the International Society for Research on Emotions and by personal contact. We extracted the correlation between envy and schadenfreude as well as the items used to measure envy. If studies included conditions in which envy was not to be expected at all (participants were asked to compare to an unsuccessful person), we took the correlation only from the upward comparison condition. If studies included conditions in which different levels of envy could be expected (e.g., manipulations of deservingness), we collapsed across the conditions. If possible, we included the correlation across these conditions. If the correlation between envy and schadenfreude was presented separately for relevant conditions, we included them as separate data points. If the correlation or the items were not provided in the article, we contacted the authors.

The criteria led to the inclusion of 24 articles and manuscripts, of which five were unpublished, with 33 data points in total. Overall, the meta-analysis contained 4,366 participants who were from Australia, Canada, Germany, Israel, Japan, the Netherlands, Poland, and the United States of America. Fourteen data points came from MTurk samples, 18 from student samples, and in one case the sample was not specified. The included articles are marked with an asterisk in the reference list.

Analytic strategy. The correlation coefficients between envy and schadenfreude were transformed to Fisher's Z scores. In eight cases, the authors used multiple scales to

measure envy (seven times a benign and a malicious scale and once a benign, malicious, and general envy scale). Therefore, in many cases, the effect sizes were not independent. To take the non-independence into account, we conducted a multi-level model with effect sizes nested within studies using maximum likelihood estimation of parameters. The study factor was treated as random effect. We controlled for the covariance between effect sizes within studies. We calculated the covariances with a formula taken from Steiger (1980). We conducted the meta-analysis with the *rma.mv* function in the *metafor* package in *R* (Viechtbauer, 2010).

We coded the items of each envy scale with respect to their components. If an item measured *desire*, *improvement motivation*, or *emulation* (i.e., components representing benign envy under the PaDE Theory), it was coded -1. If an item measured *communication*, *directed aggression*, or *non-directed aggression* (i.e., components representing malicious envy under the PaDE Theory), it was coded 1. In line with the PaDE Theory, we coded all pain items as 0 because pain is a shared component of both benign and malicious envy. We also coded all non-defined items as 0. The first and last author coded each study independently. They agreed in 92% of the cases. Differences were resolved by discussion. We averaged the scores across items for each scale to form a score of Benign versus Maliciousness ranging from -1 to 1. This score was included as a moderator into the meta-analysis.

Results and Discussion

Figure 6 displays all data points in the meta-analysis weighted by their sample size and colored according to the kind of envy authors indicated they measured (benign, malicious, or general). There are several noteworthy findings. First, the correlation between envy and schadenfreude varied from $r = -.32$ to $r = .79$. Second, the envy scales used in this research covered the full range of Benign-Maliciousness. Benign envy scales clustered in the benign envy quadrant but still received coded scores which varied from -1 to -0.5. The malicious envy scales clustered in the malicious envy quadrant but still received coded scores which varied from 0 to +1. The scales that did not distinguish between benign and malicious envy

spread across a wide range of Benign-Maliciousness from -1 to 0.5. Third, visual inspection suggests an average positive correlation between envy moderated by Benign-Maliciousness. Indeed, the intercept of the meta-analysis was significantly positive, $B = 0.36$, $SE = 0.04$, $p < .001$, representing the average correlation across all studies between envy and schadenfreude. Furthermore, as predicted, Benign-Maliciousness was a significant moderator, $B = 0.5$, $SE = 0.02$, $p < .001$. Thus, if envy was measured as malicious envy, the relationship between envy and schadenfreude became more positive, whereas if envy was measured as benign envy, the relationship between envy and schadenfreude became more negative. When envy was measured with items capturing pain or undefined components, the link with schadenfreude was of intermediate magnitude, consistent with the proposition that pain is a central component to both benign and malicious envy. Nevertheless, there was a significant amount of residual heterogeneity, $Q_E(31) = 293.54$, $p < .001$. This indicates that other variables than Benign-Maliciousness may additionally explain the diversity of correlation coefficients between envy and schadenfreude. In the Supplementary Material we also report tests of publication bias. They support that publication bias did not affect the results.

General Discussion

The present empirical, data-driven integration of the reviewed literature on envy gave rise to the PaDE Theory (see Figure 3). Studies 1 and 2 imply that envy consists of three related elements: (a) the pain of envy—consisting of *preoccupation with the situation* and *inferiority*—(b) benign envy—consisting of *desire for the envy object*, *improvement motivation*, and *emulation of the other*—and (c) malicious envy—consisting of *communication about the other*, *directed aggression*, and *non-directed aggression*. Studies 3 and 4 suggest that these elements are structured such that a given envy episode involves a feeling of pain combined with feelings of benign or malicious envy. Importantly, this structure—consistent with the PaDE Theory—fits the three elements of envy better than the structure proposed under the Malicious Envy Theory, the Dual Envy Theory, and the Pain

Theory of Envy. Furthermore, evidence from Study 5 is in line with the idea proposed in the PaDE Theory that the pain following from an upward comparison is a fleeting affective state, whereas benign and malicious envy are more enduring. Moreover, distinguishing between all three elements allowed to unravel the inconsistent findings regarding the relation of envy and schadenfreude. A meta-analysis revealed that envy and schadenfreude is more strongly positively correlated when envy is operationalized as malicious, compared to when it is operationalized as pain, or as benign envy. Overall, these findings underline the usefulness of the PaDE Theory—a theory that may overcome the inconsistent state of envy research.

Based on these results we propose the following definition of envy:

Envy involves burdensome pain about being inferior to another person. It occurs as either benign envy, entailing a longing to improve oneself and emulate the envied person, or malicious envy, entailing hostile thoughts and intentions directed at harming the other.

This definition unites seemingly inconsistent approaches to envy. It conveys that envy may indeed entail a uniform, painful element in response to an upward comparison. This is also predicted by the Malicious Envy Theory and the Pain Theory of Envy, but stands in contrast to predictions of the Dual Envy Theory. Nevertheless, it further predicts that envy involves independent benign or malicious forms. This, in turn, dovetails with the Dual Envy Theory, but is inconsistent with the Malicious Envy Theory and the Pain Theory of Envy. Therefore, the definition proposed by the PaDE Theory unites separate, seemingly discrepant conceptual insights from three existing theories together to one integrative theory of envy. It further suggests that envy comprises both painful feelings and cognitions (Cohen-Charash & Larson, 2017) as well as action tendencies (Van de Ven, 2016). The new scale we developed, which is based on these insights, therefore allows researchers to assess the entire experience of envy comprehensively.

Recommendations for the Measurement of Envy

The PaDE Theory has two central implications for the measurement of envy: (a) to capture envy in its entirety scholars should measure all three elements and (b) the pain, benign envy, and malicious envy scales should be kept separate and not integrated to composite scales. The latter implication stands in contrast to recommendations in the recent refinement of the Dual Envy Theory, which proposed to collapse across a general envy measure (i.e., pain) and benign or malicious envy, respectively (Van de Ven, 2016). This would contradict the findings from Studies 1 and 2 suggesting that the three envy elements are independent.

Other implications of our findings for the measurement of envy are more context-dependent. In cross-sectional research, in which envy is either elicited or recalled and immediately measured, pain should be positively correlated with benign or malicious envy, depending on which variable is targeted in the research paradigm. We deem this a necessary precondition to infer that envy is present. Conversely, if pain is not correlated with benign or malicious envy, then observed variation in the envy measure might to some extent reflect other emotions that stem from appraisals of others' outstanding achievements (e.g., admiration, adoration, longing, or resentment). After demonstrating positive correlations with pain, either benign or malicious envy can be used to predict other variables of interest.

In longitudinal research, the pattern of correlations between pain, benign envy, and malicious envy may change. If envy is assessed as a current experience but is temporally distant from its eliciting events, pain may already be very low whereas benign and malicious envy could still be enduring. In this case, because pain has ceased, it may no longer correlate with benign or malicious envy. Similarly, different moderators, as proposed under the Pain Theory of Envy (Cohen-Charash & Larson, 2017; Tai et al., 2012) may amplify benign or malicious envy and its consequences over time. Thereby, the correlation pattern between pain and benign or malicious envy may change.

A final point regards the use and value of the term *envious*. Although this term seemingly captures envy in its entirety, it did not show consistent loadings in Studies 1 and 2.

The term *envious* loaded on the difficult-to-interpret Factor 3 in Study 1 and with a rather low loading on the pain factor in Study 2. As displayed in Table 1, most of the research on envy nevertheless measured it via the term *envious* or related words. Is *envious* a good term to measure envy, if the goal is to cover the whole complexity of the construct under the PaDE Theory? We doubt that this is the case. Single, abstract emotion terms turned out to be unreliable measures for other emotions with complex structures such as humility (Weidman et al., in press) or pride (Tracy & Robins, 2007). Following this logic, the general term *envious* may be less than ideal to measure envy. The scale capturing envy under the PaDE Theory may contribute to replacing this practice because of its brevity and the possibility to apply it in languages that have one or more words for envy.

Implications for Research on Envy

The separation of the three envy elements under the PaDE Theory has several advantages for future research. For example, the PaDE Theory can account for inconsistencies in envy research. This is apparent in the meta-analysis on the relationship of envy and schadenfreude. The reliance on different theories and different conceptualizations within theories that each captured only a subset of the diversity of envy led to mixed evidence regarding whether envy predicts schadenfreude. The PaDE Theory separates pain, benign envy, and malicious envy, and clarifies which components characterize each of these three elements, allowing us to unravel these conflicting findings. We think that the theory has similar predictive power in other controversial domains, such as whether envy can increase individual job performance or not (Duffy & Shaw, 2000; Schaubroeck & Lam, 2004).

The separation of pain, benign envy, and malicious envy may also directly inform research on the temporal unfolding of envy. First, the current evidence supports that the three envy elements are separate constructs and that the intensity of pain decreases more quickly than the intensities of benign and malicious envy. The Pain Theory of Envy further proposes that pain may be temporally primary and could then cause benign and malicious envy (Cohen-

Charash & Larson, 2017; Tai et al., 2012). To investigate this possibility, in Study 5 we also conducted analyses in which we determined the time points of maximum intensity separately for each participant. That is, we determined at which of the three time points, pain, benign envy, and malicious envy reached their peak intensity. If multiple time points had the same value, we averaged them. These analyses support that the time point of maximum intensity of pain is earlier than that of benign and malicious envy (see Supplementary Material), consistent with the notion that pain precedes benign and malicious envy. However, these analyses are inconclusive for two reasons. First, participants probably considered the onset of the emotional episode to be a time point at which emotional intensity was close or maybe even at its peak. This undermines the possibility to determine when exactly this peak was reached. Second, the differences in time points of maximum intensity could be an artefact of the differences in slopes. Specifically, our procedure to calculate the time points of maximum intensity may lead steeper slopes to have earlier maximum time points. To investigate questions of temporal unfolding at the elicitation phase more directly, future research would need to employ experimental paradigms in which envy is elicited and measured online.

Second, the PaDE Theory may allow to investigate the long-standing theoretical idea that a crucial characteristic of envy is that it evolves over time (Hoogland et al., 2016), and that it can transmute into other emotions (Smith, 2004). Study 5 provides the first evidence that some elements of envy (i.e., benign and malicious envy) are temporally more enduring than others (i.e., pain). The meta-analysis further supports that malicious envy as temporally stable attitude could then relate to schadenfreude once the rival suffers a misfortune.

Similar ideas could be applied to the investigation of envy's relationship with other emotions. In developing the PaDE Theory in Studies 1 and 2, we argued to separate envy from other emotions, so as to not confound them with envy at the measurement level. Consider the case of benign envy. On one hand, benign envy similarly shares certain features with other emotions stemming from others' outstanding achievements such as admiration and

adoration. On the other hand, previous research supports that benign envy is distinct from these emotions. Specifically, benign envy feels negative, whereas admiration and adoration are positive emotions (Crusius & Lange, 2014; Schindler, Zink, Windrich, & Menninghaus, 2013; Van de Ven et al., 2009). Furthermore, benign envy involves explicit social comparisons, whereas admiration (Crusius & Lange, 2014; Van de Ven et al., 2009) and adoration (Schindler et al., 2013) do not. Finally, although benign envy and admiration both elicit improvement motivation (Schindler, Paech, & Löwenbrück, 2015; Van de Ven, 2017), in benign envy these motivations may be more concretely focused on the comparison dimension, whereas in admiration these motivations may be related to broad ideals (e.g., becoming a better person; Crusius, Blatz, & Lange, 2017). Adoration, instead, motivates adherence to others' teachings and expectations serving communal functions more so than personal improvement motivation (Schindler et al., 2013).

Even though they are distinct emotions, the enduring positive attitude towards the envy object in benign envy could nevertheless translate into admiration over time. In particular, if the envied person is considered to be a means to obtain the desired envy object, seeking closeness would be functional. Admiration should be particularly likely if, in the long run, closeness promotes upward comparisons with regard to non-self-relevant domains—a precursor of admiration (Onu, Kessler, & Smith, 2016; Schindler et al., 2013). Thus, future research under the PaDE Theory may illuminate how envy can, on one hand, be distinct from other emotions but, on the other hand, transmute into them in different contexts.

Limitations of the Current Research

So far, the present research is silent with respect to when benign or malicious envy evolve. The Pain Theory of Envy holds that moderators may determine whether constructive or destructive consequences prevail (Cohen-Charash & Larson, 2017; Tai et al., 2012). For instance, self-evaluations such as self-esteem or locus of control, perceived warmth and competence of others, and perceived organizational support within the realm of organizational

behavior may play a role. In our view, this potentially infinite list of possible moderators undermines the parsimony of this theory.

In contrast, we propose a more parsimonious approach. Many theories in emotion psychology rely on appraisal dimensions as mediating mechanisms between contextual cues and emotion evolvement (for a review of different appraisal theories see Ellsworth & Scherer, 2003). These theories posit that evaluations of the environment on a specific set of dimensions determine the emotion. Importantly, the number of appraisal dimensions that can nevertheless elicit the full range of emotions is limited. In envy, empirical evidence already supports that two appraisal dimensions play a crucial role—deservingness and personal control (Lange et al., 2016; Van de Ven et al., 2009). According to this research, benign envy is elicited when the envied person's status is evaluated as deserved and personal control to reach this status is perceived as high. In contrast, malicious envy is elicited when the envied person's status is evaluated as undeserved and personal control to reach this status is perceived as low. Therefore, two appraisal dimensions may parsimoniously explain how benign and malicious envy evolve. After their elicitation, certain moderators may amplify or dampen the respective experience as proposed by the Pain Theory of Envy. Future research should more directly test the relationships of undeservingness and personal control with specific envy components over time and how these processes interact with moderators.

Conclusion

By integrating all empirically validated conceptualizations of envy and cross-validating it with items sampled from naïve participants, we derived the PaDE Theory. The initially intense pain of envy—consisting of *preoccupation with the situation* and *inferiority*—emerged as an independent element that predicts the temporally more enduring benign envy—consisting of a *desire for the envy object*, *improvement motivation*, and *emulation of other*—and malicious envy—consisting of *communication about other*, *directed aggression*, and *non-directed aggression*. We further provided evidence that the PaDE Theory

better accounts for the structural relations and temporal unfolding of these three components than existing theoretical models of envy. We hope that the PaDE Theory contributes to uniting the diverse conceptualizations of envy and unravel its confusing relationships with important outcomes. Thus, we are optimistic that it can serve as a basis for scholars from a variety of fields to investigate one of the most powerful emotional forces of human nature.

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Footnotes

[1] Furthermore, individuals may be characterized by an inclination to experience envy. Research on dispositional envy, however, will not be discussed here (for a recent overview see Lange et al., in press).

[2] For studies with exploratory or confirmatory factor analyses (Studies 1 to 3) we aimed for at least five to 10 participants per measure or parameter (Russell, 2002). For Study 4 we aimed for 90% power to find an effect of $d = 0.4$ as specified in the preregistration. Study 5 used growth curve analysis, for which at least 100 participants and three time points are recommended (Curran, Obeidat, & Losardo, 2010). We aimed for 200 participants. We a priori decided to exclude participants who indicated we should not use their data following methodological recommendations about how to deal with careless survey responses (Meade & Craig, 2012). This led to the exclusion of 11 participants in Study 1, one participant in Study 2, four participants in Study 3, and 19 participants in Study 4. We did not assess this in Study 5 to keep the experience sampling questionnaires as brief as possible. Moreover, in Study 5, 13 participants did not respond to the items within 30 minutes of the envy experience, 37 additional participants did not respond to the questionnaire of time point 2 within 60 minutes after they received it, and 10 additional participants did not respond to the questionnaire of time point 3 within 12 hours after they received it. They were excluded according to our preregistered criteria. Furthermore, if a participant contributed more than one experience (counter to instruction), we analyzed only the first one. This was done to prevent dependencies in data, although this criterion was not preregistered. Finally, as decided a priori, we excluded everyone who did not write about envy, leading to the exclusion of additional 22 participants in Study 1, 15 participants in Study 2, five participants in the pretest of Study 2, 14 participants in Study 3, and 33 participants in Study 4. For Study 5, we did not collect data on the content of the envy situations for the sake of brevity of the questionnaire.

[3] In Studies 1 and 2, we adapted the factor correlations for the factors with negative loadings

to ease interpretation.

[4] We also tested models without the benign envy items under the Malicious Envy Theory,

given that in the central theory (Smith & Kim, 2007) and in various conceptualizations (see

Table 1), benign components were excluded. In Studies 3, $\chi^2(14) = 158.22$, $p < .001$, *CFI* =

.85, *RMSEA* = .191 CI90%[.165; .219], and 4, $\chi^2(14) = 178.27$, $p < .001$, *CFI* = .70, *RMSEA* =

.217 CI90%[.189; .246], this model did not fit the data. Moreover, by not including benign

envy items at all, this model fails to account for a critical component of the envy experience,

and is therefore not satisfactory on a theoretical level.

[5] We also tested a model without the pain of envy items under the Dual Envy Theory given

that their status is not specified within this theory. In Studies 3, $\chi^2(19) = 29.78$, $p = .06$, *CFI* =

.99, *RMSEA* = .045 CI90%[.000; .075], and 4, $\chi^2(19) = 35.55$, $p = .01$, *CFI* = .97, *RMSEA* =

.059 CI90%[.027; .089], this model showed satisfactory fit to the data. However, by not

including pain items, this model fails to account for a critical component of the envy

experience, and is therefore not satisfactory on a theoretical level.

[6] Note that a simple 3-factor model is structurally identical to the current model. We chose the

regressions of benign and malicious envy on pain as opposed to covariances to underline that

pain is hypothesized to predict benign and malicious envy. This model is not meant to test

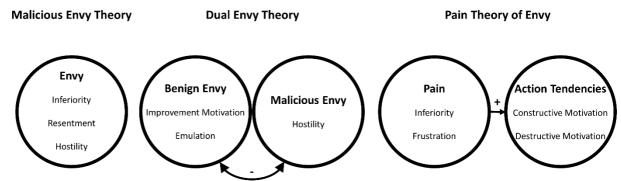whether pain causally affects benign and malicious envy.

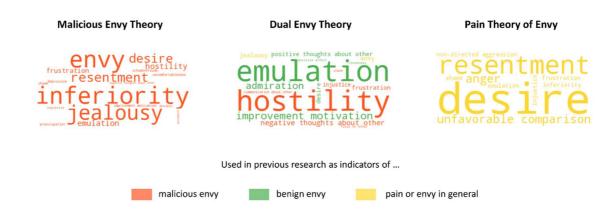*Figure 1.* The three existing theories of envy.

Figure 2. Word clouds depicting the components used to measure envy separately for each theory. Word size codes the frequency with which these components were included in respective conceptualizations.
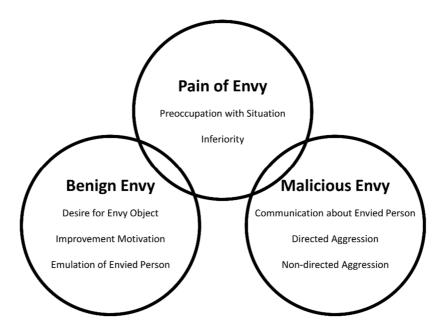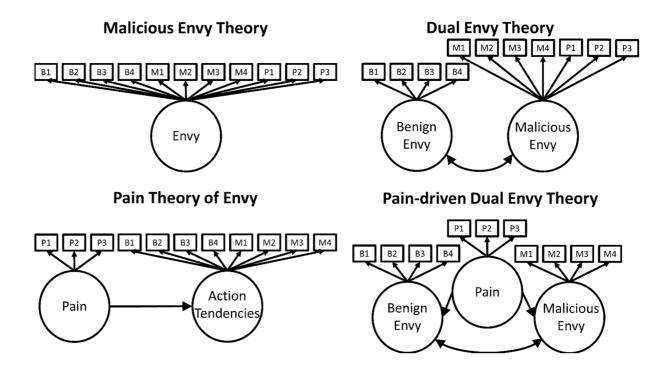
Figure 3. The Pain-driven Dual Envy (PaDE) Theory.

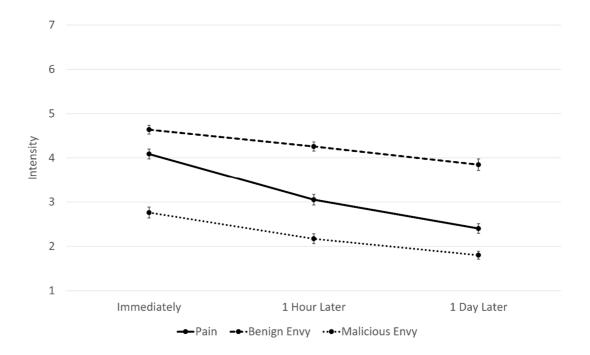*Figure 4.* Measurement models of the four theories as tested in Studies 3 and 4.

Figure 5. Means of pain, benign envy, and malicious envy for each time point in Study 5. Error bars represents one standard error of the mean.

Figure 6. All data points of the meta-analysis on the relation of envy and

schadenfreude. The y-axis shows the correlation between envy and schadenfreude

transformed to Fisher's *Z*. The x-axis shows the rating of Benign-Maliciousness of the envy

scales used in the respective study ranging from -1 (*perfectly benign envy scale*), 0 (*pain or*

undefined scale), to 1 (*perfectly malicious envy scale*). The size of the bubbles codes the

sample size of the study and the color codes the kind of envy measured as indicated in the

article.

Table 1

A summary of different theories of envy and their different operationalizations as based on the items used to measure envy in each article

Level of Analysis	Theory of Envy		
	Malicious Envy Theory	Dual Envy Theory	Pain Theory of Envy
Theoretical Background[a]	Envy is a uniform emotion entailing malicious thoughts and action tendencies mainly directed at the envied person. It consists of the components *Inferiority*, *Resentment*, and *Hostility* (Smith & Kim, 2007) and may additionally include *Helplessness* (Miceli & Castelfranchi, 2007).	Envy has two qualitatively different forms (Van de Ven et al., 2009). Benign envy contains motivation for *Self-Improvement* and *Emulation* of the envied person to increase the envier's status. Malicious envy contains *Hostility* aimed at decreasing the envied person's status. Both are negatively correlated.	Envy is the pain following an upward comparison (Cohen-Charash & Larson, 2016, 2017; Tai et al., 2012). Pain consists of the components *Inferiority* and *Frustration*. Pain simultaneously elicits constructive and destructive action tendencies. Dispositional and situational moderators determine which consequences prevail.
Operationalization of Envy[b] (Components reflected in Questionnaire Items)	Operationalization I *Inferiority* (Sawada & Hayama, 2012) Operationalization II *Emulation* (Brody, Hay, & Vandewater, 1990; Feather & Nairn, 2005; Feather & Sherman, 2002; Lim & Yang, 2015) Operationalization III *Inferiority, Resentment* (Demirtas, Hannah, Gok, Arslan, & Capar, 2015; Duffy et al., 2012; Duffy & Shaw, 2000; Eissa & Wyland, 2016; Kim, O'Neill, & Cho, 2010; Krasnova, Widjaja, Buxmann, Wenninger, & Benbasat, 2015; McKee et al., 2013; Vecchio, 2005, 2000) Operationalization IV *Inferiority, Frustration* (Fischer, Kastenmüller, Frey, & Peus, 2009) Operationalization V *Inferiority, Emulation* (Van Dijk et al., 2006; Van Dijk, Ouwerkerk, Wesseling, & Van Koningsbruggen, 2011) Operationalization VI *Desire, Emulation* (Hareli & Weiner, 2002) Operationalization VII *Inferiority, Hostility, Resentment* (Brigham, Kelso, Jackson, & Smith, 1997; Chester et al.,	Operationalization I Benign Envy: *Emulation, Positive Thoughts about Other* Malicious Envy: *Hostility* (Chan & Sengupta, 2013) Operationalization II Benign Envy: *Desire, Self-Focus* Malicious Envy: *Hostility, Focus on Other* (Van de Ven et al., 2015) Operationalization III Benign Envy: *Admiration, Emulation* Malicious Envy: general terms *envious*, *jealous* (Feather et al., 2013) Operationalization IV Benign Envy: *Admiration, Improvement Motivation* Malicious Envy: *Negative Thoughts about Other, Injustice* (Lin & Utz, 2015) Operationalization V Benign Envy: *Improvement Motivation, Emulation* Malicious Envy: *Hostility, Negative Thoughts about Other* (Lange & Crusius, 2015a) Conceptualization VI Benign Envy: *Improvement Motivation, Emulation* Malicious Envy: *Hostility, Communication about Other* (Van de Ven et al., 2012) Operationalization VII Benign Envy: *Positive Affect, Positive Thoughts about Other, Emulation*	Operationalization I Destructive (Feeling Component): *Non-Directed Aggression, Anger, Resentment* Constructive (Comparison Component): *Desire, Unfavorable Comparison* Components are part of a uniform envy. Pain is not measured separately. (Cohen-Charash, 2009; Cohen-Charash & Mueller, 2007; Khan et al., 2014; Park & Jang, 2015; Wilkin & Connelly, 2015) Operationalization II Destructive (Feeling Component): *Non-Directed Aggression, Anger, Resentment* Constructive (Comparison Component): *Desire, Unfavorable Comparison* Components are part of a uniform envy. Pain (Relative Deprivation): *Inferiority, Resentment, Injustice* (Neufeld & Johnson, 2016) Operationalization III Envy: *Desire, Emulation* Pain: *Inferiority, Frustration, Shame* (Leach & Spears, 2008)

2013; Smith et al., 1996)

Operationalization VIII
Inferiority, Shame, Negative Thoughts about Other
(Salovey & Rodin, 1986)

Operationalization IX
Inferiority, Hostility, Emulation
(Rentzsch & Gross, 2015)

Operationalization X
Inferiority, Resentment, Emulation
(Appel, Crusius, & Gerlach, 2015; Dvash, Gilam, Ben-Ze'ev, Hendler, & Shamay-Tsoory, 2010; Shamay-Tsoory et al., 2009)

Operationalization XI
Inferiority, Resentment, Frustration, Preoccupation
(Schaubroeck & Lam, 2004)

Operationalization XII
Inferiority, Resentment, Frustration, Desire
(Gino & Pierce, 2009a, 2009b; Moran & Schweitzer, 2008)

Operationalization XIII
Inferiority, Frustration, Injustice, Desire
(Tandoc, Ferrucci, & Duffy, 2015)

Operationalization XIV
Resentment, Schadenfreude, Emulation, Improvement Motivation
(Polman & Ruttan, 2011)

Operationalization XV
Inferiority, Hostility, Resentment, Injustice, Depression
(Krizan & Johar, 2012; Smith et al., 1994)

Operationalization XVI
Inferiority, Hostility, Resentment, Desire, Improvement Motivation
(Arnocky, Perilloux, Cloud, Bird, & Thomas, 2015; Hill, DelPriore, & Vaughan, 2011; Zhong, Liu, Zhang, Luo, & Chen, 2013)

Operationalization XVII
Inferiority, Hostility, Shame, Desire, Improvement Motivation, Uncomfortableness
(Haslam & Bornstein, 1996; Parrott & Smith, 1993)

Malicious Envy: *Hostility, Negative Thoughts about Other, Injustice, Frustration*
(Falcon, 2015)

Operationalization VIII
Benign Envy: *Admiration, Improvement Motivation, Emulation, Desire, Positive Thoughts about Other*
Malicious Envy: *Hostility, Negative Thoughts about Other*
(Crusius & Lange, 2014)

Operationalization IX
Benign Envy: *Admiration, Improvement Motivation, Emulation, Desire, Positive Thoughts about Other*
Malicious Envy: *Hostility, Negative Thoughts about Other, Communication about Other*
(Lange & Crusius, 2015b)

Operationalization X
Benign Envy: *Admiration, Positive Affect, Positive Thoughts about Other, Improvement Motivation, Closeness*
Malicious Envy: *Hostility, Injustice, Shame, Frustration, Communication about Other*
(Van de Ven et al., 2009)

Operationalization XI—General Terms
Only Single Envy Scale (general terms *envious* or *jealous*, general terms for *benign* and *malicious envy*, *Negative Affect*, *Frustration*)
(Crusius & Mussweiler, 2012; Schindler et al., 2015; Van de Ven, 2017; Van de Ven & Zeelenberg, 2015)

Operationalization XVIII
Inferiority, Hostility, Injustice, Shame, Avoidance, Desire
(Piskorz & Piskorz, 2009)

Operationalization XIX
Inferiority, Resentment, Frustration, Shame,
Preoccupation, Arousal, Anxiety, Desire, Improvement
Motivation
(Smith, Kim, & Parrott, 1988)

Operationalization XX—General Terms
Items encompass general terms: *envious, envy, jealous,*
jealousy
(Caprariello, Cuddy, & Fiske, 2009; Cuddy et al., 2007;
Exline & Zell, 2012; Fiske, Cuddy, Glick, & Xu, 2002;
Inoue, Hoogland, Takehashi, & Murata, 2015; Jordan,
McAuliffe, & Rand, 2015; Kim & Glomb, 2014; Lieblich,
1971; Melwani, Mueller, & Overbeck, 2012; Nabi &
Keblusek, 2014; Pedersen, Forster, & McCullough, 2014;
Pedersen, Kurzban, & McCullough, 2013; Pila et al.,
2014; Rentzsch, Schröder-Abé, & Schütz, 2015; Sadler,
Kaye, & Vaughn, 2015; Salovey & Rodin, 1984, 1991;
Schurtz et al., 2011; Smith, Diener, & Garonzik, 1990;
Smith, Parrott, Diener, Hoyle, & Kim, 1999; Sundie,
Ward, Beal, Chin, & Geiger-Oneto, 2009; Tesser, 1990;
Tesser & Collins, 1988; Verduyn et al., 2015; White,
Langer, Yariv, & Welch, 2006; Zhang, 2015)

Note. Articles were categorized to columns based on the proposed definition of envy and the theoretical background relied on by the original article's authors. Articles were categorized to specific operationalizations of envy based on components identified in the items used to measure it.

[a] Based on reviews of the literature or central empirical articles with respect to the theories.

[b] Based on all articles from which we extracted items in Study 1.

Table 2

Descriptive statistics and factor loadings of all items in Study 1

Item	*M* (*SD*)	Factor 1	Factor 2	Factor 3	Factor 4
I complained to someone else about the Person.[c]	2.87 (2.17)	**.70**	.05	-.07	-.01
I felt hostile towards the Person.[da]	2.95 (1.97)	**.81**	-.04	.03	-.09
I hoped that the Person would fail at something.[da]	2.90 (2.15)	**.81**	.01	.04	-.17
I talked negatively about the Person.[da]	2.51 (1.99)	**.82**	.08	.12	-.07
I secretly wished that the Person would lose X.[da]	2.82 (2.13)	**.79**	.04	-.04	-.10
I felt hatred.[nda]	2.62 (1.91)	**.78**	.07	.06	-.15
The Person did not deserve X.[inj]	3.07 (2.15)	**.85**	-.01	.04	.06
The Person was lucky.[inj]	5.06 (1.92)	.29	-.03	**-.47**	**.33**
I wanted to be near the other.[cl]	3.26 (1.97)	.18	**.60**	.04	.06
I felt inspired by the Person.[im]	3.50 (2.03)	-.11	**.80**	.10	-.01
I wanted to try harder to obtain X as well.[im]	4.54 (2.02)	.10	**.63**	-.20	-.04
The Person's success encouraged me.[im]	3.67 (2.00)	-.22	**.78**	.13	.02
I invested more effort to also obtain X.[im]	3.85 (2.05)	**.35**	**.43**	-.09	-.03
I wanted to be like the Person.[em]	4.70 (2.12)	-.18	**.49**	**-.32**	-.15
The Person motivated me to emulate him/her.[em]	3.23 (1.99)	.08	**.79**	.02	-.08
I desired X.[d]	5.62 (1.77)	-.22	.02	**-.67**	-.07
I was longing for what the Person had.[d]	5.72 (1.58)	-.20	.10	**-.77**	-.14
I was envious.[en]	6.00 (1.32)	.01	-.06	**-.60**	-.05
Others would disapprove if they knew what I was feeling.[unc]	3.90 (2.04)	.20	-.11	-.11	**-.49**
I denied that I was feeling envy.[unc]	3.31 (2.01)	.26	-.02	-.05	**-.32**
My envy tormented me.[p]	3.66 (2.03)	**.33**	-.11	-.22	**-.53**
I was self-conscious.[p]	4.39 (2.02)	-.05	.02	.07	**-.78**
I felt inferior to the Person.[inf]	4.05 (2.12)	.02	.14	-.10	**-.67**
I felt mediocre.[inf]	4.57 (1.92)	-.02	.13	.03	**-.77**
I felt depressed.[inf]	4.23 (2.13)	.19	-.11	-.13	**-.66**
I was dissatisfied with myself.[inf]	4.71 (1.96)	-.03	.08	-.05	**-.75**
The Person had it better than I did.[inf]	5.38 (1.76)	.03	.00	**-.61**	-.12
I would have liked to compliment the Person for X.[pt]	3.94 (2.21)	**-.33**	**.53**	.05	-.05
I liked the Person.[pt]	4.87 (1.95)	**-.57**	.27	-.02	-.11

Note. N = 270. Responses were given on a scale from 1 (*does not apply at all*) to 7 (*applies very much*). Factor loadings are taken from the factor pattern matrix of a principal component analysis with oblimin rotation (delta = 0). Loadings above |.30| are written in bold.
[c] communication, [cl] closeness to the other, [d] desire for envy object, [da] directed aggression, [em] emulation of the other, [en] envy, [im] improvement motivation, [inf] inferiority, [inj] injustice, [nda] non-directed aggression, [p] preoccupation with the situation, [pt] positive thoughts about other, [unc] uncomfortableness

Table 3

Descriptive statistics and factor loadings of all items in Study 2

Item	M (SD)	Factor 1	Factor 2	Factor 3
I wanted to talk about my feelings.[c]	3.18 (1.98)	**.54**	.12	.02
I shared my feelings with other people.[c]	3.18 (2.04)	**.62**	.17	.18
I tried to bring my feelings up in discussions with others.[c]	2.90 (2.01)	**.73**	.14	.13
I wished that something bad happens to the Person.[da]	2.09 (1.73)	**.75**	-.03	.01
I made negative remarks about the Person.[da]	2.53 (1.98)	**.88**	-.04	.01
I developed hatred for the Person.[da]	2.31 (1.87)	**.80**	-.04	-.06
I criticized the Person.[da]	2.67 (2.02)	**.84**	-.03	-.01
I wanted to insult the Person.[da]	2.50 (1.95)	**.85**	-.06	-.03
I wanted to curse.[nda]	3.41 (2.33)	**.58**	-.04	**-.33**
I wanted to yell.[nda]	3.08 (2.22)	**.65**	-.01	-.27
I was short with people I talked to.[nda]	2.64 (1.83)	**.56**	.03	-.23
I didn't want to see the Person.[a]	3.08 (2.24)	**.75**	-.08	-.16
I gave the Person the silent treatment.[a]	2.22 (1.77)	**.68**	-.10	-.07
I wished that the Person would leave.[a]	2.88 (2.21)	**.83**	-.12	-.06
I closed up and felt tight-lipped.[a]	3.35 (2.09)	.29	-.09	**-.61**
I felt that the Person did not deserve X.[inj]	3.33 (2.25)	**.79**	-.03	.00
I thought that the situation was unfair.[inj]	4.20 (2.18)	**.48**	.08	**-.34**
I wanted to boast about my own qualities, achievements, or possessions.[b]	3.11 (2.03)	**.53**	.18	-.01
I tried to make myself look good.[b]	3.24 (2.01)	**.42**	**.30**	-.16
I wanted to work harder to also obtain X.[im]	4.71 (1.90)	-.01	**.85**	.13
I was motivated to also obtain X.[im]	4.82 (1.87)	.03	**.86**	.20
I plotted my course of how I will obtain X.[im]	3.68 (2.04)	.19	**.68**	.05
I invested more effort to also obtain X.[im]	4.01 (2.06)	.17	**.70**	.05
I focused my energies on dealing with my envy.[im]	3.81 (1.88)	.23	.28	-.25
I wanted to be as successful as the other Person.[em]	5.39 (1.77)	-.16	**.57**	-.25
I wanted to be like the Person.[em]	4.57 (1.98)	**-.36**	.29	**-.52**
I desired X.[d]	5.56 (1.78)	-.14	**.64**	-.12
I was longing for X.[d]	5.08 (1.86)	-.07	**.54**	-.13
I felt entitled to also have X.[ent]	4.49 (2.08)	.26	**.45**	-.16
I wondered why I didn't have X.[ent]	4.53 (2.03)	.15	**.42**	**-.36**
I felt envious.[en]	5.98 (1.41)	-.14	.22	**-.47**
I was obsessed with X.[p]	3.31 (1.96)	**.41**	**.40**	-.11
I was preoccupied with my envious thoughts.[p]	4.10 (1.88)	**.33**	.17	**-.49**
I was dreaming about why I was lacking X.[p]	3.93 (2.14)	.09	**.40**	**-.36**
I felt helpless.[inf]	3.98 (2.10)	.25	-.03	**-.63**
I lacked self-confidence.[inf]	3.75 (2.12)	.03	-.06	**-.77**
I felt inadequate.[inf]	4.38 (2.07)	.03	.05	**-.75**
I wanted to give up.[inf]	3.09 (2.05)	**.33**	-.14	**-.63**
I put on a false smile.[er]	4.02 (2.17)	.14	.06	**-.55**
I tried to mask all my feelings.[er]	4.46 (2.03)	.02	.00	**-.66**

Note. N = 285. Responses were given on a scale from 1 (*does not apply at all*) to 7 (*applies very much*). Factor loadings are taken from the factor pattern matrix of a principal component analysis with oblimin rotation (delta = 0). Loadings above |.30| are written in bold.
[a] avoidance of the other, [b] boasting intention, [c] communication, [d] desire for envy object, [da] directed aggression, [em] emulation of the other, [en] envy, [ent] entitlement, [er] emotion regulation, [im] improvement motivation, [inf] inferiority, [inj] injustice, [nda] non-directed aggression, [p] preoccupation with the situation

Table 4

Descriptive statistics and zero-order correlations in Study 3

	M (*SD*)	Benign Envy	Malicious Envy	Pain of Envy	Hope for Success	Fear of Failure
Benign Envy[a]	3.86 (1.48)	-				
Malicious Envy[a]	2.77 (1.69)	12*	-			
Pain of Envy[a]	3.65 (1.66)	.33*	.52*	-		
Hope for Success[b]	3.22 (0.60)	.05	-.03	-.05	-	
Fear of Failure[b]	2.44 (0.70)	.08	.11$^+$	.33*	-.27*	-

Note. N = 282. $^+$ *p* < .10, * *p* < .05

[a] Responses were given on a scale from 1 (*does not apply at all*) to 7 (*applies very much*).

[b] Achievement Motives Scale (Lang & Fries, 2006). Responses were given on a scale from 1 (*strongly disagree*) to 4 (*strongly agree*).

Table 5

Descriptive statistics, univariate ANOVAs, and Bayes Factors for the effects of Condition on

benign envy, malicious envy, and pain of envy in Study 4

Scale	M_{Benign} (*SD*)	$M_{Malicious}$ (*SD*)	Univariate Effect	Bayes Factor
Benign Envy	4.11 (1.47)	3.57 (1.51)	$F(1, 248) = 7.97$, $p = .01$, $\eta_p^2 = .03$	$BF_{10} = 11.62$[a]
Malicious Envy	2.30 (1.51)	3.22 (1.62)	$F(1, 248) = 21.41$, $p < .001$, $\eta_p^2 = .08$	$BF_{10} = 5151.08$[b]
Pain of Envy	4.13 (1.67)	4.07 (1.70)	$F(1, 248) = 0.09$, $p = .77$, $\eta_p^2 < .001$	$BF_{01} = 6.89$[c]

Note. $n_{Benign} = 139$, $n_{Malicious} = 111$. Responses were given on a scale from 1 (*does not apply at all*) to 7 (*applies very much*).

[a] Test whether $M_{Benign} > M_{Malicious}$ with Cauchy prior (width = 0.707).

[b] Test whether $M_{Benign} < M_{Malicious}$ with Cauchy prior (width = 0.707).

[c] Test whether H_0 is true with Cauchy prior (width = 0.707).

Table 6

Descriptive statistics and zero-order correlations in Study 4

	M (SD)	Benign Envy	Malicious Envy	Pain of Envy	INCOM	INCOM ability	INCOM opinion	M Approach	M Avoidance	P Approach	P Avoidance
Benign Envy[a]	3.87 (1.51)	-									
Malicious Envy[a]	2.71 (1.62)	-.16*	-								
Pain of Envy[a]	4.10 (1.68)	.20*	.32*	-							
INCOM[b]	3.59 (0.64)	.27*	.09	.25*	-						
INCOM ability[b]	3.36 (0.78)	.24*	.17*	.31*	.89*	-					
INCOM opinion[b]	3.87 (0.73)	.22*	-.05	.09	.80*	.44*	-				
M Approach[c]	5.54 (1.22)	.17*	-.18*	.01	.09	-.03	.22*	-			
M Avoidance[c]	4.86 (1.44)	.07	.11+	.22*	.24*	.19*	.21*	.39*	-		
P Approach[c]	4.00 (1.74)	.19*	.07	.19*	.32*	.39*	.11+	.05	.08	-	
P Avoidance[c]	3.61 (1.51)	.18*	.09	.22*	.29*	.36*	.10	.02	.20*	.73*	-

Note. $N = 250$. + $p < .10$, * $p < .05$

[a] Responses were given on a scale from 1 (*does not apply at all*) to 7 (*applies very much*).

[b] German version of the Iowa-Netherlands Comparison Orientation Measure (Schneider & Schupp, 2011). Responses were given on a scale from 1 (*I disagree strongly*) to 7 (*I agree strongly*).

[c] German version of the Achievement Goals Questionnaire (Bachmann, 2009). M – Mastery, P – Performance. Responses were given on a scale from 1 (*not at all true*) to 7 (*very much true*)

Table 7

Linear regressions of benign envy, malicious envy, and pain of envy on the INCOM subscales

and the AGQ subscales in Study 4

| | Criterion | | | | | |
| Predictor | Benign Envy | | Malicious Envy | | Pain of Envy | |
	B	*SE*	*B*	*SE*	*B*	*SE*
INCOM ability	0.34*	0.13	0.48*	0.14	0.72*	0.14
INCOM opinion	0.30*	0.14	-0.33*	0.16	-0.14	0.16
Model R^2	.07*		.05*		.10*	
M Approach	0.21*	0.08	-0.34*	0.09	-0.10	0.09
M Avoidance	-0.02	0.07	0.22*	0.08	0.25*	0.08
P Approach	0.10	0.08	0.04	0.08	0.08	0.09
P Avoidance	0.10	0.09	0.03	0.10	0.13	0.10
Model R^2	.07*		.07*		.09*	

Note. $N = 250$. * $p < .05$.

INCOM – Iowa-Netherlands Comparison Orientation Measure; German version (Schneider & Schupp, 2011)

M – Mastery, P – Performance. Achievement Goals Questionnaire; German version (Bachmann, 2009)

Appendix

Table A1

The scales measuring pain, benign envy, and malicious envy based on the PaDE Theory

Scale	Component	Item
Pain	Preoccupation	I felt tormented.
	Inferiority	I felt inadequate.
	Inferiority	I felt depressed.
Benign Envy	Desire	I felt deep longing for X.
	Improvement Motivation	I wanted to work harder to also obtain exactly X.
	Improvement Motivation	I devised a plan to obtain X as well.
	Emulation	The Person motivated me to become just like him/her.
Malicious Envy	Communication	I complained to someone else about the Person.
	Directed Aggression	I felt hostile towards the Person.
	Directed Aggression	I secretly wished that the Person would lose X.
	Non-Directed Aggression	I felt hatred.