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MUTABILITY OF THE GREEN-EYED MONSTER: A FUNCTIONAL APPROACH TO UNDERSTANDING THE DISTINCTION BETWEEN BENIGN AND HOSTILE ENVY

Rachael G. Falcon

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**MUTABILITY OF THE GREEN-EYED MONSTER: A
FUNCTIONAL APPROACH TO UNDERSTANDING THE
DISTINCTION BETWEEN BENIGN AND HOSTILE ENVY**

by

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DISSERTATION

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MUTABILITY OF THE GREEN-EYED MONSTER: A FUNCTIONAL APPROACH
TO UNDERSTANDING THE DISTINCTION BETWEEN BENIGN AND HOSTILE
ENVY

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ABSTRACT

Envy functions in resource competition situations in which a competitor out-competes oneself in a fitness relevant domain (Hill & Buss, 2006, 2008). Research suggests that there are two types of envy, a hostile version, aimed at depriving the envied person of his or her advantage, and a benign version, aimed at gaining an advantage for oneself (Parrott, 1991; van de Ven, Zeelenberg, & Pieters, 2009). Three predictions were derived from the hypothesis that the selection of envy type is functional, taking into account the costs and benefits of a benign versus a hostile response: 1) Hostile envy was expected to be more likely when the advantage can't be acquired without taking it from the envied. 2) Benign envy was expected to be more likely when the relationship with the envied person is highly valuable to the envier. 3) Benign envy was expected to be more likely when the social environment favors the envied person. Additionally, the emotions experienced as part of envy were proposed to mediate the relationships between elements of the situation and responses to envy. Using a daily diary method, participants described their everyday experiences of envy, which were categorized as benign or hostile based on taxometric and latent class analyses. Prediction 1 was fully supported and prediction 2 was largely supported. Prediction 3 was not supported; instead participants' beliefs about the envied person's deservingness directly affected envy type. Mediation analyses supported the proposal that emotions mediate the relationships between situations and responses. The degree to which the envied person's possession of the advantage makes it harder for the envier to get emerged as an important factor in how one responds to hostile envy.

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Introduction

We all know the feeling; your colleague has just received the corner office, research grant, or prestigious award that you were hoping for. You smile, you congratulate her, but deep inside you know it's there, gnawing away at you, that most vile of sins—envy. Envy is a subjectively distressing emotion (Salovey & Rodin, 1984; Parrott, 1991; van de Ven, Zeelenberg, & Pieters, 2009) that occurs in response to an unfavorable social comparison, with a similar person, in a self-relevant domain (Miceli & Castelfranchi, 2007; Parrott, 1991; Salovey & Rodin, 1984; Smith & Kim, 2007). Envy—wanting something that you lack but another person has—differs from jealousy—having something (typically a relationship with another person) that you fear losing to a rival (Haslam & Bornstein, 1996; Parrott & Smith, 1993). Envy can be detrimental to cooperation and functioning in work contexts (Cohen-Charash & Mueller, 2007; Duffy & Shaw, 2000; Parks, Rumble, & Posey, 2002; Vecchio, 1997, 2005;) and between friends (Cobo-Reyes & Jiménez, 2012). Envious people have been shown to make sacrifices in order to decrease the relative advantage of the envied person (Grolleau, Mzoughi, & Sutan, 2006; Parks et al., 2002; Zizzo & Oswald, 2001). Envy has been blamed for aggressive behaviors ranging from malicious gossip (Ariel de Vidas, 2007; Foster, 1965; van Vleet, 2003; Wert & Salovey, 2004) to ostracism (Ariel de Vidas, 2007), and even murder (Schoeck, 1969; Standing 1981). Enviousness is universally looked down upon (Foster, 1972; Schoeck, 1969), is associated with negative mental health outcomes (Gold, 1996; Habimana & Masse, 2000; Salovey & Rothman, 1991, Smith, Combs, & Thielke, 2008), and it is one of Christianity's “seven deadly sins”. Clearly envy is an emotion worthy of study.

The Question of Types

There is disagreement about whether envy is necessarily malicious and hostile, or whether a benign type exists as well. Many researchers claim that envy is necessarily hostile, aimed exclusively at pulling the other down to one's own inferior level, and not at improving one's own absolute standing (Miceli & Castelfranchi, 2007; Sabini & Silver, 1982; Schoeck, 1969; Smith, 1991; Smith & Kim, 2007). According to these researchers, what is often described as benign envy is not envy at all, but rather admiration for, or emulation of, the superior other. Support for this view comes from research showing that onlookers are unlikely to infer that a person is envious unless he derogates his competitor (Silver & Sabini, 1978), and that there is a relationship between self-reported envy and the tendency to disparage the envied person (Salovey & Rodin, 1984). Additionally, numerous social comparison studies suggest that there are two types of outcomes of upward social comparisons in self-relevant domains. The first outcome involves liking the comparison person, a desire to emulate his or her success, and a pleasant emotional experience—effectively, admiration. The second involves dislike for the comparison person, unpleasant feelings, and sometimes envy (Lockwood & Kunda, 1997, 1999; reviewed in Major, Testa, & Bylsma, 1991). Unpleasant emotions and, in particular, envy, do not seem to co-occur with admiration in these studies. In fact, Lockwood and Kunda (1999) report that “one might imagine that a superior other could make individuals feel badly about their inferior achievements and, at the same time, spur them on to overcome their inferior status and achieve future success.” They describe here precisely the emotion one would expect benign envy to look like. They go on to say, “We found no evidence for this: Upward comparisons that had a negative impact on the

self-view were associated with decreased motivation, whereas those that had a positive impact on self-perceptions were associated with increased motivation” (pp. 226-227).

Other researchers argue that there is such a thing as benign envy, and its aim is to improve oneself so as to achieve the superior standing of the envied person (Parrott, 1991; Tai, Narayanan, & McAllister, 2012¹; van de Ven, Zeelenberg, & Pieters, 2009, 2011b, 2012). In fact, some languages, such as Dutch, German, Polish, and Thai, have different words for the two (van de Ven et al., 2009, 2011b). Support for the existence of two types of envy comes from research based on self-reports. Both Parrott (1991) and van de Ven et al. (2009) had participants give written accounts of occasions when they felt envy. Both found that the accounts tend to cluster into two types, a benign type and a hostile type. To show that the benign type is distinct from admiration, van de Ven et al. (2009) also solicited accounts about experiences of admiration and compared the two. Whereas admiration tended to be directed toward someone who was not similar to the self and whose success was not in a self-relevant domain, benign envy was directed toward a similar person whose success was in a domain that was important to the envier. Also, while admiration was generally reported as being pleasant, experiences of benign envy were unpleasant and entailed negative feelings about the self. Finally, benign envy was more strongly associated with motivation to improve one’s own situation than admiration was. Van de Ven et al. (2011b) further showed that benign envy, but not hostile envy or admiration, leads to both motivation to improve and *actual* improvement. Interestingly, the domain in which the motivation and improvement occurred was not necessarily the same as the domain of the envy, which seems inconsistent with the result

¹ Tai, Narayanan, & McAllister (2012) actually claim that there is only one type of envy, but that it can lead to both benign and hostile action tendencies, which equally contradicts those that claim that envy is exclusively aimed at removing the other’s advantage.

in their 2011a article that benign envy was associated with the willingness to pay more for an envied advantage, while hostile envy was associated with the willingness to pay more for a related, but somewhat different advantage.

Van de Ven et al. (2012) investigated the role of deservingness and personal control in leading to these different emotions, concluding that hostile, but not benign envy, occurs when the envied person doesn't deserve the advantage, and that benign envy, but not admiration, occurs when the envier has control over the situation. They note that control and deservingness are confounded, however, because people generally have little control over their outcomes in situations in which one can receive an advantage without doing anything to deserve it.

One goal of the present study was to replicate van de Ven et al.'s (2009) finding that there are two "types" of envy, a benign version and a hostile version. The second goal of this study, explained below, was to investigate several hypotheses about the conditions that lead to one type of envy versus the other.

The Question of Function

Evolutionary psychologists apply the principles of evolution by natural selection to the field of human psychology. Modern human psychology is viewed as the result of hundreds of thousands of years of selection on human behavior, which has resulted in psychological adaptations that are well designed to solve the adaptive problems that were repeatedly faced by our ancestors. Evolutionary psychologists take an inherently functional approach to psychology.

Evolutionary psychologists have proposed that emotions function as systems that coordinate various components of an organism's cognition, physiology, and behavior in

order to be able to respond adaptively to situations that were reliably associated with particular adaptive problems over humans' evolutionary history (Cosmides & Tooby, 2000; Nesse, 1990; Nesse, 2005; Tooby & Cosmides, 2005). Because natural selection operates on differences between individuals, there is no such thing as "good enough", there is only better or worse than one's competitors. Hence, the superiority of a competitor in a domain that is important to one's own fitness is, itself, an adaptive problem, and one that was probably common in human ancestral environments. Sarah Hill and David Buss (2006, 2008) argue that envy is well designed to solve this adaptive problem by coordinating attention, memory, motivation, and behavior. They point out that envy focuses attention toward (Hill, DelPriore, & Vaughan, 2011; also see Zhong, liu, Zhang, Luo, & Chen, 2013) and improves memory for (Hill, et al., 2011) information about an envied person, and they propose that envy motivates action to reduce the threat posed by the superiority of the envied (Hill & Buss, 2006, 2008). Envy targets precisely those advantages that are most important to ones' fitness (Hill & Buss, 2006), and precisely those individuals with whom competition for those advantages is greatest (Hill & Buss, 2006). Through its secretive nature, envy efficiently hides its presence from its targets who, were they aware of it, would take steps to prevent their superiority from being diminished (Hill & Buss, 2008). Our understanding of envy has been greatly improved by this evolutionary perspective. For example, the issue of why envy is directed toward similar people instead of those who are vastly superior, and seemingly so much more enviable, becomes clear when we take into account that the more similar people are, the more they are in competition with each other for fitness relevant resources (Hill & Buss, 2006). Also, the concept of self-relevance, previously completely

subjective and unpredictable, can now be understood as fitness relevance, allowing predictions to be made and tested (DelPriore, Hill, & Buss, 2012; Hill & Buss, 2006).

Hill and Buss did not address the issue of the two “types” of envy however. A full understanding of the function of envy must include the differences in the functions served by the two types. Therefore, the second goal of the present study was to test several hypotheses derived from a proposal of the functional differences between the two types of envy.

Proposed Functional Distinctions

When a problematic relative inferiority is detected, there are two possible ways to resolve it; one can either improve one’s own position to reach the level of the envied, or one can drag the envied person down to one’s inferior level. From a functional perspective, the decision about which of these two methods to employ should depend on the anticipated cost/benefit ratio of each.

Hostile envy. Hostile envy is about pulling the envied person down from their advantaged position. Hostile envy leads to hostile responses that either deprive the envied person of the desired advantage (e.g. through theft or sabotage) or damage the social position that it affords the envied (e.g. through gossip or backbiting). It is characterized by a lack of ambition (van de Ven et al., 2009, 2011b), and feelings of helplessness, ill will, and being wronged by the envied person (Parrott, 1991; Smith, Parrott, Ozer, & Moniz, 1994; van de Ven et al., 2009).

Benign envy. Benign envy is about raising oneself up to the advantaged position of the envied person. Benign envy leads to motivation and the increased effort necessary to acquire the desired advantage (van de Ven et al., 2009, 2011a, 2011b). Because there

is no hostility toward the envied, people who are benignly envious may be able to benefit from the envied persons' possession of the advantage or knowledge about how to acquire it. It is characterized by ambition and affiliative feelings toward the envied person, such as admiration (Parrott, 1991; van de Ven et al., 2009).

Attainability hypothesis. An envious person's ability to attain the envied advantage, and related concepts like perceived control and feelings of helplessness, are thought by many to be important to envy (Miceli & Castelfranchi, 2007; Smith, 1991; Smith & Kim, 2007; Vecchio, 1997). Miceli and Castelfranchi (2007) and Smith and Kim (2007) claim that the perception that the advantage is unattainable is necessary for envy to occur. They also claim that envy is necessarily hostile, however, so this claim might not apply to benign envy.

An evolutionary functional perspective leads to the prediction that benign envy, because it is aimed at gaining the envied advantage, will be more likely to occur the more attainable the advantage is. Hostile envy, aimed at dragging the envied person down, will be more functional if the advantage is difficult or impossible for the envier to attain.

Consistent with this prediction, van de Ven et al. (2009, 2011b, 2012) found that a perceived lack of control was more characteristic of hostile than benign envy. However, when they experimentally manipulated attainability they found that the deservingness of the envied², but not the envier's ability to attain the advantage, affected envy type, with deserved advantages leading to more benign envy. When an advantage was deserved,

² In the undeserved condition the advantage was bestowed on the envied by another, so the envied had not done anything to justify hostility toward them. Van de Ven and colleagues found that resentment, not envy, occurs when the target attains an undeserved advantage through improper means, so undeserved advantages that provoke envy should generally be the result of chance or of a third party.

attainability did affect whether benign envy or admiration was experienced, with attainable advantages leading to more benign envy.

This discrepancy between the evolutionary functional prediction and van de Ven et al.'s (2012) findings may be due to their emphasis on subjective perceptions, which they used to control for a confound between attainability and deservingness in their study. They experimentally manipulated deservingness by varying whether the envied person performed better or worse than the envier, and they manipulated attainability by varying whether another opportunity to gain the advantage would occur soon, or in the distant future. However, participants' ratings of perceived control in the attainable but undeserved condition were low, which is not surprising given that performance wasn't rewarded with payoff in that condition so there was little reason for participants to expect to be successful at their next opportunity to gain the advantage either. Nonetheless they find that *perceptions* of deservingness, and not *perceptions* of control, predict envy type. It may be the case, however, that actual attainability does influence the type of envy that people experience, but envious people are not aware of its importance. Envious people may be very aware of their perceptions of deservingness, on the other hand, because deservingness is likely to be important to how they respond. In fact, perceptions of deservingness might be influenced by the type of envy being experienced, especially if the situation is somewhat ambiguous. For instance, it may benefit a person who experiences hostile envy to believe the advantage to be undeserved in order to justify removing it, or trying to convince others to disregard it. Similarly it may benefit a person experiencing benign envy to believe the advantage is deserved in order to avoid insulting the envied person who may share the advantage with the envier, or who may be an

important social partner. It is therefore possible that attainability is a factor in determining what type of envy is experienced, while perceived deservingness, and not perceived control, appears to be more important to the envious person.

If actual deservingness is more important, then envy over an advantage that isn't deserved, but is gained by legitimate means (e.g. chance), and that is also easily acquired, should result in hostile envy and no motivation to gain the envied advantage. If actual attainability is more important, then benign envy, and increased motivation, should result. In a study of the effects of impaired self-control on expressions of envy, envious participants who were randomly assigned to receive a less desirable food than another were willing to pay more and were more likely to actually buy the (cheap and easily attained) desirable food than those who weren't exposed to a better off partner, and this effect was mediated by self-reported envy (Crusius & Mussweiler, 2012). This result would seem to support the evolutionary functional prediction, but it is important to note that the effect was not found in participants whose self-control wasn't taxed.

Relationship value hypothesis. It is well known that people tend to envy those who are close in proximity and similar to themselves (Miceli & Castelfranchi, 2007; Salovey & Rodin, 1984) – such as close friends or family (Hill & Buss, 2006; Tesser & Smith, 1980) – yet these close relationships are often beneficial for the envier, so harming these people or one's relationship with them, would ultimately be harmful for the envier. An evolutionary functional perspective would therefore predict that as the value of the relationship to the envier increases, the probability of benign envy also increases.

While this prediction has not previously been tested, research on envy in the workplace has shown that a possible proxy for value – social identification – is negatively

related to socially hostile responding in the form of social undermining (Duffy, Scott, Shaw, Tepper & Aquino 2012).

Social environment hypothesis. Except to note that envy is universally frowned upon (Foster, 1972; Schoeck, 1969), little has been said about the role of the social environment in envy, despite the fact that envy is a social emotion, and that many of the advantages that evoke envy are determined by the social environment. The handing out of advantages like job promotions and memberships to prestigious clubs depends on the perceptions of other people regarding one's relative value, deservingness, and abilities. Other important advantages, like relationships, reputation, and status, are socially determined by their very nature. Status, in particular, is necessarily zero-sum. An increase in one person's status means that another person's status has decreased. As a result, humans have evolved to seek status as a goal in itself (Huberman, Loch & Öncüler, 2004). Status has acquired its psychological importance because of its historical link to the actual benefits afforded by one's social group. As Smith and Kim (2007) point out "relative standing usually contributes much to deciding who gains the prized things in life" (p. 50). It is also important to remember that status is an inherently social construct, depending not on one's actual abilities, successes and failures, but on social acknowledgement thereof (Miceli & Caslelfranchi, 2007). Status can be gained by displaying actual superiority in an area, or by convincing others of one's superiority, whether or not it exists (Buss & Dedden, 1990). A great deal of envy is provoked by social advantages like status and its indicators.

Because so many envied advantages are socially determined, many hostile responses to envy are also social. These social-hostile responses have the potential to

reduce the benefits that the advantage affords the envied person, or even cause the social environment to rescind the advantage entirely, but they can also backfire, doing more harm to the envier than the envied. Indeed, Smith (1991) found that anonymity increased the expression of envious hostility. Therefore, an evolutionary functional perspective leads to the prediction that the more the relevant social environment favors the envied person over the envier, the more likely it is that benign envy will be experienced.

The social environment may favor the envied person in general; for example, the envied could be well liked or have strong social ties to the environment. The social environment may also favor the envied person in relation to the envy context, where deservingness may play an important role. To the degree that the envied person clearly deserves his or her advantage, any attempt to convince people otherwise is only going to make the envier look bad. If the situation is ambiguous, then a person experiencing hostile envy may be able to influence the opinions of others. Therefore, perceived deservingness should play a role in determining the type of envy experienced because of its impact on the favor social environment. This is contrary to van de Ven et al.'s (2012) argument that liking the envied affects envy type, but only through an effect on perceived deservingness.

Factors affecting type. In sum, three predictions about factors affecting the type of envy have been derived from an evolutionary functional perspective. First, the more attainable an envied advantage is, the greater the probability of benign envy (attainability hypothesis). Second, the more valuable the relationship with the envied is to the envier, the greater the probability of benign envy (relationship value hypothesis). Third, the

more the relevant social environment favors the envied person over the envier, the greater the probability of benign envy (social environment hypothesis).

The Envy Process

Envy is a complex emotion that often co-occurs with a variety of other emotions, the content and combination of which can change over time (Parrott, 1991; Smith & Kim, 2007). The evolutionary functional perspective suggests that envy directs cognitive resources toward information gathering and situational assessment, and to the selection of either a benign or hostile trajectory. The function of the other emotions that are experienced may be more directly related to the precise response that is selected. A third goal of the present study was to investigate the possibility that the emotions experienced along with envy play a role in the selection of a response.

Process hypothesis. The process hypothesis proposes a process by which an effective response to an envy situation is selected. Early in an envy experience a mixture of emotions are felt as different aspects of the situation become salient during the appraisal process. Once a benign or hostile trajectory is selected, the range of felt emotions narrows. Benign trajectories should include feelings associated with motivation and/or positive feelings toward the envied, and should lead to increased efforts to gain the envied advantage, and/or to affiliating with the envied person. Hostile trajectories should include feelings associated with a lack of motivation, such as helplessness, as well as feelings of injustice and of ill will toward the envied, and should lead to attempts to sabotage, damage, or steal the envied advantage and/or to erode the superiority of the envied person in the eyes of others. Which particular emotions are felt depends not only on the type of envy experienced, but also on the particular situation in which the envy is

occurring. In other words, the process hypothesis states that particular emotions that are felt are expected to mediate the relationship between the elements of the situation, and the chosen response. For example, within hostile envy, feelings of frustration, injustice, and/or coldness toward the envied might be expected to motivate non-social responses like theft, destruction, or sabotage, while feelings of anger, disgust, and/or betrayal might be expected to motivate social responses like gossip or ostracism. In hostile envy more generally, feelings of helplessness are expected to suppress attempts to attain the advantage for oneself. Similarly, within benign envy, feelings of frustration and/or longing might be expected to motivate increased effort toward independently attaining the envied advantage, while feelings of inferiority, sadness, and/or admiration might be expected to motivate affiliation with the envied in order to learn from him or her or share in the benefits of the advantage. In benign envy more generally, feelings of motivation are expected to increase attempts to attain the advantage for oneself.

In addition to their role in selecting and motivating a response, the emotions that co-occur with envy probably also have an important expressive role. Envy itself is not an expressed emotion—it lacks a particular facial expression and it is usually kept hidden from others (Foster, 1972; Habimana & Massé, 2000; Miceli & Castelfranchi, 2007; Schoeck, 1969; Silver & Sabini, 1978)—but many of these co-occurring emotions, like anger and disgust, are expressed. According to the socio-relational framework of expressive behaviors, the adaptive value of expressed emotion is in the effect it has on an audience (Vigil, 2009). This framework posits two dimensions on which expressed emotions can vary, capacity—the ability to effect an outcome—and trustworthiness—the likelihood of behaving altruistically. Social responses to benign envy largely involve

soliciting aid from the envied person or from others with the capacity to help. These responses will only be directed toward those who are seen by the envier as high capacity, high trustworthiness, and the expressions of admiration and interest that accompany them will serve to promote affiliation with these potential helpers. Expressions of sadness and inferiority resulting from one's own low capacity and high trustworthiness signal to a potential helper that the envier is harmless, but worth helping because he or she will reciprocate in the future. Social responses to hostile envy are generally targeted at people other than the envied. Expressions of anger and/or disgust signal that the envier is *actually* high capacity (despite his or her apparent inferiority) and that the envied is *actually* low capacity and low trustworthiness (despite his or her apparent superiority). These signals will reinforce an envious person's message that the envied doesn't really deserve the advantage and the envier, therefore, isn't really inferior.

While many of these emotions and responses appear to be deceptive, it is not necessary that the envier be consciously aware of the deception. On the contrary, the envier's stories of how inferior and undeserving the envied truly is are more likely to be believed if the envier believes them him or herself (von Hippel & Trivers, 2011). The emotions behind those stories are therefore expected to be truly felt (van de Ven et al., 2011b; Parrott, 1991).

Individual Differences

Little is known about whether certain people tend to experience one type of envy more than the other, and if so, what individual differences variables differentiate them, though some predictions have been made. Based on their idea that the types are distinguished by perceptions of deservingness, van de Ven et al. (2012) predicted that

people who feel entitled will be more likely to experience hostile envy while those who are higher in the belief in a just world and those with an internal locus of control will be more likely to experience benign envy. Similarly, Tai et al. (2012), while they argue that there is only one type of envy, predict that high self-esteem, high self-efficacy, internal locus of control, and high emotional stability will lead to more benign types of responses to envy. Somewhat contrary to Tai et al.'s prediction regarding self-esteem, Cohen-Charash and Mueller (2007) found that, when the envied person's advantage is perceived as deserved, people with higher self-esteem were *more* likely to respond to envy in hostile ways, which may imply that higher self-esteem increases the likelihood that a person will do something in response to his or her hostile envy.

Several predictions can be derived from hypothesized functional distinctions described above. The first prediction, regarding self-efficacy, is consistent with the predictions of Tai et al. and van de Ven et al. (2012). People higher in self-efficacy are expected to be more likely to experience benign envy, because benign envy is hypothesized to occur when envious individuals believe they can gain the envied advantage for themselves. Agreeableness is expected to be positively associated with benign envy because hostile responses are intended to harm others, which may be difficult for agreeable people to do, and also because the success of benign responses may depend on gaining the support of the envied person, which may be easier for agreeable people to do. Finally, emotional intelligence is predicted to moderate the effect of the perceptions of the social environment on the type of envy experienced because use of those perceptions to assess costs and benefits requires the ability to accurately infer the beliefs of other people.

Many other personality traits and individual differences variables are also likely to relate to the type of envy a person is prone to. For example some researchers have speculated that envy, especially hostile envy, could lead to poor health outcomes (Smith & Kim, 2007), particularly cardiovascular disease (Smith, Combs, & Thielke, 2008), because of the inequality, negative emotions, and hostility that envy entails. A great deal of research has linked hostility, in particular, to cardiovascular disease (see Everson-Rose & Lewis, 2005, and Chida & Steptoe, 2009, for reviews). Hostile envy may therefore be expected to be a risk factor as well. However there has been so little research on individual differences in envy that few additional predictions can be made. A fourth goal of the present study is to explore individual differences that may relate to the frequency of envy, and to the type of envy a person is prone to.

The Present Study

In the present study, detailed information about the participants was collected during an initial introductory session. Subsequently, participants completed a two-week daily diary task during which they reported in-depth information about their actual experiences of envy.

During the initial session, participants' blood pressure was measured and they filled out demographics and personality questionnaires. These measures were used to test the individual differences hypotheses and to explore the roles of a variety of individual differences in the experience of envy and its types. Blood pressure was measured as a first step in investigating the possible relationship between envy and cardiovascular health.

Participants who reported experiencing envy during the two week daily diary task described their experience and answered several questions about the envied advantage, the social environment in which the envy took place, the people that they envied, their feelings, and how they responded to the situation. These answers were used to test the attainability, value of the relationship, and social environment hypotheses. Mediation analyses were also used to investigate the process hypothesis. Mediation is a causal process, and while the process hypothesis is a causal one, the methods of the present study were not experimental, and so were not sufficient to test for causality. Indeed many of the factors that were treated as situational in the present study, such as dislike for the envied person, were probably influenced by the envy experience, while others, such as the type of relationship between the participant and the envied person, almost certainly were not. Similarly the emotions, while probably affected by the envy situation, may often have had a preexisting component as well. Consequently, the mediation analyses are not truly a test of the process hypothesis. However they are useful for identifying situation–emotion–response paths to be focused on in future research, or, if no such paths were found, they could cast serious doubt on the process hypothesis.

Method

The daily diary procedure completed by the participants was borrowed from previous envy research (van de Ven et al., 2009, Study 3). The present study differs from that of van de Ven et al. in having an in-person introductory session during which demographics and individual differences were measured, in using an online questionnaire format, in asking participants to report in-depth on two experiences of envy rather than one, and in the content of the questionnaires about the envy experience.

Participants

The primary method used to determine whether each envy experience was benign or hostile—taxometric analysis—requires at least 300 cases (Beuchaine, 2007; Ruscio, Ruscio, & Carey, 2011). An even larger sample is recommended if, as in the present study, the indicators are measured with a limited number of response categories rather than being truly continuous (Ruscio, Ruscio, & Carey, 2011). It was not possible to know beforehand how many cases—experiences of envy—each participant would report, so participant recruitment continued until 350 cases had been collected. At that point recruitment was ended but participants who had already been recruited or had begun participating were allowed to finish.

Once data collection was complete, 292 (95 men, 197 women, $M_{\text{age}} = 22.10$ years, age range: 18–60 years) undergraduate students at a large Southwestern University had participated. Of these, 22 withdrew from the study following the initial session. Of the remaining 270 participants, 17 failed to complete the full 14 days of the daily diary task. Where appropriate, their data were adjusted for the number of days they completed. All participants received partial credit toward a psychology course.

The sample was 44.5% Hispanic, 34.9% White non-Hispanic, and 20.6% other or multiracial. Religious identification was 66.8% Christian (Protestant, Catholic, or Other Christian), 21.6% atheist or agnostic, and 11.6% other. Relationship status was 58.9% single or dating casually, 32.9% in a committed relationship but not married, and 8.2% married. Those who withdrew from the study did not significantly differ from those who did not on gender, age, religion, or relationship status (all $ps \geq .113$), but they did differ on ethnicity, $\chi^2(2, N = 291) = 6.8, p = .033$. Participants who withdrew were less likely to be Hispanic or White non-Hispanic than expected by chance.

Procedure

Participants came to the lab for an introductory session during which they learned about the study, had their blood pressure measured, and completed a series of computerized demographics and personality questionnaires including the Big 5 Factors of personality (John, Donahue, & Kentle, 1991; John, Naumann, & Soto, 2008), emotional intelligence (Cooper & Petrides, 2010; Petrides & Furnham, 2006), self-efficacy (Chen, Gully, & Eden, 2001), dispositional envy (Smith, Parrott, Diener, Hoyle, & Kim, 1999), social comparison orientation (Gibbons & Buunk, 1999; Buunk & Gibbons, 2006), mate value (Fisher, Cox, Bennett, & Gavric, 2008) political orientation (Carney, Jost, Gosling, & Potter, 2008), moral foundations profile (Graham, Nosek, Haidt, Iyer, Koleva, & Ditto, 2011), and the dark triad of Machiavellianism, Narcissism and psychopathy (Paulhus & Jones, 2011) (Appendix A). Blood pressure was measured using a Healthy Living, Automatic Inflate Blood Pressure Monitor (model BA-508AC) by Samsung and an appropriate sized cuff³. Two measurements were taken on the left arm of each

³ Two cuff sizes were available, one appropriate for arm circumferences ranging from 9 to 13 inches and the other appropriate for arm circumferences ranging from 13 to 17 inches.

participant with the arm supported at heart level. If the monitor reported an error, the researcher adjusted the fit of the cuff and, in some cases, changed cuff size. If the monitor still reported an error, then no reading was recorded. No blood pressure information was recorded for 8.2% of the participants and only one reading was recorded for 6.3% of the participants.

Participants were asked to define “envy” in their own words. If they were unable to do so, or if they confused envy with jealousy (fear of losing a relationship to a rival) or longing (wanting something, regardless of whether another person has it) then the following definition was read to them: “an unpleasant emotional experience that can occur when you compare yourself to someone else and realize that they have something that you don’t have but you wish you did have.”

Participants were then instructed to check-in at the research website every evening for 14 days. If a day was missed the participant was asked to skip it and resume checking in the following day. Participation continued until 14 daily check-ins were completed.

Upon logging into the research website participants were asked whether or not they had felt envy that day. A “no” answer ended the task until the following evening. A “yes” answer was followed by the question “how many times did you feel envy today?” Starting with the second “yes” answer participants were also asked if the person they envied today was the same person they reported envying previously. The first two times that participants reported envy toward a new target they were forwarded to the questionnaire, where they were first asked to describe, in detail, the situation in which they felt envy, their thoughts and feelings, and their actions. Then they were asked

several short answer and likert-type questions designed to test the study hypotheses (Appendix B).

After participants reported in-depth on two experiences of envy, they were no longer forwarded to the questionnaire and additional occurrences of envy were simply counted for the remainder of the 14 days.

Analysis and Results

Qualitative Data Coding and Organization

Codebook creation. Based on both the study hypotheses and on themes that were present in the data, two preliminary codebooks were drafted, one for coding the participants' descriptions of their envy experiences, and another for coding their answers to the open ended questions. The codebooks were applied to a random sample of about 20 cases, and then revised to address issues that arose. Next the coders reviewed and discussed the codebooks, followed by further revisions. Appendix C contains the versions of the codebooks that were used by the coders during the coding process. Each codebook contains several items where different codes could be applied for each item. For example the item "direct indication that motivation was affected" could be given the following codes, motivation decreased (-1), motivation not mentioned (0), or motivation increased (+1). Items could be measured as absent/present, e.g. "felt helpless"; as absent/valence, e.g. "motivation affected"; as categorical, e.g. "relationship of the envied person to the participant"; or rated on a seven point scale, e.g. "how easily the envied advantage can be obtained".

Coders. The coders were undergraduate and recently graduated volunteers who were blind to the hypotheses of the study. Five volunteers coded the participants' descriptions of their envy experiences and an additional two volunteers coded their answers to the open ended questions. All coders were trained over a minimum of eight rounds of trial – feedback – discussion using fictitious data. Training continued until each coder was able to apply the coding system in a manner that was consistent with the other coders and with me.

Coding process. Each of the envy descriptions was coded by at least three of the five descriptions coders. All of the answers to the open-ended questions were coded by both of the questions coders. The data was presented to each coder in a unique random order. The coders met regularly throughout the coding process to re-calibrate and to address any issues that arose during the coding process.

Data screening. The frequency of use of each code, as well as how easily each code was confused with every other code, were assessed. Codes that occurred rarely were either collapsed into another category or eliminated. Codes that were frequently confused with each other were collapsed into a single category. All cases where the code “other” was applied were reviewed, and additional codes were created to account for frequently occurring categories that didn’t fall under any existing code. For example, roommate was often listed as the identity of the envied person, but there was no roommate code in the original coding system, so it was added during the data screening. Appendix D contains the revised codebooks reflecting these adjustments.

Some items allowed multiple codes to be assigned to a case. For example, if a participant said that he or she felt both “sad” and “frustrated”, then two emotions codes would be assigned. For these items the coders were instructed to list the codes in the order that they appeared in the text, and to leave a comment with each code indicating the portion of the text that the code referred to. When there was disagreement between coders on how many codes should be assigned to a given case the comments were used to match up the appropriate codes. For example if coder A assigned two emotions codes, one for “sad” and one for “frustrated”, but coder B only assigned a code for “frustrated”, then coder B’s “frustrated” code would be aligned with coder A’s “frustrated” code.

The “type of response” item that was used to code the answers to the open ended questions included more categories than the “response type” item that was used to code the descriptions. To make the two comparable, the original “type of response” codes were re-categorized as either hostile (codes 2, 3, and 5), beneficial (code 1), or other (codes 4, 6, and 9).

Reliability analysis. Krippendorff’s alphas were used to assess inter-coder reliability for each item. Krippendorff’s alpha can be used with any scale of measurement, for any number of coders, can handle missing data, and accounts for the distribution of the applied codes so as not to be biased by underused categories or scale points (Hayes & Krippendorff, 2007). Reliability statistics are reported in Table E-1 in Appendix E. Because every case was independently coded by multiple coders, a high reliability was maintained by including only those cases for which the majority of the coders agreed on the correct code. Therefore, the relatively liberal cutoff of $\alpha \geq .667$ was used to determine which items to retain (Krippendorff, 2004, p. 241-242). Codes that do not indicate a particular category, such as other, unclear, or does not apply, were not included in the reliability analysis, and were not used in subsequent analyses. Where the same coding instruction set was used for more than one item, the alphas were averaged across those items to determine whether the coding instruction set was applied with sufficient reliability for inclusion. For example, participants reported how they actually responded to the situation, and how they wanted to respond to the situation. The answers to both of those questions were rated for “hostility toward the envied person” on a seven point scale from *not hostile* to *extremely hostile*, and the alphas of those two items were

averaged to determine whether the “hostility toward the envied” coding instruction set was reliably applied.

Krippendorff’s alpha assumes that cases are independent. It would violate this assumption to include all codes for those items that allowed multiple codes to be applied to a case. Therefore, reliability for these items was assessed using only the first code listed for each case.

A few items used hierarchical coding systems. For example, if a participant reported feeling envy because the participant’s best friend had spent more time with a newcomer than with the participant, then the domain of the envy would be coded as 1cii. The top level code 1 indicates that the domain is social. The second level code 1c indicates envy over friends, and the third level code 1cii indicates that the envied advantage is the attention of a specific friend, rather than having lots of friends in general. In cases where there was ambiguity about the lower level(s), coders were allowed to code only those levels that were clear. For example if it was unclear whether this participant was envious because the newcomer received the attention of this particular individual (1cii), or because the newcomer was able to make friends so quickly (1ci), then the coder would assign the code 1c and wouldn’t include a third level code at all. Krippendorff’s alpha treats each code as a separate category and would therefore underestimate reliability because it would treat 1c as completely different from 1cii, where, in fact, they are nearly the same. Therefore, reliability for items with hierarchical coding systems was assessed using only those codes that included all possible levels. So if one coder assigned 1ci and another coder assigned 1cii, both codes would be included

in the analysis. If a third coder assigned 1c, that code would be treated as missing for the purpose of the reliability analysis.

Organization of the coded data. For each of the items that achieved sufficient reliability to be included in the analyses, the set of codes applied to each case during the coding process was reduced to a single value according to the following process.

For rating scale items, the ratings were averaged across all coders, and the average was used for further analysis.

For categorical items, the code that was assigned to a given case by the majority of the coders was used for further analysis. Cases where there was no majority agreement were treated as missing. For those items that allowed multiple codes to be assigned by each coder, each code was treated as a separate, present/absent item, and was considered present if the majority of the coders included it, absent if the majority of the coders did not include it, and was treated as missing if there was no majority agreement. Items with hierarchical coding systems were assigned the code corresponding to the lowest level at which majority agreement was achieved. For example, if four coders assigned the codes 5a, 1c, 1ci, and 1cii, to a particular case, the code that would be used for further analysis would be 1c because three of the four coders agreed that this second level code applies.

The questions “what did you do [as a result of the situation in which you felt envy]” and “what did you want to do [as a result of the situation in which you felt envy]” allowed multiple codes to be applied to cases where the participant reported multiple responses. Each response was then also coded for “type of response” and rated on

“objective social approval”. These measures were condensed across multiple responses, separately for actual and desired responses, according to the following process:

Type of response. If only one response was coded, the code (hostile, other, beneficial) assigned to that response was used. If two responses were coded and both were assigned the same code, the agreed upon code was used. If two responses were coded and were assigned different codes, where one of those codes was other, the code that wasn't other was used. For example if one response was coded as hostile and a second response was coded as other, the hostile code would be used. There were no cases in which both a hostile and a beneficial code had been assigned.

Objective social approval. If only one response was rated, the rating assigned to that response was used. If more than one response was rated, the average rating across all responses was used.

Determination of Envy Type

Van de Ven et al. (2009) used latent class analysis to determine if the cases fell into one or two classes. Latent class analysis, is biased toward creating classes when the data may actually represent a dimensional trait (Beauchaine, 2007; Cleland, Rothschild, & Haslam, 2000; Haslam, Williams, Haslam, Graetz & Sawyer, 2006; Uebersax, 1999). Taxometric analysis is a more conservative method for determining whether the latent structure of a construct is best defined by a single dimension or by two naturally occurring classes (Meehl, 1995; Waller & Meehl, 1998).

Method. Taxometric analysis relies on consistency testing – multiple procedures converging on the same result – rather than on null hypothesis significance testing for identifying the latent structure of a construct. Therefore, two nonredundant taxometric

procedures were performed, MAXCOV (maximum covariance; Meehl & Yonce, 1996) and MAMBAC (mean above minus below a cut; Meehl & Yonce, 1994). To be consistent with van de Ven et al.'s (2009) methods, and to provide further confirmation of the results, a latent class analysis was also performed.

The MAXCOV procedure divides one indicator into a series of overlapping intervals and calculates the covariance between two additional indicators within each of the intervals. If the underlying structure of the data is truly categorical then the covariance will be small in intervals that fall within a class and large in intervals that fall between classes. When plotted over the first indicator, the covariances should form a peak at the point where the classes are maximally differentiated. Dimensional data instead produce a flat or dish shaped curve. MAMBAC makes a series of cuts along one indicator and calculates the difference between the mean of a second indicator above minus below each cut. If the underlying structure of the data is truly categorical, then within each class the difference between the mean above the cut and the mean below will be small. Between the classes that difference will be large. When plotted over the first indicator, the differences should form a peak at the point where the classes are maximally differentiated. Dimensional data again produce a flat or dish shaped curve. For detailed explanations of these procedures see (Meehl & Yonce, 1994).

Interpretation of the graphs produced by a Taxometric Analysis can be difficult because analysis choices and distributional characteristics of the data can affect the degree to which they match the prototypical peaked or flat shapes for underlying categorical or dimensional structures, respectively. To aid in interpretation a relative fit statistic – the Comparison Curve Fit Index (CCFI) – was calculated for each taxometric

analysis (see Ruscio, 2007 for a detailed discussion). Simulated categorical and dimensional data sets that match the actual data on “distributional and correlational features” are generated and the same analysis is carried out on the actual, and the two simulated, datasets. The CCFI measures the degree to which the graphs produced from the actual data match those produced by the simulated categorical data versus the simulated dimensional data (Ruscio, 2007). A CCFI of 0.5 is maximally ambiguous with values closer to 0 indicating increasingly strong support for a dimensional structure and values closer to 1 indicating increasingly strong support for a categorical structure. Based on Monte Carlo studies by Ruscio, Walters, Marcus, and Kacetow (2010) only results below .45 or above .55 should be interpreted. They found that, for a wide variety of data conditions, when MAMBAC and MAXCOV were applied together, mean CCFIs outside of this range correctly identified the underlying structure of the data 99.2% of the time. When both methods resulted in CCFIs either below .45 or above .55, the structure was correctly identified 99.7% of the time.

Indicator selection. Selection of the indicators for the taxometric analysis started with those that significantly discriminated the classes in van de Ven et al.’s (2009) second and third studies: [1] Liked the envied, [2] Felt inspired by the envied, [3] Felt frustrated, [4] Wanted to hurt the envied, [5] Hoped that the envied would fail at something, [6] Considered the situation to be unfair, [7] Felt pleasant, [8] Tried harder to achieve my goals, [9] Complimented the envied, [10] Felt cold toward the envied, [11] Complained to someone else about the envied. Indicators 1, 2, 7, 8, and 9 were reverse scored. Indicator 11 was eliminated because it was measured as a yes/no question and dichotomous indicators have been shown to produce poor accuracy (Meehl & Yonce,

1996; Walters & Ruscio, 2009). Indicator 4 was also eliminated because it was highly skewed (skew = 3.103) and skewness above 2 has been shown to bias towards a categorical interpretation (Beach, Amir, & Bau, 2005; Beauchaine, 2007). Taxometric procedures require that indicators be positively correlated with each other in the full sample so bivariate correlations were calculated for the remaining indicators (See Table 1). Indicator 8 was eliminated because it was either uncorrelated or negatively correlated with all but one of the other indicators.

Table 1. *Bivariate Correlations Between Potential Indicators*

Indicator	[1]	[2]	[3]	[5]	[6]	[7]	[8]	[9]	[10]
[1] Liked the envied (R)	—	.29	.04	.39	.07	.16	.00	.38	.43
[2] Felt inspired by the envied (R)	.29	—	.09	.26	.23	.25	.24	.31	.33
[3] Felt frustrated	.04	.09	—	.29	.38	.36	-.25	.00	.37
[5] Hoped the envied would fail at something	.39	.26	.29	—	.24	.24	-.02	.15	.56
[6] Considered the situation to be unfair	.07	.23	.38	.24	—	.21	-.08	.03	.33
[7] Felt pleasant (R)	.16	.25	.36	.24	.21	—	-.02	.20	.28
[8] Tried harder to achieve my goals (R)	.00	.24	-.25	-.02	-.08	-.02	—	.07	-.02
[9] Complimented the envied (R)	.38	.31	.00	.15	.03	.20	.07	—	.21
[10] Felt cold toward the envied	.43	.33	.37	.56	.33	.28	-.02	.21	—

Note. (R) indicates reverse scored. Significant at $p < .01$ in boldface.

Latent structure analyses. Cases were excluded if they were missing data on any of the remaining eight indicators, leaving 404 cases for analysis. The taxometric

analyses were conducted using Ruscio's (2012) taxometric programs for R (R Core Team, 2013). The latent class analyses were conducted using Linzer and Lewis's (2011, 2013) poLCA package for R (R Core Team, 2013).

Taxometric analysis requires substantial correlation between indicators in the full sample, but little or no correlation between the indicators within the classes (Meehl, 1995). The average correlation between indicators in the full sample was .254. The true within-class correlations—assuming there actually are classes—are unknown, but the estimated correlations based on the classes created by the subsequent TA analyses were much smaller than the correlations in the full sample. The average within class correlations based on the MAXCOV analysis were .094 and .076, and based on the MAMBAC analysis they were .072 and .002. However the average Cohen's d s – 1.036 for the MAXCOV and 1.104 for the MAMBAC – were somewhat lower than the recommended minimum of 1.25 (Meehl, 1995). Lower than ideal effect sizes bias the test against the detection of classes (Beauchaine & Beauchaine, 2002), making this a more conservative test for an underlying categorical structure.

MAXCOV. The indicators were standardized prior to analysis. All eight indicators served in all possible (input, output, output) triplets. Following Walters & Ruscio (2010) 25 windows with 90% overlap were used. Bayesian probabilities were used to determine class membership. Figure 1 shows the averaged output curve overlaid on the simulated categorical and dimensional comparison curves. The actual data most closely resemble the categorical comparison data, as was reflected in the CCFI of 0.6. According to this analysis the proportion of cases belonging to the class with higher scores on the indicators was 0.356.

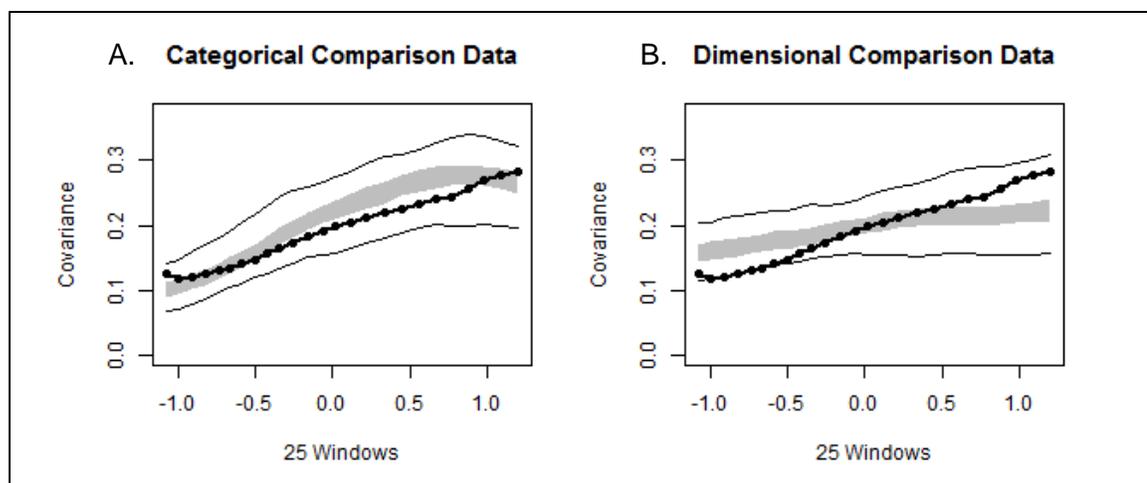


Figure 1. Averaged MAXCOV output curve overlaid on the simulated categorical (Panel A) and dimensional (Panel B) comparison curves.

MAMBAC. The indicators were standardized prior to analysis. All eight indicators served in all possible input-output pairings. Fifty cuts were used with 25 cases maintained at each end. The indicators were measured on a seven point scale so there were many cases with identical scores on a given indicator causing cuts to fall between tied cases. Tied cases were therefore randomly resorted for 10 replications (Ruscio, Haslam, & Ruscio, 2006). Figure 2 shows the averaged output curve overlaid on the simulated categorical and dimensional comparison curves. Again the actual data most closely resemble the categorical comparison data and again the categorical interpretation is supported by the CCFI of 0.583. According to this analysis the proportion of cases belonging to the class with higher scores on the indicators was 0.446.

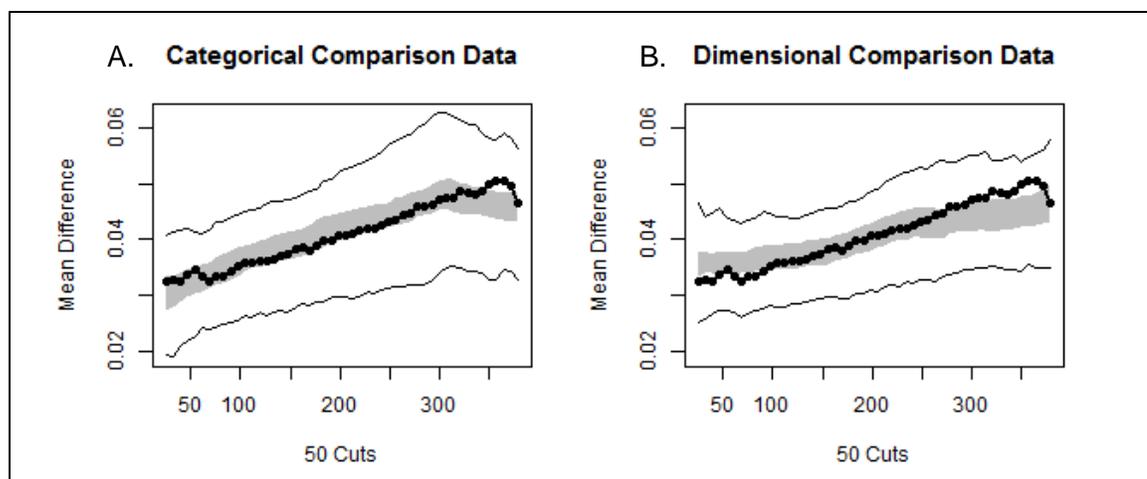


Figure 2. Averaged MAMBAC output curve overlaid on the simulated categorical (Panel A) and dimensional (Panel B) comparison curves.

Latent Class Analysis. Latent class analyses were performed for one, two, and three classes using the same eight indicators that were used in the taxometric analyses. The solution with the lowest Bayesian Information Criterion (BIC) was selected as the best fit. Consistent with the results of the two taxometric analyses, the two-class solution had the lowest BIC (1 class: 11188.24, 2 classes: 11018.13, 3 classes: 11116.65). According to this analysis the proportion of cases belonging to the class with higher scores on the indicators was 0.273.

Determination of class membership. The cases were sorted into classes twice, once using Bayesian-estimated probabilities based on the MAXCOV analysis and once based on the two-class latent class analysis. Given the difference in base rate estimates between the two methods, the maximum possible agreement was 91.1%, and chance agreement would have been 56.5%. Actual agreement was 85.6%. Both predicted class membership and predicted probability of class membership, based on both the MAXCOV and the latent class analysis, were recorded for each case. The 58 cases on which the two

methods disagreed (and hence class membership was ambiguous) were excluded from all subsequent analyses comparing envy types. The indicator means for the two classes are reported in Table 2. The first class is higher than the second on every indicator, where the indicators are scaled so that higher scores indicate more negativity/hostility, clearly indicating that the first class represents hostile envy, and the second class represents benign envy.

Table 2. *Indicator Means by Class*

	Class 1 Hostile Envy (<i>n</i> = 97)	Class 2 Benign Envy (<i>n</i> = 249)
Liked the envied (R)	4.34	2.56
Felt inspired by the envied (R)	5.81	3.78
Felt frustrated	6.31	4.31
Hoped that the envied would fail at something	4.54	1.43
Considered the situation to be unfair	5.16	3.00
Felt pleasant (R)	6.31	4.77
Complimented the envied (R)	5.82	4.22
Felt cold toward the envied	4.93	1.35

Note. (R) indicates reverse scored. All differences are significant at $p < .001$.

Missing Data

Missing data due to failure to respond to individual questions was not a problem (<0.5%). However, a substantial amount of data was missing for four other reasons. First, 29 participants reported that they never felt envy over the course of the study, so they were excluded from all analysis involving envy type or any other measures of the envy experience. Second, the two classing methods, taxometric analysis and latent class

analysis, disagreed on the class of 58 of the cases, so they were excluded from any analysis involving envy type. Third, many of the questionnaire items were only presented to participants if their responses to earlier questions indicated that they were relevant. For example, participants were only asked about the other people who were present when they felt envy if they indicated that other people were, in fact, present. Fourth, anytime that the majority of the coders did not agree on the appropriate code to apply to a qualitative response, or anytime an other code was applied, that data point was treated as missing. Due to these four causes of missing data, the effective N varied considerably from analysis to analysis.

Envy Frequency and Type

Participants reported experiencing envy an average of 3.63 ($SD = 4.25$) times over fourteen days.⁴ The distribution of frequency of envy was positively skewed and the median and mode were both two experiences of envy in fourteen days. Thirty-one participants (11.5%) did not report in-depth on any experiences of envy, 75 participants (27.8%) reported in-depth on one experience, 162 participants (60.4%) reported in-depth on two experiences and, due to an error with the data collection website, one participant (0.4%) reported in-depth on three experiences of envy. Of the 404 envy experiences that were reported on in-depth, 249 (61.6%) were classified by both the taxometric analysis and the latent class analysis as benign, 97 (24.0%) were classified by both methods as hostile, and 58 (14.4%) were ambiguous.

Individual Differences

The two outcomes of interest for investigating individual differences were frequency of envy, and likelihood of hostile envy. Frequency of envy was measured as

⁴ Adjusted for number of days completed for those who withdrew early

the total number of experiences of envy over the 14 days. For those who withdrew from the study early, number of experiences of envy was corrected for number of days of participation, to give an estimated number of envy experiences had the participant completed the full 14 days. Frequency of envy was modeled with the Poisson distribution using a log link function.

The number of cases of envy that were successfully classed as either hostile or benign ranged from zero to two for each participant. Likelihood of hostile envy was measured as the number of cases of envy that were classed as hostile, relative to the number of cases of envy that were successfully classed, for each participant. This was modeled with the binomial distribution using a logit link function. Models for both of these outcome variables were estimated as Generalized Linear Models with Hybrid Fisher and Newton-Raphson parameter estimation and robust estimators.

Frequency of envy did not significantly predict the likelihood that an envy experience was hostile, $OR = 1.028$, Wald $\chi^2(1, N = 219) = 0.834$, $p = .361$.

Analyses of individual differences in the propensity for envy, and for each type of envy, were largely exploratory. Of the 23 individual differences that were measured only two—The Dispositional Envy Scale, and blood pressure—were hypothesized to predict frequency of envy, and four—The Dispositional Envy Scale, blood pressure, self-efficacy, and agreeableness—were hypothesized to predict envy type. See Appendix A for details of the individual differences measures. A priori predictions were tested at a significance level of .05. To control the Type I error rate, exploratory analyses regarding frequency of envy were tested at a significance level of $.05/21 = .00238$, and exploratory

analyses regarding envy type were tested at a significance level of $.05/19 = .00263$.

Table 3 gives the results for frequency and Table 4 gives the results for envy type.

As hypothesized, the Dispositional Envy Scale (Smith, Parrott, Diener, Hoyle, & Kim, 1999) did predict more frequent envy, as it was intended to. It also differentially predicted hostile envy, which isn't terribly surprising considering that its creators claim that all envy is hostile. However, as a measure of overall envy, including benign envy, it may not be appropriate.

Multiple blood pressure readings were averaged to produce a single systolic and diastolic blood pressure estimate for each participant. Neither measure of blood pressure significantly predicted frequency of envy, but systolic blood pressure did significantly predict envy type, with higher systolic blood pressure associated with a *lower* likelihood of hostile envy, opposite the hypothesized direction. It should be noted, however, that the size of this effect was small with a one standard deviation increase from the mean in systolic blood pressure corresponding to an 8.2% decrease in the predicted probability of hostile envy. Self-efficacy and agreeableness were both hypothesized to indicate less hostile envy, but neither was significantly associated with envy type.

Table 3. *Individual Differences Variables Predicting Frequency of Envy*

Effect	<i>b</i>	Wald χ^2	<i>N</i>	<i>p</i>
Hypothesized				
Dispositional Envy Scale	0.149	7.293	264	.007**
Blood Pressure – Systolic ^a	-0.007	0.923	238	.337
Blood Pressure – Diastolic ^a	0.010	1.141	238	.286
Exploratory				
Gender ^b	-0.389	4.152	264	.042
Religious Attendance	0.069	0.897	264	.344
Age	0.003	0.168	264	.682
Mate Value	0.027	0.132	264	.717
Political Orientation ^c	0.061	1.654	264	.198
Openness (Big 5)	0.024	0.065	263	.798
Conscientiousness (Big 5)	0.096	1.028	263	.311
Extraversion (Big 5)	0.085	2.052	263	.152
Agreeableness (Big 5)	0.015	0.030	263	.863
Neuroticism (Big 5)	0.060	0.843	263	.359
Self-efficacy	-0.046	0.260	263	.610
Emotional Intelligence	-0.028	0.049	263	.824
Machiavellianism (Dark Triad)	0.104	1.979	263	.160
Narcissism (Dark Triad)	0.194	4.473	263	.034
Psychopathy (Dark Triad)	0.079	0.743	263	.389
Social Comparison Orientation	0.084	0.713	262	.398
Harm – Moral Foundation	0.009	0.005	263	.942
Fairness – Moral Foundation	0.008	0.003	263	.955
Ingroup – Moral Foundation	0.052	0.335	263	.563
Authority – Moral Foundation	0.134	2.963	263	.085
Purity – Moral Foundation	0.057	0.590	263	.442

Note. Higher values indicate higher levels of the measured trait unless otherwise indicated. All tests had 1 degree of freedom

^a Four outliers with either a systolic, diastolic, or both > 3 standard deviations above the mean were excluded. With those four outliers included, systolic is non-significant but diastolic blood pressure borderline significantly predicts frequency of envy, $p = .050$.

^b Female coded as 0, male coded as 1

^c Higher values indicate a more conservative Political Orientation.

* $p \leq .05$ for a priori effects or $p \leq .00238$ for exploratory effects. ** $p \leq .01$ for a priori effects or $p \leq .00048$ for exploratory effects.

Table 4. *Individual Differences Variables Predicting Envy Type*

Effect	OR	Wald χ^2	N	p
Hypothesized				
Dispositional Envy Scale	1.367	8.375	224	.004**
Self-efficacy	0.980	0.018	223	.893
Agreeableness (Big 5)	1.075	0.261	223	.609
Blood Pressure – Systolic ^a	0.955	8.504	203	.004*
Blood Pressure – Diastolic ^a	0.971	2.643	203	.104
Exploratory				
Gender ^b	0.545	3.193	224	.074
Religious Attendance	1.185	1.902	224	.168
Age	0.931	8.486	224	.004
Mate Value	1.310	7.197	224	.007
Political Orientation ^c	1.174	3.495	224	.062
Openness (Big 5)	0.955	0.095	223	.758
Conscientiousness (Big 5)	0.974	0.032	223	.858
Extraversion (Big 5)	1.246	4.093	223	.043
Neuroticism (Big 5)	1.112	0.688	223	.407
Emotional Intelligence	0.915	0.197	223	.657
Machiavellianism (Dark Triad)	1.400	4.555	223	.033
Narcissism (Dark Triad)	1.390	4.087	223	.043
Psychopathy (Dark Triad)	1.116	0.486	223	.486
Social Comparison Orientation	1.195	1.045	222	.307
Harm – Moral Foundation	1.024	0.021	223	.886
Fairness – Moral Foundation	1.013	0.005	223	.943
Ingroup – Moral Foundation	1.422	6.086	223	.014
Authority – Moral Foundation	1.535	9.541	223	.002*
Purity – Moral Foundation	1.488	9.327	223	.002*

Note. Higher values indicate higher levels of the measured trait are associated with more hostile envy unless otherwise indicated. All tests had 1 degree of freedom

^a Four outliers with either a systolic, diastolic, or both > 3 standard deviations above the mean were excluded. With those four outliers included, systolic blood pressure significantly predicts envy type, $p = .001$, and diastolic blood pressure is also significant at $p = .044$.

^b Female coded as 0, male coded as 1

^c Higher values indicate a more conservative political orientation.

* $p \leq .05$ for a priori effects or $p \leq .00263$ for exploratory effects. ** $p \leq .01$ for a priori effects or $p \leq .00053$ for exploratory effects.

Of the exploratory effects, only two were significant at the adjusted α used for those tests. Subscribing more strongly to an authority based moral foundation, or a purity based moral foundation, was associated with a higher likelihood of experiencing hostile envy.

While no other exploratory effects achieved statistical significance, low p -values for gender, age, mate value, and the dark triad, particularly with respect to envy type, suggest that these individual differences variables may nonetheless be worthy of further study.

Analyses of Factors Predicting Envy Type

Three situational elements were hypothesized to predict envy type—the attainability of the envied advantage, the value to the envier of the relationship with the envied, and the degree to which the social environment favored the envied over the envier. In addition, envy type was hypothesized to be related to the emotions experienced and to the responses enacted, in response to the envy situation. The following sections describe how the tests of these hypotheses were performed.

Non-Independence of Cases. Hierarchical Linear Modeling (HLM) was used to account for the non-independence of cases that occurred because some participants reported on multiple experiences of envy. Primary analyses testing the hypotheses about envy type were conducted using the dichotomous outcome, type of envy (class membership). The results of the primary analyses were then tested for robustness using the continuous outcome, probability of hostile envy. In all HLM models the participants' intercepts were treated as random unless otherwise indicated. Significance tests of the variance of these random intercepts used one-tailed Wald Z tests, and are reported as

footnotes. All scale-level predictors were standardized. Where composite variables were created using Principal Components Analysis (PCA), the factor scores were estimated with the regression method, giving them a mean of zero and a standard deviation of one. Where composite variables were created by averaging, the predictors were first standardized, then averaged, then the resulting composite was standardized again to give it a mean of zero and a standard deviation of one.

Envy type – Dichotomous outcome. The primary outcome variable of interest was envy type, as determined by the taxometric analysis and latent class analysis, where hostile envy was coded as 1 and benign envy was coded as 0. The Generalized Linear Mixed Model procedure with a Binary Logistic Regression model in SPSS version 19 was used for all HLM analyses on this outcome variable. Robust estimation was used to handle potential violations of model assumptions for all fixed effects and coefficients. The estimated intraclass correlation for the intercept only model was .127, indicating that 12.7% of the total variance in envy type was between participants.⁵

Unless otherwise indicated, for each hypothesis being tested, an initial model was created containing the main effects and all two-way interactions between any relevant predictors, whether or not those interactions were of particular interest. Though gender was not relevant to the study hypotheses, there were theoretical reasons to expect possible gender effects—for example there are gender differences in the types of advantages that are envied (DelPriore, Hill, & Buss, 2012; Hill & Buss, 2006)—so participant gender and its two-way interactions with all predictors were initially included as well. Any effects that were not directly relevant to the hypothesis being tested (gender main effect or

⁵ Estimated ICC = [intercept variance / (intercept variance + $\pi^2/3$)] following Heck, Thomas, and Tabata (2012).

interaction effects) with $p \geq .10$ were then dropped to create a final model. Odds Ratios (e^{β} exponential log odds) are reported for all significant fixed effects. Because the scale-level predictors were standardized, their odds ratios are interpretable as the increase in the odds of hostile envy for each standard deviation increase in the predictor variable.

Probability of envy type – Continuous outcome. The probabilities of class membership produced by the taxometric analysis and the latent class analysis were averaged together to create an estimated probability that a case falls into the hostile class. Analyses on this outcome variable were conducted in SPSS version 19 using the Linear Mixed Model procedure with Restricted Maximum Likelihood (REML) estimation. Again participants were treated as a random variable so their intercepts were allowed to vary.

Situational Elements Hypothesized to Predict Envy Type⁶

Attainability hypothesis. Hostile envy was expected for advantages that are difficult to attain without taking them from the envied person. Thus, both the general attainability of an advantage, and the degree to which the envied person's possession of the advantage makes attaining it more difficult—hereafter referred to as the *dependence of attainability*—were expected to contribute to envy type. See Table 5 for details of the measures.

The general attainability of the envied advantage, the dependence of attainability, participant gender, and all 2-way interactions, were entered into a model predicting envy type. Neither the main effect of gender, nor any of the two way interactions were significant (all $ps \geq .151$) and they were removed from the model. In the resulting final

⁶ Neither the order of a participant's in-depth reports, nor its interaction with other effects, was significant for any of the main hypotheses so this variable is not included in the analyses reported below.

model, the main effect of general attainability, $OR = 0.723$, $t(329) = -2.271$, $p = .024$, and the main effect of dependence of attainability, $OR = 1.686$, $t(329) = 3.602$, $p < .001$, were both significant. As hypothesized, hostile envy was less likely for advantages that are easier to attain, and more likely for advantages that are harder to attain *because* the envied person already possessed them.⁷

Table 5. *Variables Used to Test the Attainability Hypothesis*

Variable	Scale Direction— Higher scores on the variable indicate:	Method	Factor Loading	Question(s) or Item(s)
General Attainability	The advantage is more attainable	PCA	.836	In general, how easily can someone get an advantage like this one?
			.836	How easily can you get the envied advantage now that the other person has it?
Dependence of Attainability	Possession by envied person makes the advantage less attainable to the participant			Would it change how easily you can get the envied advantage if the other person didn't have it and wasn't going to get it?

Note. Composite variables are in boldface.

To test whether these effects are robust the final attainability model was replicated with the continuous probability of envy type outcome variable. Both effects were significant, and the direction of the effects was consistent with the dichotomous envy type model—general attainability: $b = -0.059$, $t(327.742) = -2.739$, $p = .006$; dependence of attainability: $b = 0.096$, $t(328.715) = 4.488$, $p < .001$.⁸

⁷ Intercept variance = 0.340, Wald $Z = 1.009$, $p = .157$.

⁸ Intercept variance = 0.033, Wald $Z = 2.392$, $p = .008$.

Summary. The attainability hypothesis was supported. Advantages that were more easily attained tended to elicit benign envy, but advantages that were harder to attain because the envied person already had them tended to elicit hostile envy. These effects were robust across both measures of envy type.⁹

Relationship value hypothesis. Envy in relationships that are valuable to the envier was hypothesized to be more likely to be benign than envy toward those who aren't valued. Relationship value was expected to be reflected both by participants' self-reports and by their degree of biological relatedness to the envied person.

Table 6. *Variables Used to Test the Value of the Relationship Hypothesis*

Variable	Scale Direction— Higher scores on the variable indicate:	Method	Factor Loading	Question(s) or Item(s)
Relationship Value	more valuable relationship	PCA	.869	Relationship type (ordered by importance)
			-.745	How much do you dislike the person you envied?
			.900	How much would you feel hurt if your relationship with the envied person was damaged?
Relatedness	Closer biological relationship			Estimate based on reported relationship to the envied

Note. Composite variables are in boldface.

⁹ Social status, because it is zero-sum, may be difficult to attain, leading to hostile envy. The fact that it is socially determined may imply that the envied is favored by the social environment, leading to benign envy (social environment hypothesis). To control for the possibility that attainability and social perceptions work in opposition when the envied advantage is status, the degree to which the social environment favored the envied person was added to the final attainability model. The final Hessian matrix was not positive definite so the intercepts were constrained to be equal (Singer & Willett, 2003). The main effect of the social environment was significant, $OR = 0.328$, $t(316) = -6.428$, $p < .001$, but controlling for social environment did not notably affect the rest of the model so it does not appear that the attainability effects are being masked by a confound with social perceptions.

Value of the relationship to the participant was measured with a composite of self-report variables consisting of the type of relationship between the participant and the envied, ordered by importance, how much the participant dislikes the envied, and how much the participant would be hurt if his or her relationship with the envied was damaged (See Table 6 for details). The degree to which the participant reported disliking the envied person was included in this composite, but liking for the envied person was excluded because it was one of the indicators used to differentiate the envy types in the taxometric and latent class analyses.

Kin relationships are also likely to be valuable ones (Hamilton, 1964), so a coefficient of relatedness between the participant and the envied person was estimated for each case. Cases where the envied person was a family member by marriage were assigned a coefficient of .001. Though the participant is not truly related to the envied in these cases, to the degree that kin-based benefits “leak” over to the non-kin family-member, the relationship is valuable because of kin-ties. For example, if the participant envies her sister-in-law (relatedness = 0), and the sister-in-law provides benefits to her brother (relatedness = .5), the participant also benefits from the kin-relationship between her husband and her sister-in-law.

The degree to which the participant valued his or her relationship with the envied person, the estimated coefficient of relatedness, participant gender, and all 2-way interactions, were entered into a model predicting dichotomous envy type. The interaction between relationship value and relatedness was not significant ($p = .926$) and was removed from the model. The interaction between gender and relationship value was

also non-significant ($p = .799$) and was also removed. Gender, and the interaction between gender and relatedness, were both significant and were retained in the model.

In the resulting model, the main effect of relationship value was significant, $OR = 0.342$, $t(314) = -6.854$, $p < .001$, where hostile envy was less likely in more highly valued relationships, as hypothesized. The main effects of relatedness and gender were also significant—relatedness: $OR = 1.640$, $t(314) = 3.351$, $p = .001$; gender: $OR = 0.302$, $t(314) = -3.261$, $p = .001$ —but were modified by a significant relatedness by gender interaction, $OR = 0.036$, $t(314) = -16.941$, $p < .001$.¹⁰

To investigate the significant relatedness by gender interaction, the main effects of relatedness and relationship value on dichotomous envy type were assessed separately for men and women (Figure 3). For women, the main effect of relationship value was significant, $OR = 0.350$, $t(245) = -6.048$, $p < .001$ with hostile envy being less likely in more valued relationships. The main effect of relatedness was also significant, $OR = 1.624$, $t(245) = 3.235$, $p = .001$. Contrary to the hypothesis, a higher coefficient of relatedness was associated with an increased probability of hostile envy in women.¹¹ In men, the main effect of relationship value was significant, $OR = 0.306$, $t(68) = -3.385$, $p = .001$, and similar to the effect in women. The main effect of relatedness was also significant, $OR = 0.049$, $t(68) = -14.230$, $p < .001$, but in the opposite direction of the effect in women. In men, the probability of hostile envy decreased as relatedness increased, as originally hypothesized.¹²

Using the continuous probability of envy type outcome variable, the model was robust for women. The main effect of relationship value was significant, $b = -0.173$,

¹⁰ Intercept variance = 0.738, Wald $Z = 1.745$, $p = .041$.

¹¹ Intercept variance = 0.628, Wald $Z = 1.362$, $p = .087$.

¹² Intercept variance = 1.258, Wald $Z = 1.198$, $p = .115$.

$t(217.767) = -7.409, p < .001$. As value of the relationship to the participant increased, the probability of hostile envy decreased. The main effect of relatedness was also significant, $b = 0.077, t(218.387) = 3.231, p = .001$. Higher coefficients of relatedness were associated with increased likelihood of hostile envy in women.¹³

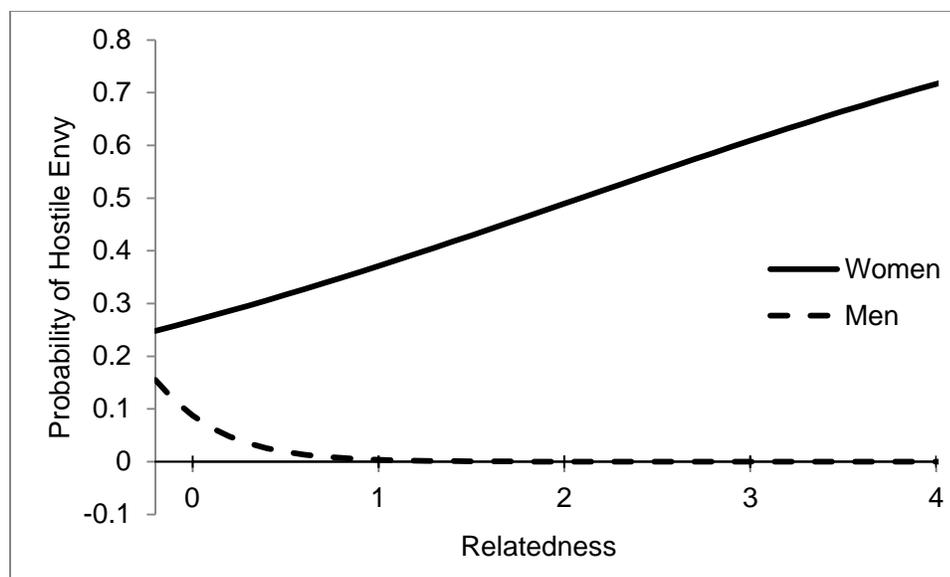


Figure 3. Gender by relatedness interaction. Lines are plotted at the mean self-reported relationship value for each gender

In men, the main effect of relationship value was consistent with the dichotomous envy type model, $b = -0.168, t(60.036) = -3.964, p < .001$. The main effect of relatedness was not significant, $b = 0.014, t(26.595) = 0.430, p = .670$, which was not consistent with the significant negative relationship found in the dichotomous envy type model.¹⁴

Summary. The relationship value hypothesis was supported with the self-reported measure of relationship value, but the effect of relatedness on envy type was complicated by an interaction with gender. In men, as hypothesized, the probability of

¹³ Intercept variance = 0.042, Wald $Z = 2.768, p = .003$.

¹⁴ Intercept variance = 0.072, Wald $Z = 3.087, p = .001$.

hostile envy decreased as relatedness increased, but this effect was only significant with the dichotomous envy type outcome variable so it may not be robust. There was a robust effect of relatedness on envy type in women, but it was opposite the hypothesized direction; women were *more* likely to experience hostile envy toward biological family members than they were toward unrelated individuals.

Social environment hypothesis. Benign envy was expected to be more likely when the social environment favored the envied person over the participant, and vice versa. Both liking for the envied, relative to the envier, and perceptions of the envied's deservingness, were expected to contribute to the social environment's favor. Emotional intelligence was expected to moderate the effect of the social environment on envy type because people with higher social intelligence should have been better at inferring the beliefs and feelings of others.

The degree to which the social environment favored the envied person over the participant was measured with a composite of the degree to which other people liked the envied, liked the participant, thought the envied deserved his or her advantage, and the degree to which hypothetical objective observers would say the envied deserved his or her advantage (See Table 7 for details).

Table 7. *Variables Used to Test the Social Environment Hypothesis*

Variable	Scale Direction— Higher scores indicate:	Method	Question(s) or Item(s)
Social environment	The social environment favors the envied person over the participant	Average	<p>Other people like the envied more than the participant</p> <p>In general, how much do you think the other people who were present will believe the envied person deserved the advantage?</p> <p>To what degree do you think that objective observers would say the envied person deserved the advantage that you are envious of?</p> <p>Others think the envied did wrong (coded) Who the others who were present would favor</p>
Other people like the Envied more than the Participant	Those who were present like the envied person <i>more</i> than the participant	Difference	<p>In general, how much do you think the other people who were present like the person you envied?</p> <p>In general, how much do you think the other people who were present like you?</p>
Others think the envied did wrong	Others think the envied acted wrongly	Average	<p>To what degree would other people say this person acted wrongly in how they gained the envied advantage?</p> <p>To what degree would other people say this person acted wrongly in how they kept the envied advantage?</p> <p>To what degree would other people say this person acted wrongly in how they reacted to getting the envied advantage?</p>

Table 7 Continued

Variable	Scale Direction— Higher scores indicate:	Method	Question(s) or Item(s)
Liking Component of Social Environment	The social environment likes the envied person more than the participant	Average	Other people like the envied more than the participant (coded) Who the others who were present would favor
Deserving component of the social environment	The social environment believes the envied is deserving	Average	In general, how much do you think the other people who were present will believe the envied person deserved the advantage? To what degree do you think that objective observers would say the envied person deserved the advantage that you are envious of? Others think the envied did wrong
Emotional Intelligence			TEIQue short form. See Petrides and Furnham (2006), and Cooper and Petrides (2010).

Note. Composite variables are in boldface.

Averaged variables ignored missing data, so individual cases include only those measures for which there was data available. Composite variables that included an item that was only measured when other people were present are created by averaging, rather than PCA, so as to retain those cases where no one else was present.

The degree to which the social environment favored the envied person, participant gender, and the interaction between the two were entered into a model predicting dichotomous envy type. Neither gender, nor its interaction with the social environment, were significant (all $ps \geq .179$) and they were dropped from the model. In the resulting model, the social environment significantly predicted envy type, $OR = 0.320$, $t(344) = -$

7.091, $p < .001$. As hypothesized, the more the social environment favored the envied person, the less likely hostile envy was.¹⁵

The main effect of the social environment was robust when tested with the continuous probability of envy type, $b = -0.180$, $t(342.997) = -9.573$, $p < .001$.^{16, 17}

Emotional intelligence was hypothesized to moderate the effect of the social environment on envy type with those of high emotional intelligence being more affected by the social environment than those of low emotional intelligence. Again, the main effect of social environment was significant, $OR = 0.304$, $t(341) = -6.455$, $p < .001$. The main effect of emotional intelligence was not significant, $OR = 0.792$, $t(341) = -1.296$, $p = .196$. The effect of interest, the interaction between emotional intelligence and social environment, was significant, $OR = 0.629$, $t(341) = -2.644$, $p = .009$. Figure 4 shows the effect of the social environment on the model predicted probability of envy for the mean and for one standard deviation above and below the mean of emotional intelligence. As predicted, the effect of the social environment on envy type was stronger for those with higher emotional intelligence.¹⁸

These effects were robust when tested against the continuous probability of envy type. The main effect of the social environment was significant, $b = -0.173$, $t(340,991) = -9.166$, $p < .001$. The main effect of emotional intelligence was not significant, $b = -0.004$, $t(206.036) = -0.219$, $p = .827$. Most importantly, the interaction between social

¹⁵ Intercept variance = 0.459, Wald Z = 1.211, $p = .113$.

¹⁶ Intercept variance = 0.033, Wald Z = 2.889, $p = .004$.

¹⁷ I again considered the possibility that a confound between the attainability of status and the social environment's perception of high-status people was masking the effect of the social environment. The main effects of the two measures of attainability were added to the model. The main effects of both measures of attainability were significant, but including them in the model did not notably alter the odds ratio for the social environment main effect, $OR = 0.328$, or the p -value, $p < .001$. Attainability does not appear to be masking a social environment effect.

¹⁸ Intercept variance = 0.408, Wald Z = 1.077, $p = .141$.

environment and emotional intelligence was significant, $b = -0.056$, $t(335.358) = -2.842$, $p = .005$.¹⁹

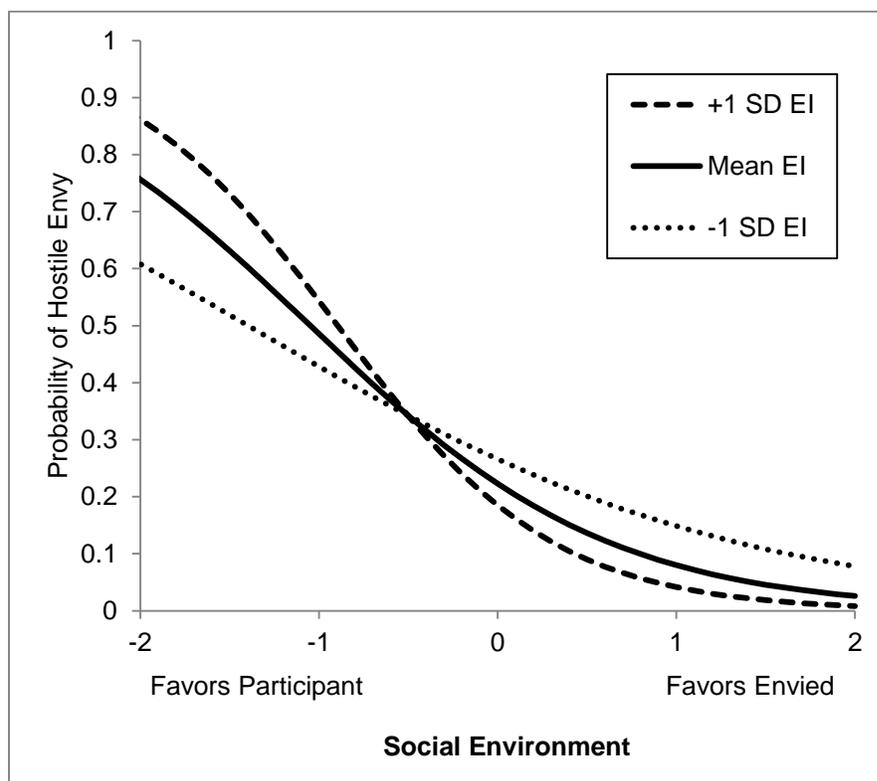


Figure 4. Interaction of Emotional Intelligence (EI) and Social Environment on the Probability of Hostile Envy. Dashed line is one standard deviation above the mean on Emotional Intelligence, solid line is at the mean Emotional Intelligence, dotted line is one standard deviation below the mean on emotional intelligence. Social Environment scores are standardized.

To investigate which aspects of the perceptions of the social environment were most relevant to envy type, the social environment was broken into a liking component and a deserving component. Gender was not included in this, or any subsequent models that further break down the social environment effect because it was not significant in the overall social environment model.

¹⁹ Intercept variance = 0.031, Wald $Z = 2.767$, $p = .003$.

The interaction between liking and deserving was not significant ($p = .252$) and was removed from the model. In the resulting model, the main effect of deserving was significant, $OR = 0.248$, $t(186) = -7.218$, $p < .001$, where the more the social environment believed the envied person deserved the advantage, the less likely hostile envy was. The main effect of liking was not significant, $OR = 1.036$, $t(186) = 0.178$, $p = .859$.²⁰ The effect of the social environment appears to be accounted for by the degree to which the envied person was perceived to deserve the advantage, and not by the degree to which the social environment liked the envied person more than the participant. This finding was robust when tested with the continuous probability of envy type as well—liking: $b = 0.006$, $t(173.883) = 0.217$, $p = .829$; deserving: $b = -0.209$, $t(163.255) = -8.286$, $p < .001$.²¹

It is possible that the participants' own beliefs about the envied person's deservingness, and not the beliefs of the social environment, that account for the effect of the envied person's deservingness. The degree to which the participant believed the envied was deserving, and the participant's perception of the degree to which others who were present believed the envied was deserving, were correlated, $r = .59$, $N = 189$, $p < .001$. In a model predicting dichotomous envy type from both measures, the participants' beliefs about the envied person's deservingness significantly predicted envy type, $OR = 0.330$, $t(186) = -4.717$, $p < .001$, and the participants' perception of the beliefs of others was not significant, $OR = 0.936$, $t(186) = -0.304$, $p = .761$.²² This result was robust when

²⁰ Intercept variance = 0.551, Wald $Z = 0.940$, $p = .174$.

²¹ Intercept variance = 0.057, Wald $Z = 3.085$, $p = .001$.

²² Intercept variance = 0.386, Wald $Z = 0.739$, $p = .230$

tested with the continuous probability of envy type—self: $b = -0.168$, $t(185.751) = -5.247$, $p < .001$; others: $b = -0.025$, $t(184.718) = -0.792$, $p = .429$.²³

Summary. A composite variable measuring how much the social environment liked the envied person, relative to the envier, and how deserving they thought the envied was, did predict envy type as hypothesized, and, also as hypothesized, emotional intelligence did moderate that effect. When broken down into its components, the social environment effect was accounted for by perceptions of the envied's deservingness, not by relative liking for the envied. Further, the participant's own perception of the envied's deservingness better account for the effect than participant's beliefs about the perceptions of others. Given the lack of an independent effect of the social environment, the social environment hypothesis was not supported.

Independent contribution of the situational elements. Two of the three main predictions regarding envy type were supported; attainability of the envied advantage and value of the relationship to the envious person both influenced envy type. A measure of the perceptions of the social environment also predicted envy type, though the effect seems to be better accounted for by the envied person's deservingness than by the favor of the social environment.

To assess whether each of these elements independently contributes to envy type, all three were entered into a single model along with all two-way interactions across predictions. The two-way interaction between general attainability and dependence of attainability on envied's possession was not included because it was not significant in the overall tests of attainability on envy type. The estimated coefficient of relatedness was

²³ Intercept variance = 0.037, Wald $Z = 1.785$, $p = .037$

not included because its effect was conditional on the gender of the participant and opposite the predicted direction for women.

None of the two-way interactions were significant, but the interaction between value of the relationship and dependence of attainability on envied's possession was close, $p = .071$, so it was retained in the model. All other two-way interactions were dropped, all $ps \geq .173$. All main effects were retained, regardless of their p -value.

The Hessian Matrix for the resulting model was not positive definite and the intercept variance estimate was zero, so the intercepts were constrained to be equal (Singer & Willett, 2003). There was a significant main effect of each of the three main study hypotheses. The main effect of general attainability of the envied advantage was significant, $OR = 0.675$, $t(313) = -2.278$, $p < .001$, where more easily attained advantages were less likely to elicit hostile envy. The main effect of dependence of attainability, the other predictor variable from the attainability hypothesis, was not significant, $OR = 1.306$, $t(313) = 1.559$, $p = .120$. The main effect of relationship value was significant, $OR = 0.507$, $t(313) = -3.937$, $p < .001$, where more valuable relationships were less likely to elicit hostile envy. The main effect of the social environment was significant, $OR = 0.375$, $t(313) = -5.736$, $p < .001$, where social environments that favored the envied over the participant elicited less hostile envy than social environments favoring the participant. The only interaction remaining in the model, the interaction between relationship value and dependence of attainability, was not significant, $OR = 0.788$, $t(313) = -1.539$, $p = .125$.

Indicators of all three hypotheses independently contributed to envy type. The significant effects in this model were robust when tested against the continuous

probability of envy type—attainability: $b = -.039$, $t(310.860) = -2.068$, $p = .039$;
 relationship value: $b = -.097$, $t(305.937) = -5.030$, $p < .001$; social
 environment/deservingness: $b = -.136$, $t(314.005) = -6.882$, $p < .001$ —however the main
 effect of dependence of attainability, $b = .042$, $t(313.585) = 2.138$, $p = .033$, and the
 interaction between dependence of attainability and relationship value, $b = -.053$,
 $t(295.998) = -3.035$, $p = .003$, were also significant in that model.

In light of the finding that the participant's perceptions of the deservingness of the
 envied may account for the apparent effect of the social environment, this analysis was
 repeated replacing the social environment with the participant's rating of the
 deservingness of the envied. None of the two-way interactions were significant so all
 were dropped. Again the Hessian Matrix for the model was not positive definite and the
 intercept variance estimate was zero, so the intercepts were constrained to be equal
 (Singer & Willett, 2003). The results were remarkably similar to the analysis with the
 social environment measure. Except for dependence of attainability, $OR = 1.249$, $t(314)$
 $= 1.313$, $p = .190$, all the main effects were significant—general attainability: $OR =$
 0.702 , $t(314) = -1.973$, $p = .049$; participant's rating of envied's deservingness: $OR =$
 0.310 , $t(314) = -6.831$, $p < .001$; relationship value: $OR = 0.458$, $t(314) = -4.397$, $p <$
 $.001$. The deservingness and relationship value effects were robust when tested with the
 continuous probability of hostile envy outcome—participant's rating of envied's
 deservingness: $b = -0.158$, $t(303.676) = -8.010$, $p < .001$; relationship value: $b = -0.101$,
 $t(314.371) = -5.295$, $p < .001$. In this model both measures of attainability narrowly

missed significance—general attainability: $b = -0.036$, $t(314.875) = -1.906$, $p = .058$;
dependence of attainability: $b = 0.035$, $t(313.830) = 1.791$, $p = .074$.²⁴

Summary. All three of the hypothesized situational elements independently contributed to envy type, though the effect of the social environment is most likely not due to the degree to which the social environment favors the envied over the envier, as hypothesized, but to the envier's perception of the deservingness of the envied instead. The effect of the general attainability of the envied advantage independently contributed to envy type more consistently than the dependence of attainability did.

Envy Process

The process by which envy is hypothesized to lead to a response involves the various emotions that occur as part of the envy experience. The envy types are proposed to narrow the available set of emotions and responses to either benign, raising the self up types, or hostile, pull the envied down types. Being limited to one type of envy or the other prevents the envious person from using conflicting responses that would be likely to interfere with each other's effectiveness.

Emotions. Feelings of helplessness, injustice, and ill will toward the envied person were expected to be more characteristic of hostile, than benign, envy, while motivation, and affiliative feelings toward the envied, were expected to be more characteristic of benign, than hostile, envy.

Emotions were measured in two ways. First, participants were asked to rate the degree to which they felt each of a list of emotions on a scale from *not at all* to *extremely*. This type of measurement forces participants to consider each emotion in question.

²⁴ Intercept variance = 0.015, Wald $Z = 1.263$, $p = .103$.

Second, the written descriptions were coded for explicit mention of emotion words.

While this type of measurement may fail to capture quite a lot of felt emotion, it may be a better measure of which emotions were most salient to the participant. See Table 8 for details.

Table 8. *Variables Used to Test the Emotions Hypotheses*

Variable	Scale Direction— Higher scores on the variable indicate:	Method	Factor Loading	Question(s) or Item(s)
Self-Rated				
Helpless	Felt more helpless			How helpless did you feel?
Envied Deserved (Unfair)	Envied was more deserving (situation was less unfair)			To what degree do you believe that this person deserved the advantage that you are envious of?
Ill Will	More ill will	PCA	.902	How angry were you at the person you envied?
			.884	How much did you resent the person you envied?
			.869	How disgusted were you by the person you envied?
			.720	How much did you want to hurt the person you envied?
Affiliative	More affiliative feelings	PCA	.894	How friendly did you feel toward the person you envied?
			.894	How much did you admire the person you envied?
Intensity of Envy	More intense envy	PCA	.921	How envious did you feel?
			.921	How intense was the emotional experience overall?

Table 8 Continued

Variable	Scale Direction— Higher scores on the variable indicate:	Method	Factor Loading	Question(s) or Item(s)
Inferiority	More inferiority	PCA	.946	How inferior did you feel?
			.946	How inadequate did you feel?
Guilty	More guilt			How guilty did you feel?
Longing	More longing			How much did you long for the envied advantage?

Coded

See Appendix D for descriptions of the individual emotions codes

Note. Composite variables are in boldface.

Self-rated emotions. Those emotions that were used as indicators to differentiate the envy types in the taxometric and latent class analyses were excluded from this analysis (unfair, frustrated, pleasant, cold toward the envied, hoped the envied would fail, inspired by the envied). Because the only direct measure of feelings of unfairness—the question, “how unfair did you feel the situation was?”—had to be excluded, the degree to which the participant believed the envied person deserved the advantage was used to measure (un)fairness instead. Note that this measure is expected to negatively predict hostile envy. Feelings of motivation were not directly measured. Based on an inspection of the bivariate correlations between the rated emotions (Table 9), four emotion composites were created, intensity of envy, feelings of ill will, affiliative feelings and feelings of inferiority (see Table 8 for details).

Table 9. *Bivariate Correlations Between Rated Emotions*

Indicator	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]
[1] Emotional Intensity	—	.70	.49	.50	.28	.38	.30	-.20	-.08	.41	.43	.33	.18	-.13
[2] Envious	.70	—	.48	.48	.23	.36	.43	-.11	-.03	.34	.38	.20	.15	-.05
[3] Inadequate	.49	.48	—	.79	.44	.48	.35	-.01	.06	.24	.25	.12	.07	.01
[4] Inferior	.50	.48	.79	—	.37	.46	.34	-.13	.08	.31	.31	.17	.08	-.07
[5] Guilty	.28	.23	.44	.37	—	.33	.19	.12	.22	.06	.08	-.01	.00	.02
[6] Helpless	.38	.36	.48	.46	.33	—	.30	-.05	.01	.22	.27	.17	.07	-.08
[7] Longing	.30	.43	.35	.34	.19	.30	—	-.11	.06	.12	.20	.03	.04	.13
[8] Friendly toward Envied	-.20	-.11	-.01	-.13	.12	-.05	-.11	—	.60	-.52	-.51	-.46	-.38	.40
[9] Admire Envied	-.08	-.03	.06	.08	.22	.01	.06	.60	—	.43	-.37	-.42	-.34	.41
[10] Angry at Envied	.41	.34	.24	.31	.06	.22	.12	-.52	-.43	—	.82	.70	.50	-.44
[11] Resented Envied	.43	.38	.25	.31	.08	.27	.20	-.51	-.37	.82	—	.67	.47	-.38
[12] Disgusted by Envied	.33	.20	.12	.17	-.01	.17	.03	-.46	-.42	.70	.67	—	.56	-.44
[13] Wanted to Hurt Envied	.18	.15	.07	.08	.00	.07	.04	-.38	-.34	.50	.47	.56	—	-.30
[14] Envied Deserved	-.13	-.05	.01	-.07	.02	-.08	.13	.40	.41	-.44	-.38	-.44	-.30	—

Note. Significant correlations ($p < .05$) are in boldface.

These emotion measures were then entered into a main effects only model predicting envy type, along with gender, which was non-significant and was dropped.

The four hypothesized effects were each assessed against a significance level of .05. The four exploratory effects were each assessed against a significance level of $.05/4 = .0125$.

The final Hessian matrix was not positive definite for this model, and the estimated

variance in the intercepts was 0, so the intercepts were constrained to be equal (Singer & Willett, 2003). The results are displayed in Table 10.

Table 10. *Models predicting Envy Type from the Self-Rated Emotions*

Effect	Dichotomous Envy Type			Continuous Envy Type			
	Odds Ratio	<i>t</i>	<i>p</i>	<i>b</i>	<i>df</i>	<i>t</i>	<i>p</i>
Hypothesized							
Helpless	1.745	2.159	.032*	0.039	335.722	2.658	.008**
Envied Deserved	0.359	-3.309	.001**	-0.075	333.504	-4.301	< .001**
Ill Will	4.666	5.791	< .001**	0.172	336.017	9.382	< .001**
Affiliative	0.316	-4.064	< .001**	-0.087	334.882	-5.256	< .001**
Exploratory							
Intensity of Envy	2.155	2.278	.023	0.048	326.957	2.869	.004*
Inferior	1.245	0.569	.570	0.009	335.159	0.539	.591
Guilty	0.813	-0.894	.372	-0.005	335.736	-0.358	.721
Longing	1.399	0.961	.337	0.020	335.715	1.391	.165
				Estimate	Wald Z	<i>p</i>	
Intercept	Fixed at 0			0.008	1.430	.077	
Variance							

Note. $N = 345$. $df = 335$ for all fixed effects in the Dichotomous Envy Type Model.

* $p \leq .05$ for hypothesized effects or $p \leq .0125$ for exploratory effects. ** $p \leq .01$ for a priori effects or $p \leq .0025$ for exploratory effects.

The hypothesized relationships between envy type and helplessness, unfairness (envied deserved), ill will, and affiliative feelings were all significant. Type of envy was not significantly predicted by intensity of envy, or by feelings of inferiority, guilt, or longing. These effects were robust when tested with the continuous probability of envy

type (Table 10), except for a non-hypothesized significant effect where more intense envy feelings were associated with a higher probability of hostile envy.

Emotions in the written descriptions. Each emotion was given a code of 1 if the majority of the coders agreed that the emotion was mentioned by the participant in the written description, otherwise it was given a code of 0. The motivation item was coded +1 if the participant indicated their motivation increased and -1 if motivation decreased. Mention of specific emotions were fairly rare and the most frequently mentioned emotion, sadness, occurred in only 49 out of 344 valid cases. The item measuring helplessness did not achieve sufficient reliability to be used. Ill will was represented by coded hostility. Affiliative feelings were represented by mention of feeling happy for the envied person. Also measured were unfairness, inferiority, guilt or shame, longing, feeling that the envied person didn't appreciate his or her advantage, frustration, worry, sadness, lonely, betrayed, surprised, and annoyed. Betrayed and surprised occurred only once each so they were excluded from the analysis.

The coded emotions were entered into a main effects only model predicting envy type. Gender was not significant, and was dropped. The hypothesized effects were each assessed against a significance level of .05. The nine exploratory effects were each assessed against a significance level of $.05/9 = .00556$. The results are displayed in Table 11.

The hypothesized relationships between envy type and unfairness, ill will, and affiliative feelings were supported. The hypothesized relationship between benign envy and motivation was not significant however. Type of envy was not significantly predicted by feelings of inferiority, guilt, longing, feeling that the envied doesn't

appreciate the advantage, frustration, worry, sadness, lonely, or annoyed. These effects were robust when tested against the continuous probability of envy type (Table 11).

Table 11. *Models predicting Envy Type from the Coded Emotions*

Effect	Dichotomous Envy Type			Continuous Envy Type			
	Odds Ratio	<i>t</i>	<i>p</i>	<i>b</i>	<i>df</i>	<i>t</i>	<i>p</i>
Hypothesized							
Unfair	10.571	2.935	.004**	0.429	307.761	3.262	.001**
Hostility	3.083	2.981	.003**	0.213	313.997	3.213	.001**
Motivation	0.682	-0.550	.583	-0.071	310.663	-0.791	.430
Happy for Envied [†]	0.000	-34.750	< .001**	-0.278	292.477	-2.129	.034*
Exploratory							
Inferior	0.296	-2.065	.040	-0.116	311.185	-1.715	.087
Guilt/Shame	0.434	-1.013	.312	-0.063	308.342	-0.374	.709
Longing	0.743	-0.586	.558	-0.035	307.804	-0.380	.704
Lack of Appreciation	4.743	1.548	.123	0.284	290.967	1.995	.047
Frustration	0.728	-0.266	.790	-0.017	289.784	-0.130	.896
Worry	5.858	1.510	.132	0.352	266.870	1.684	.093
Sad	1.295	0.724	.469	0.083	297.436	1.402	.162
Lonely	1.185	0.218	.828	0.014	289.305	0.104	.917
Annoyed	8.199	2.076	.039	0.339	308.476	1.975	.049
	Estimate	Wald Z	<i>p</i>	Estimate	Wald Z	<i>p</i>	
Intercept Variance	0.578	1.482	.069	0.036	2.697	.004**	

Note. [†]This code only occurs in benign cases. *df* = 314 for all fixed effects in the Dichotomous Envy Type Model.

**p* ≤ .05 for hypothesized effects or *p* ≤ .00556 for exploratory effects. ** *p* ≤ .01 for a priori effects or *p* ≤ .00111 for exploratory effects.

Emotions summary. All of the hypothesized relationships between emotions and envy type were found except for the hypothesized negative relationship between motivation and hostile envy. None of the emotions about which no a priori hypotheses were made significantly predicted envy type.

Of those emotions that were measured by both self-report and coded for their presence in the written descriptions—unfairness, ill will, affiliative feelings, inferiority, guilt, and longing—unfairness, ill will, and affiliative emotions predicted envy type in the expected direction across both types of emotion measures and both types of outcome measure.

Of those emotions measured only by self-report—intensity of envy and helplessness—only helplessness significantly predicted envy type, in the expected direction, across both model types. Intensity of envy was significant in the continuous probability of envy type model, but missed significance after correction for multiple comparisons in the dichotomous envy type model. Nonetheless it may be worth looking into further in the future.

None of the emotions that were measured only by presence coding—frustration, worry, sad, lonely, annoyed, envied doesn't appreciate—significantly predicted envy type in either model.

Responses. Hostile envy was hypothesized to be associated with responses that deprive the envied person of the advantage—pulling the envied down responses—while benign envy was hypothesized to be associated with responses that benefit the envier without depriving the envied—raising the self up responses.

Table 12. *Variables Used to Test the Response Hypotheses*

Variable	Scale Direction— Higher scores on the variable indicate:	Method	Question(s) or Item(s)
Self-Rated			
Pull Down Responses	More use of pull down responses	Average	To what degree did you talk negatively about the envied person behind their back? How much did you want to hurt the person you envied?
Raise Self Up Responses	More use of raise self up responses	Average	To what degree did you try harder to achieve your own goals? Did you try to get the person you envied involved in your efforts to achieve your goals (e.g. ask them for help) To what degree did you attempt to imitate the envied person?

See Appendix B for descriptions of the individual response questions

Coded

Hostile - Beneficial Responses (Coded)	More indication/confidence of beneficial responses in qualitative data	Sum	Beneficial responses in the descriptions (coded +1) Hostile responses in the descriptions (coded -1) Beneficial responses in the open-ended answers (coded +1) Hostile responses in the open-ended answers (coded -1)
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See Appendix D for descriptions of the individual response codes

Note. Composite variables are in boldface.

Averaged variables ignored missing data, so individual cases include only those measures for which there was data available.

Self-rated responses. Of the measured responses, talking negatively about the envied person behind his or her back—in other words, malicious gossip—pulls the envied down by depriving him or her of the social benefits of the advantage so it was expected to be more likely to occur with hostile envy. How much the participant wanted to hurt the envied was also expected to predict hostile envy. While this was not an actual response, it is likely that, in the normal course of envy, several responses are considered and most or all are then discarded. Actually hurting the envied person should be associated with hostile envy, but this response is probably so rare as to not be worth measuring. Therefore, wanting to hurt the envied, even if that option was ultimately discarded, was treated as a pull down response. The responses: tried harder to achieve your goals, imitated the envied, and got the envied involved in helping you achieve your goals, function to raise the envier to the superior level of the envied so they were expected to be more likely to occur with benign envy. Complimenting the envied was also expected to be associated with benign envy, but it was not included in the analysis on self-rated responses because it had been used to differentiate the envy types in the taxometric and latent class analyses. The response of saying something mean or hurtful to the envied was also measured, but though it is hostile in nature, it does not function to harm the envied in the eyes of others, or to otherwise deprive the envied of the advantage. If anything it alerts others, especially the envied, to the fact that one is envious, thus putting them on guard against future attempts to diminish the relative superiority of the envied. Therefore, saying something mean to the envied was not included in the pull down responses. Complaining to someone is another type of response, but no a priori predictions about it were made. On the one hand hostilely envious people who have

convinced themselves the situation is truly unjust, and who are trying to convince the social environment of that as well, might view their communications as complaints, rather than as gossip. On the other hand complaining could be a way that benignly envious people express their need to potential helpers. Therefore, no predictions were made about an association between complaining and envy type.

To first look at the overall relationships between envy type and pulling the envied down vs. raising the self up types of responses, composite variables were created from the self-report measures (see Table 12 for more details). Pulling the other down, raising the self up, gender, and all 2-way interactions were initially included. The final Hessian Matrix was not positive definite and the intercept variance estimate was zero so the variances were constrained to be equal (Singer & Willett, 2003). Neither the main effect of gender, nor its interaction with either of the composite response variables was significant (all $p_s \geq .257$) so they were removed from the model. The interaction between raising the self up and pulling the envied down responses was $p = .067$ so it was retained in the model.

In the resulting model the main effect of raising the self up was not significant, $OR = 0.914$, $t(342) = -0.594$, $p = .553$, but the main effect of pulling the other down was significant, $OR = 4.413$, $t(342) = 7.318$, $p < .001$. The two-way interaction between the response types was not significant, $OR = 1.541$, $t(342) = 1.805$, $p = .072$.²⁵ When tested for robustness against the continuous probability of envy type, the non-significance of the main effect of raising the self up was robust, $b > 0.001$, $t(338.335) = 0.004$, $p = .997$, and the significant main effect of pulling the envied down was also robust, $b = 0.231$,

²⁵ Intercept variance = 0.377, Wald Z = 0.867, $p = .193$.

$t(341.986) = 13.400, p < .001$. In this model the interaction between the response types was also significant, $b = 0.047, t(339.048) = 2.661, p = .008$.²⁶

Though the two-way interaction between the response types was not robust across outcome measures, the fact that both p values were below .10 in both models, and below .05 in one model, suggests that further investigation of the effect is worthwhile, though any conclusions must be tentative.

To delve into this potential interaction, the relationship between pulling down responses and the model predicted probability of hostile envy was plotted at the mean, and one standard deviation above and below the mean, on raise self up responses in Figure 5. The positive relationship between pull down responses and hostile envy was stronger when raise self up responses were also being used than when they weren't. Only pull down, not raise up, responses predicted envy type, but that effect was stronger at high levels of raise up responses than at low levels. There was more hostility when both pull down and raise self up responses were high than when pulling down was high but raising the self up was not. When pulling the envied down was low, hostility was also low, regardless of the level of raising the self up.

²⁶ Intercept variance = 0.023, Wald $Z = 2.316, p = .010$.

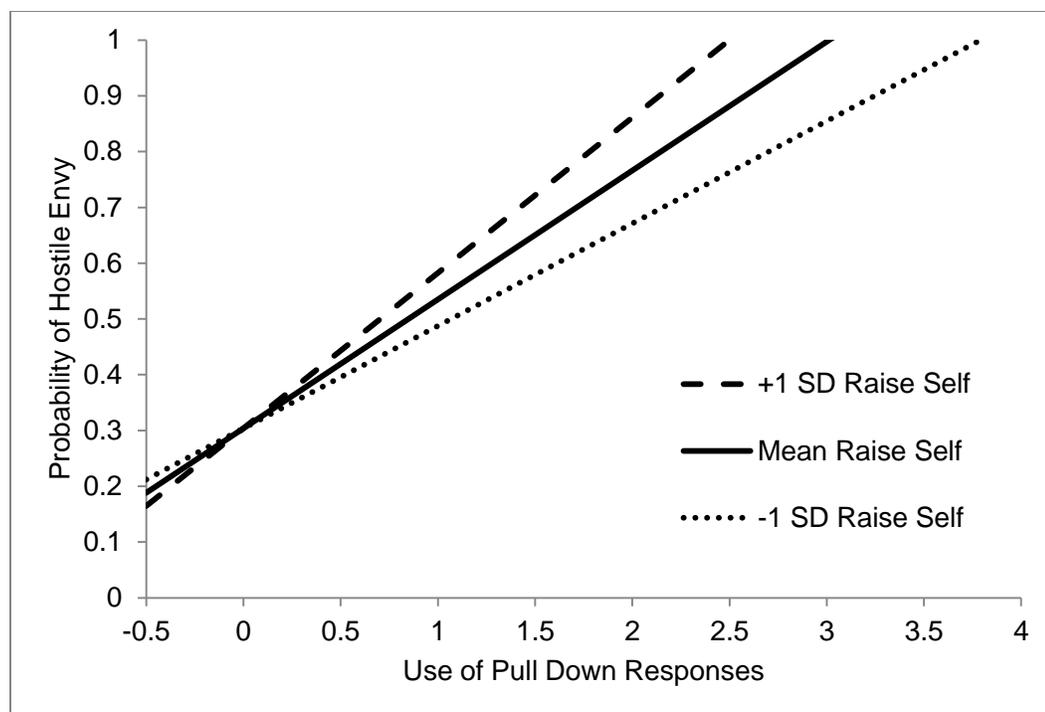


Figure 5. Interaction between raise the self up and pull the envied down response types.

To investigate the relationships between the individual responses and the envy types, all of the self-rated responses, except for those used to differentiate the classes in the taxometric and latent class analyses, were included in a single model. Due to the large number of factors, instead of including all two-way interactions, interactions were only included for those responses that seemed likely to interact. The interaction between wanting to hurt the envied and saying something mean to the envied, and the interaction between wanting to hurt the envied and gossiping about the envied, were both included because a person who wants to hurt another may do so by saying something mean or by gossiping about him or her. Also included were the interactions between trying harder and imitating the envied, and trying harder and soliciting aid from the envied, because a person who tries harder may do so by imitating or asking for help from a successful other. The final Hessian matrix was not positive definite for this model, and the

estimated variance in the intercepts was 0, so the intercepts were constrained to be equal (Singer & Willett, 2003). None of the two-way interactions were significant (all $ps \geq .559$) so they were removed from the model.

The resulting model was unable to converge even after the intercepts were constrained to be equal and the maximum iterations was increased by a factor of 10 so this model was assessed using logistic regression instead. Though the estimation algorithms for logistic regression and generalized linear mixed models differ in SPSS, the underlying linear model with a logit link function is the same for both methods given that the intercepts are constrained to be equal in the mixed model.

Table 13 shows the results of the logistic regression model. The hypothesized effects were each assessed against a significance level of .05, and the two exploratory effects were each tested against $.05/2 = .025$. There was no prediction about how, or if, complaining about the situation would relate to envy type. In fact complaining significantly predicted hostile envy. There was also no prediction about being mean to the envied, and this effect did not significantly predict envy type. All other significant effects were in the hypothesized direction except for trying harder, which predicted hostile envy, rather than benign envy, as hypothesized. Imitating the envied, which was hypothesized to be negatively associated with hostile envy, was not significant in either model. These effects were robust when tested with the averaged probability of hostile envy²⁷.

Table 13. *Models predicting Envy Type from the Self-Rated Responses*

²⁷ When “want to hurt the envied,” the only item in this model that isn’t actually a response, was left out, the results were the same except that the main effect of “say something mean to the envied” reached significance with both the dichotomous and continuous outcome models.

Effect	Dichotomous Envy Type			Continuous Envy Type			
	OR	Wald Z	p	b	df	t	p
Hypothesized							
Want to hurt	4.139	7.421	.006	0.112	192.765	4.856	<.001
Talk behind back (gossip)	2.350	10.549	.001	0.111	189.202	4.801	<.001
Try harder	3.460	5.709	.017	0.118	209.076	3.072	.002
Solicit aid from envied ^a	0.164	4.263	.039	-0.140	206.599	-2.549	.012
Imitate envied	0.846	0.532	.466	0.000	196.204	-0.022	.982
Exploratory							
Say something mean	1.578	2.723	.099	0.047	190.882	2.127	.035
Complain about situation ^a	5.981	14.149	<.001	0.217	91.154	4.798	<.001
				Estimate	Wald Z	p	
Intercept variance	Not Estimated			0.034	3.115	.001	

Note. ^a Categorical predictor.

Responses in the written descriptions. To look at the overall relationship between envy type and pull down vs. raise self up types of responses, a single variable measuring the overall harm/benefit of the coded responses was created. Responses were coded as hostile or beneficial based on both the written descriptions and the open-ended answers. Raise self up responses were given a positive valence (+1) and pull down responses were given a negative valence (-1).²⁸ The raise self up responses in the descriptions, pull envied down responses in the descriptions, raise self up responses in the answers, and pull envied down responses in the answers variables were summed.

²⁸ The criteria used by the coders was not explicitly defined as raising the self up versus pulling the envied down. See Appendix D for the coding rules.

Positive scores indicate more mention of/confidence of a raise self up response. Negative scores indicate more mention of/confidence of a pull envied down response. A score of 0 can indicate no response mentioned, a balance between raise self and pull down responses, or a lack of clarity/confidence in the appropriate type of any responses mentioned.

This measure of response type was included in a model with participant gender and the two-way interaction between response type and gender. The interaction was not significant, $p = .798$, so it was dropped from the model. Gender was also not-significant, but it was retained in the model because $p = .078$.

Dichotomous envy type was significantly predicted by response type, $OR = 0.471$, $t(342) = -5.164$, $p < .001$, with the probability of hostile envy being lower the more indication there was of a raise self up response, and the less indication of a pull envied down response, in the qualitative data. Gender did not quite reach significance, $p = .055$.²⁹ The effect of response type was robust when tested with the continuous probability of envy type, $b = -.114$, $t(323.901) = -5.766$, $p < .001$. Gender did reach significance in this model, $b = .111$, $t(232.477) = 2.174$, $p = .031$, where women were more likely to experience hostile envy than men.³⁰

In addition to being coded by type, responses that were mentioned in the written descriptions were also categorized by the particular action taken. Several of the original code categories that would have constituted pulling down types of responses, such as talking negatively about the envied person behind their back and devaluing the quality or value of the advantage, were coded too rarely to be used in analysis. The only pulling

²⁹ Intercept variance = 0.467, Wald $Z = 1.323$, $p = .093$.

³⁰ Intercept variance = .039, Wald $Z = 3.032$, $p = .002$.

down response that was coded frequently enough to include in the analysis was “other social-hostile responses”. Hostile envy was expected to be more likely when the participant reported using social-hostile responses. The response categories that qualified for analysis and that constituted raising the self up responses were congratulated the envied, expended effort, acted nice toward the envied, and asked the envied for help. No hypotheses were made about what type of envy, if any, would be associated with hiding one’s envy, distancing oneself from the envied, acting less available to the envied, other non-hostile responses, telling others about one’s envy, or telling the envied about one’s envy. The hypothesized effects were each assessed against a significance level of .05. The six exploratory effects were each assessed against a significance level of $.05/6 = .0083$. Gender was not included in this model because it did not interact with response type in the previous models. The results of this model for both the dichotomous envy type outcome and the continuous probability of envy type outcome are displayed in Table 14.

Table 14. *Models predicting Envy Type from the Coded Responses*

Effect	Dichotomous Envy Type			Continuous Envy Type			
	<i>OR</i>	<i>t</i>	<i>p</i>	<i>b</i>	<i>df</i>	<i>t</i>	<i>p</i>
Hypothesized							
Other social-hostile	9.621	1.872	.062	0.431	320.822	2.474	.014*
Congratulate	0.000	-30.961	< .001**	-0.182	295.889	-1.050	.295
Expend effort	>999.999	24.589	< .001**	0.725	292.998	2.710	.007**
Be nice	0.882	-0.115	.908	0.040	325.512	0.208	.836
Ask envied for help	0.000	-26.626	< .001**	-0.283	305.504	-1.288	.199
Exploratory							
Hide envy	1.537	0.760	.448	0.086	320.360	0.863	.389
Distance self	6.024	2.144	.033	0.344	329.983	2.298	.022
Less available	1.522	0.460	.646	0.059	312.842	0.362	.718
Other non-hostile	0.000	-21.221	< .001**	-0.321	299.480	-1.198	.232
Tell others	1.246	0.262	.793	0.035	306.619	0.268	.789
Tell envied	0.650	-0.361	.718	-0.083	319.775	-0.474	.636
	<i>Estimate</i>	<i>Wald Z</i>	<i>p</i>	<i>Estimate</i>	<i>Wald Z</i>	<i>p</i>	
Intercept variance	.468	1.357	.088	0.039	2.644	.004**	

Note: *df* = 330 for all fixed effects in the Dichotomous Envy Type Model.

p* < .05 (after correction where applicable), *p* < .01 (after correction where applicable)

The only coded response that significantly predicted envy type across both outcome variable types was expending effort, which positively predicted hostile envy. The positive relationship between expending effort and hostile envy is opposite the hypothesized direction, but consistent with the effect of trying harder as measured by

self-report. In the dichotomous envy type model congratulating the envied, asking the envied for help, and other non-hostile responses were all negatively associated with hostile envy, as hypothesized, but those effects did not replicate with continuous probability of envy type as the outcome variable. In the continuous envy type model other social-hostile responses were positively associated with hostile envy, as hypothesized, but that effect was not robust with the dichotomous envy type outcome variable. Distancing oneself from the envied did not make the corrected $\alpha = .0125$ cutoff, but the p was $< .05$ in both models, so the role of distancing in predicting hostile envy may be a topic for future research.

Responses summary. On the whole the hypothesized association between envy type and response type was supported; hostile envy was associated with responses aimed at pulling the envied person down and benign envy was associated with responses aimed at improving one's own position in a non-hostile way, though a few of the hypothesized benign responses were not significant. There was one very important exception; trying harder, which was expected to positively predict benign envy, was instead robustly associated with more hostile envy.

Of those responses that were measured both by participant rating and by qualitative coding, the only response that was significant across both measures and both model types was trying harder, and the effect was opposite the predicted direction; trying harder was associated with a higher probability of *hostile* envy.

Self-rated gossip behavior significantly predicted hostile envy across both model types, and the coded measure of social hostile responses, which may measure something

similar, significantly predicted hostile envy in the continuous, but not the dichotomous, model.

Asking for help from the envied significantly predicted benign envy in both self-report models and in the dichotomous model on the coded data.

Whether the participants mentioned complaining to someone in their written descriptions didn't differentiate envy type, but when they were asked if they complained to someone, answering that they had was significantly associated with more hostile envy across both outcome types.

Of the responses that were self-rated, but not coded, only wanting to hurt the envied was significant across both outcome types, positively predicting hostile envy. Neither saying something mean to the envied, nor imitating the envied, significantly predicted envy type across both outcome types.

None of the responses that were coded, but not self-rated, were robustly significant across both outcome types.

Whole process. Particular elements of the situation were hypothesized to be related to particular responses, and felt emotions were hypothesized to mediate those relationships. To test this hypothesis, a separate mediation analysis was conducted for each of the six self-rated responses that were measured on seven-point scales. There were not enough coded responses mentioned in the written descriptions to attempt similar analyses on those.

Mediation analysis method. Envy type was not relevant to the mediation analyses so all self-rated emotions and responses were included, whether or not they were used to differentiate the envy types in the taxometric and latent class analyses.

The process hypothesis says only that emotions mediate the effects of the situation on the response; no particular situation-emotion-response pathways were specified. The search for significant pathways was therefore exploratory. Although this means that a large number of tests were performed, two-tailed α s of .05 (or 95% confidence intervals, where relevant) were used for all significance tests with the exception of those including a multicategorical variable. The exploratory nature of these analyses means that a Type II error would be more harmful, and a Type I error, less harmful, than they would be in a test intended to confirm a hypothesis.

To identify candidate situation and emotion variables to include in each mediation analysis, separate hierarchical linear models were performed predicting the responses from the situation variables, and from the emotions. First, main effect only models including all of the rated emotions were performed, separately, for each of the responses. Those emotions that significantly predicted a particular response, in the presence of all of the other emotions, were identified as potential mediators of that response.

There were a very large number of situational variables measured, some of which were categorical with several categories, and some of which were only measured on a portion of the cases (if other people were present when the envy was felt). Therefore, instead of including all of the situation variables at once, they were divided into four groups and tested, first, as four separate main effects only models. One group consisted of all the situation variables that were only measured when other people were present at the time of the envy experience. The second group consisted of attributes of the envied person and of the participant (e.g. age, popularity). The third group consisted of measures relating to the association of the participant and the envied person, as well as

the participant's perception of the envied. The fourth group included everything else, but primarily measures relating to the envied advantage. Those situation variables that significantly predicted a particular response in the presence of the other situation variables in its group were then entered in a single model together. The situation variables that were significant in this second-level model were identified for inclusion in the mediation analysis for that response. Table 15 lists the situation and emotion variables included in the mediation analysis for each response variable.

A few of these preliminary HLM analyses had Hessian Matrices that were not positive definite and variance estimates of zero. The intercepts of those models were fixed to be equal (Singer & Willett, 2003).

The two multicategorical situation variables, relationship between the participant and the envied person, and domain of the envy, were effect coded. Because the mediation analyses did not estimate the indirect effect of the reference category, the least conceptually interesting category was chosen as the reference category for each variable—strangers for the relationship variable and general achievement for the domain variable. The significant other relationship category contained only six cases so it was dropped, resulting in five relationship effect code variables; family, friend, classmate, acquaintance, and coworker. Significance tests of all effects involving a relationship effect code variable were conducted at $.05/5 = .01$.

Table 15. *Variables Included in the Mediation Analyses*

Response Variable (Outcome)	Situation Variables (Predictor)	Emotion Variables (Mediator)
Want to Hurt the Envied	Dependence of Attainability	Unfair Situation
	Dislike Envied	Disgust Toward Envied
Compliment the Envied	Hurt if Relationship Damaged	Unfair Situation
	Similar to Envied	Friendly Toward Envied Admired Envied
Say Something Mean to Envied	Others Detect Envy*	Inferior
	Similar to Envied	
	Relationship to Envied	
Talk Negatively Behind Envied's Back	Dependence of Attainability	Disgust Toward Envied
	Others Detect Envy*	Cold Toward Envied
	Like Envied	
	Dislike Envied	
	Others Were Present	
	Relationship to Envied	
Try Harder to Achieve Own Goals	Participant Deserved Advantage	Frustrated
	Dependence of Attainability	Longing
	Domain of Envy	Inspired by Envied
Imitate Envied	Participant's popularity	Inspired by Envied
	Often Compared with Envied	Cold Toward Envied

Note. * Variable only measured if people other than the participant and the envied were present when the envy was experienced.

The original domain measure included 18 categories. To reduce the number of domain categories, the participant's self-categorization was compared with the coded domain from the written descriptions, and several discriminant analyses were run to assess how closely related the self-categorized domains were. Based on these, "other

material possessions” was combined with “money”, “other social relationships” was combined with “sexual or romantic partner”, and “general knowledge or education level” was combined with “general intelligence”. All remaining categories with 13 cases or less were then dropped. The eight remaining domain categories were represented with seven effect code variables; “material resources”, “relationships”, “physical attractiveness”, “other physical attributes”, “physical talents or skills”, “general intelligence/general knowledge/education”, and “popularity/social status”. Significance tests of all effects involving a domain effect code variable were conducted at $.05/7 = .00714$.

Some items were only measured if people other than the participant and the envied were present when the envy was experienced, which occurred in 54.2% of cases. To ensure that the results of analyses involving one of these variables weren’t specific to situations where others were present, these analyses were repeated with the relevant variable excluded. Additionally, the dichotomous variable “others were present” was only included in analyses that were not restricted to cases where others were present.

All scale-level situation variables and emotions were standardized prior to analysis. The mediation analyses excluded cases with missing data on any of the variables in the model, so the value “0” represents the mean of the entire sample, not necessarily the mean of the cases included in the analysis, and similarly “1” is the standard deviation for the entire sample, though not necessarily for the cases in the analysis.

To account for the assumption of no interaction between predictors and mediators, hierarchical linear models for each response were assessed for any significant two-way interactions between situations and emotions. Significant interactions were included in

the mediation analyses as potential moderators of the mediation effect (Preacher, Rucker, & Hayes, 2007).

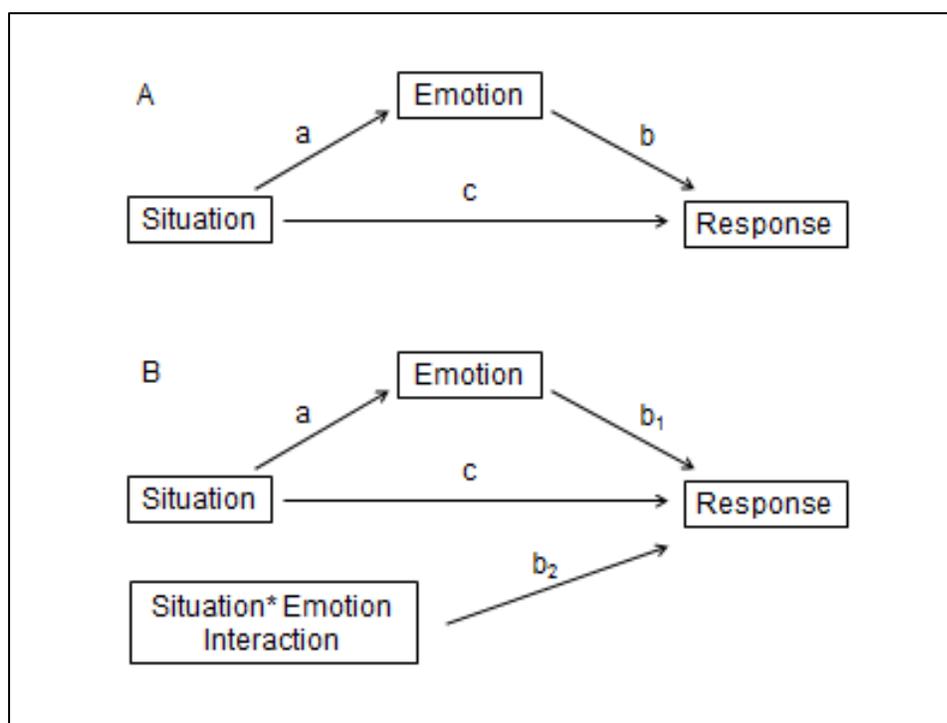


Figure 6. Panel A (top) diagrams a basic mediation model. Panel B (bottom) diagrams a moderated mediation model.

Situation-emotion coefficient estimates (path a in Figure 6) were obtained from HLMs predicting each emotion in a particular mediation analysis from all the situation variables in that analysis. Emotion-response coefficient estimates (path b in panel A and b_1 in panel B), situation*emotion – response coefficients (path b_2 in panel B), and direct effect estimates (path c) were obtained from HLMs predicting the responses from all relevant situation variables, emotions, and interactions. Total effect estimates were obtained from HLMs predicting the responses from the situation variables only. Indirect effects that were not modified by a situation*emotion interaction were estimated by multiplying coefficient a by coefficient b. Indirect effects that were modified by a

situation*emotion interaction were estimated with $a*(b_1 + b_2*X)$, and were assessed at $X = 0$ and 1 for dichotomous situation variables, and at $X = -1, 0,$ and $+1$ for scale-level situation variables. Each indirect effect was assessed with all other predictors in the model treated as control variables.

The significance of indirect effects was assessed with Monte Carlo confidence intervals (Preacher & Selig, 2012). To account for the non-independence of observations, the Monte Carlo coefficient estimates were drawn from a multivariate normal distribution based on the actual coefficient estimates and their variances and covariances (K. Preacher, personal communication). See Appendix F for example R code used to compute confidence intervals for direct effects and conditional direct effects .

Mediation analysis results. Several emotions significantly mediated relationships between situations and responses³¹.

Want to hurt the envied. Earlier analyses showed that wanting to hurt the envied was associated with more hostile envy. A desire to hurt the envied was rare with 85.1% of the sample saying that they did not want to hurt the envied at all, and only 1.2% saying they wanted to hurt the envied intensely (Mean = 0.4, $SD = 1.131$, on a 0 to 6 scale). Both dependence of attainability of the advantage and dislike of the envied person significantly indirectly predicted wanting to hurt the envied through the mediating effect of feeling disgusted by the envied. A significant dislike by disgust interaction revealed that, at low levels of dislike, the indirect effect was not significant, but the effect increased with dislike such that the more disliked the envied person was, the more disgusted participants felt, and the more they wanted to hurt the envied. Feeling that the

³¹ Additional details regarding tests of interactions, p -values for total and direct effects, and confidence intervals for indirect effects can be found in Appendix E.

situation was unfair did not significantly mediate the effects of either dependence of attainability or dislike on wanting to hurt the envied.

Table 16. *Mediation Results – Want to Hurt the Envied*

X	Total Effect	Direct Effect	Mediator	Indirect Effect
Dependence of Attainability	.145*	0.067	Unfair	0.002
			Disgust Toward Envied	0.043*
Dislike Envied	.482*	0.188*	Unfair	-0.015
			Disgust Toward Envied	0.122*
Dislike * Disgust		0.281*	Disgust at Dislike = -1	-0.009
			Disgust at Dislike = 1	0.253*

Note. * $p < .05$.

Say something mean or hurtful to the envied. Earlier analyses did not detect a relationship between saying something mean to the envied and envy type. Saying something mean to the envied was also a rare response, with 84.9% of the sample saying that they didn't do this at all, and only 0.5% saying they did this completely (Mean = 0.41, $SD = 1.104$, on a 0 to 6 scale). Feelings of inferiority, the only potential mediator of this response that was tested, did not significantly mediate the effects of others detecting one's envy, similarity to the envied, or relationship to the envied, on saying something mean or hurtful to the envied.

Table 17. *Mediation Results – Say Something Mean to the Envied, Others Present Only*

X	Total Effect	Direct Effect	Mediator	Indirect Effect
Others Detect Envy	0.338*	0.314*	Inferior	0.000
Detect * Inferior		-0.142*		
Similar to Envied	-0.148	-0.151	Inferior	-0.003
Relationship to Envied				
Family	1.14*	1.063*	Inferior	-0.008
Friend	0.467	0.433	Inferior	-0.011
Classmate	0.184	0.117	Inferior	-0.035
Acquaintance	0.091	0.163	Inferior	-0.055
Coworker	-0.104	-0.290	Inferior	0.013

Note. * $p < .05$, except for the five relationship types which are each tested at $p < .01$.

Table 18. *Mediation Results – Say Something Mean to the Envied, Others Present or Absent*

X	Total Effect	Direct Effect	Mediator	Indirect Effect
Similar to Envied	-0.198*	-0.198*	Inferior	> -0.001
Relationship to Envied				
Family	0.795*	0.795*	Inferior	< 0.001
Friend	0.219	0.219	Inferior	< 0.001
Classmate	-0.119	-0.119	Inferior	> -0.001
Acquaintance	0.070	0.070	Inferior	> -0.001
Coworker	-0.334	-0.334	Inferior	< 0.001

Note. * $p < .05$, except for the five relationship variables which are each tested at $p < .01$.

Talk negatively about the envied person behind their back. Earlier analyses showed that talking negatively about the envied behind their back, or gossiping, was associated with more hostile envy. Gossiping was more common than the other two unkind responses, with 70% of the sample saying they didn't do it at all, and 3.2% saying they did it completely (Mean = 0.91, $SD = 1.674$, on a 0 to 6 scale). The effect of the presence of other people on gossiping was not significantly mediated by either disgust or coldness toward the envied. However, dependence of attainability, others detecting one's envy, liking the envied, disliking the envied, and relationship with the envied, all significantly indirectly predicted talking about the envied behind his or her back through the mediating effect of feeling cold toward the envied. The only indirect effect that was negative was liking. Liking the envied led to feeling less cold toward him or her, and therefore to less gossiping, while advantages that were less attainable if the envied had them, others being able to tell the participant was envious, and disliking the envied, all led to more coldness, and more gossiping. The participants felt colder toward envied friends and family, than non-friends and non-family, leading to more gossiping about them. When the ability of others to detect one's envy, which was only measured when others were present, was excluded, and the presence of others was included in the analysis, a significant family by cold interaction indicated that the indirect effect of family member status on gossiping, through cold feelings, was stronger for family members than non-family members. Feelings of disgust toward the envied person did not significantly mediate the effects of any of the situation variables on gossiping about the envied.

Table 19. *Mediation Results – Talk about Envied Behind Back, Others Present Only*

X	Total Effect	Direct Effect	Mediator	Indirect Effect
Dependence of Attainability	0.252*	0.095	Disgust Toward Envied	0.012
			Cold Toward Envied	0.147*
Others Detect Envy	0.307*	0.122	Disgust Toward Envied	0.017
			Cold Toward Envied	0.201*
Detect * Cold		-0.129		
Like Envied	-0.710*	-0.469*	Disgust Toward Envied	-0.030
			Cold Toward Envied	-0.228*
Dislike Envied	0.448*	0.185	Disgust Toward Envied	0.029
			Cold Toward Envied	0.295*
Relationship to Envied				
Family	1.729*	1.126	Disgust Toward Envied	0.083
			Cold Toward Envied	0.673*
Friend	1.279*	0.546	Disgust Toward Envied	0.084
			Cold Toward Envied	0.695*
Classmate	0.033	0.005	Disgust Toward Envied	0.005
			Cold Toward Envied	0.062
Acquaintance	0.219	< .001	Disgust Toward Envied	0.083
			Cold Toward Envied	0.268
Coworker	0.637	0.379	Disgust Toward Envied	0.057
			Cold Toward Envied	0.253

Note. * $p < .05$, except for the five relationship variables which are each tested at $p < .01$.

Table 20. *Mediation Results – Talk about Envied Behind Back, Others Present or Absent*

X	Total Effect	Direct Effect	Mediator	Indirect Effect
Others Present	0.344*	0.351*	Disgust Toward Envied	> -0.001
			Cold Toward Envied	---
Others Present * Cold		0.380*	At Others Present = 0	-0.006
			At Others Present = 1	-0.011
Dependence of Attainability	0.179*	0.067	Disgust Toward Envied	0.014
			Cold Toward Envied	0.046*
Like Envied	-0.434*	-0.231	Disgust Toward Envied	-0.032
			Cold Toward Envied	-0.102*
Dislike Envied	0.565*	0.208	Disgust Toward Envied	0.033
			Cold Toward Envied	0.227*
Relationship to Envied*				
Family	1.376*	0.699	Disgust Toward Envied	0.085
			Cold Toward Envied	---
Family * Cold		0.365	At Family = 0	0.348*
			At Family = 1	0.630*
Friend	1.050*	0.559	Disgust Toward Envied	0.067
			Cold Toward Envied	0.242*
Classmate	0.101	0.225	Disgust Toward Envied	-0.007
			Cold Toward Envied	-0.084
Acquaintance	0.580	0.489	Disgust Toward Envied	0.059
			Cold Toward Envied	0.008
Coworker	0.551	0.395	Disgust Toward Envied	0.043
			Cold Toward Envied	0.044

Note. * $p < .05$, except for the five relationship types which are each tested at $p < .01$.

Try harder to achieve your own goals. Earlier analyses showed that trying harder to achieve one's own goals was associated with more hostile envy. Trying harder was the most commonly reported response with only 37.1% of the sample saying they didn't do it at all and 14.6% saying they did it completely (Mean = 2.83, *SD* = 2.393, on a 0 to 6 scale). Participants' own self-perceived deservingness, and the dependence of attainability, both significantly indirectly predicted trying harder through the mediating effect of frustration. Believing that one was deserving of the advantage, and advantages that were less attainable if the envied had them, both led to more frustration, and therefore to more effort. Dependence of attainability, and the domain of the envy, both significantly indirectly predicted trying harder through the mediating effect of feeling inspired by the envied. The effect of dependence of attainability was negative, so advantages that were less attainable if the envied had them led to less inspiration and less effort. Envy over desired relationships, sexual/romantic or otherwise, led to less inspiration than envy over other advantages, and therefore to less effort. Longing for the envied advantage did not significantly mediate the effects of any of the situation variables on trying harder to achieve one's goals.

Table 21. *Mediation Results – Try Harder*

X	Total Effect	Direct Effect	Mediator	Indirect Effect
Participant Deserved	0.448*	0.248	Frustrated	0.129*
			Longing	0.040
			Inspired by Envied	0.006
Dependence of Attainability	0.311*	0.285*	Frustrated	0.087*
			Longing	0.007
			Inspired by Envied	-0.051*

Table 21 Continued

X	Total Effect	Direct Effect	Mediator	Indirect Effect
Dependence of Attainability * Longing		0.367*	At Longing = -1 At Longing = 1	-0.010 0.024
Domain of Envy*				
Money/Material Possessions	-0.367	-0.153	Frustrated	-0.019
			Longing	-0.047
			Inspired by Envied	-0.125
Relationships	-1.329*	-1.270*	Frustrated	0.052
			Longing	0.001
			Inspired by Envied	-0.168*
Physical Attractiveness	-0.200	-0.295	Frustrated	-0.031
			Longing	0.043
			Inspired by Envied	0.094
Other Physical Attributes	0.558	0.717	Frustrated	-0.106
			Longing	-0.022
			Inspired by Envied	0.035
Physical Talents or Skills	1.223*	0.867	Frustrated	0.094
			Longing	0.081
			Inspired by Envied	0.141
Intelligence/General Knowledge	0.841	0.624	Frustrated	0.118
			Longing	0.007
			Inspired by Envied	0.091
Popularity/Social Status	-1.593*	-1.288	Frustrated	-0.093
			Longing	-0.036
			Inspired by Envied	-0.137

Note. * $p < .05$, except for the seven domain variables which are each tested at $p < .00714$.

Attempt to imitate the envied. Earlier analyses did not detect a relationship between attempting to imitate the envied and envy type. Attempting to imitate the envied was the least common of the beneficial responses with 66.1% of the sample saying they didn't do it at all and 14.6% saying they did it completely (Mean = 1.10, $SD = 1.764$, on a 0 to 6 scale). Neither feeling inspired by, nor cold toward, the envied significantly mediated the effects of the participant's popularity or the frequency of being compared to the envied, on attempting to imitate the envied.

Table 22. *Mediation Results – Imitate Envied*

X	Total Effect	Direct Effect	Mediator	Indirect Effect
Participant Popularity	0.210*	0.228*	Inspired by Envied	-0.054
			Cold Toward Envied	0.037
Often Compared with Envied	0.303*	0.267*	Inspired by Envied	0.038
			Cold Toward Envied	-0.006

Note. * $p < .05$

Compliment the envied person on their success. Earlier analyses showed that complimenting the envied, as measured by content coding of participants' written descriptions of the envy situation, was associated with more benign envy, though the self-rated measure of complimenting was excluded from those analyses. Complimenting the envied person was a fairly common response, with 44.8% of the sample saying they didn't do it at all and 12.9% saying they did it completely (Mean = 2.24, $SD = 2.328$, on a 0 to 6 scale). The degree to which the participants reported that they would feel hurt if their relationship with the envied was damaged, and the participants' similarity to the envied, both significantly indirectly predicted complimenting the envied through the

mediating effects of feeling friendly toward the envied and admiring him or her. The more participants said they would feel hurt if the relationship was damaged, and the more similar they were to the envied, the more admiring and friendly they felt, and the more likely they were to compliment him or her. Feeling that the situation was unfair did not significantly mediate the effects of either being hurt if the relationship were damaged or similarity to the envied on complimenting him or her.

Table 23. *Mediation Results – Complimented the Envied*

X	Total Effect	Direct Effect	Mediator	Indirect Effect
Hurt if Relationship Damaged	0.752*	0.447*	Unfair	0.017
			Friendly Toward Envied	0.178*
			Admire Envied	0.113*
Similar to Envied	0.249*	0.072	Unfair	-0.020
			Friendly Toward Envied	0.097*
			Admire Envied	0.105*

Note. * $p < .05$.

While situation variables were sometimes associated with several emotions and responses, no emotion significantly mediated more than one response. Feeling disgust toward the envied was associated with wanting to hurt him or her, feeling cold toward the envied was associated with gossiping about him or her, frustration and feeling inspired by the envied were associated with trying harder, and feeling friendly toward and admiring the envied were associated with complimenting him or her.

Discussion

There were four goals of the present study: (1) to use taxometric methods to assess the claim that there are two distinct forms of envy, hostile and benign; (2) to test three hypotheses, based on evolutionary functional reasoning, about the conditions that lead to one type of envy versus the other; (3) to investigate the process by which envy leads to a response, and the possible mediating role of emotions in that process; and (4) to explore the relationship between envy type and personality, health, and other individual differences. The outcome of each of these goals is discussed below.

Two Types of Envy

The results of the present study confirm that envy occurs in two distinct forms, a benign type and a hostile type. Two nonredundant taxometric procedures indicated that envy is better described by a two-class solution than a dimensional solution, and latent class analyses confirmed that the data were best fit by a two-class solution. The first class comprised 28% of the sampled envy experiences and it was higher on frustration, hoping the envied would fail at something, considering the situation to be unfair, and feeling cold toward the envied. The second class comprised 72% of the sampled envy experiences and it was higher on liking the envied, feeling inspired by the envied, feeling pleasant, and complimenting the envied. The first class consists of hostile envy and the second class consists of benign envy.

Evolutionary Functional Perspective

Based on the idea that hostile envy is about pulling the envied person down to the inferior level of the envier (Miceli & Caslelfranchi, 2007; Schoeck, 1969), and benign envy is about raising the envier up to the superior position of the envied (Parrott, 1991;

van de Ven, Zeelenberg, & Pieters, 2009), three hypotheses about when each of these responses would be most, or least, effective were derived from an evolutionary functional perspective. Of the three hypotheses, two were largely supported.

Attainability hypothesis. A benign response of attempting to raise oneself up to the superior level of the envied should benefit an envious person most when it is possible for the envier to gain the envied advantage for himself or herself without depriving the envied person of it. Therefore, benign envy was expected to be more likely for advantages that are easier to attain, and less likely for advantages that are harder to attain *because* the envied person already has them. Both of these predictions were supported. Self-reported measures of the attainability of the envied advantage, and the degree to which the attainability of the advantage depends on whether the envied person possesses it, both significantly predicted envy type in the predicted directions.

Relationship value hypothesis. If an envious person's relationship with the envied is valuable to him or her, then a hostile response could harm the envier by damaging that relationship, thereby depriving the envier of the benefits it provides. Therefore, benign envy was expected to be more likely to occur if the relationship with the envied person was valuable to the envier. This hypothesis was partially supported. A composite of self-reported measures of the degree to which the envier valued their relationship with the envied did significantly predict envy type in the hypothesized direction. According to inclusive fitness theory (Hamilton, 1964), biological relatedness should also indicate relationship value, but these results were mixed. In men, the expected relationship between kinship and benign envy was found with the dichotomous envy type outcome, but it was not robust when tested with the continuous probability of

envy type outcome, so the reliability of that effect is questionable. The true surprise was a robust effect in women that was opposite the predicted direction. When self-reported relationship value was controlled for, women were more likely to experience hostile envy towards kin than non-kin. Though this result is inconsistent with the relationship value hypothesis, it is consistent with a broader set of findings, discussed below (see Kin Envy in Women).

Social environment hypothesis. Malicious gossip and other social hostile responses are unlikely to be effective, and could instead reflect poorly on the envier, if the social environment favors the envied person over the envier. Therefore, benign envy was expected to be more likely to occur when the social environment liked the envied person more than the envier, and perceived the envied person as deserving of the advantage. This relationship was expected to be stronger for enviers that were higher in emotional intelligence because they would be better at assessing the feelings and beliefs of their social environment. Both of these predictions initially appeared to be supported. An analysis of a composite of items measuring the degree to which participants believed that others in the environment liked the envied relative to the envier, and believed the envied deserved the advantage, revealed that benign envy was indeed more likely in social environments that favored the envied. This effect interacted with participants' emotional intelligence as predicted; envy type was more strongly related to the social environment for people with higher emotional intelligence.

When the composite social environment measure was broken down into separate liking and deserving components, however, only the deserving component significantly predicted envy type. This finding casts doubt on the social environment hypothesis

because it is hard to accept that onlookers are susceptible to malicious gossip (or other social manipulation) about people they like, even from a source that they dislike, yet they are not susceptible to malicious gossip about people who deserve what they have attained, regardless of whether they are liked. Further, the deserving component was better accounted for by the participants' own perceptions of the deservingness of the envied than by their beliefs about the social environment's perceptions. Consequently, these results do not support the social environment hypothesis, suggesting instead that the envier's beliefs about the envied person's deservingness are directly related to envy type.

It is possible that a confound between deservingness of the envied and attainability of the advantage could account for the direct effect of deservingness on envy type. In order for the envied to deserve the advantage he or she must have done something to earn it, implying that the advantage is something that can be earned through a person's actions. If so, then the envied person might be able to teach the envier how to earn such an advantage. Because deserved advantages will often be attainable, and envied people might be able to help enviers learn how to attain them, deserved advantages should generally lead to benign envy. Advantages that are bestowed by chance or by luck are undeserved. There is little an envier can do to gain such advantages, so they will seem unattainable, and the "skill" of gaining them can't be taught, so the envied can't provide help. Therefore, undeserved advantages should more often lead to hostile envy. It is also possible that people who are more emotionally intelligent have more faith in their ability to successfully solicit help from an envied person, so the moderating effect of emotional intelligence on the relationship between

deservingness of the envied and envy type could also be accounted for by this explanation.

If this explanation for the direct effect of deservingness of the envied on envy type is correct then there should be some overlap in the variance in envy type that is accounted for by deservingness and by attainability. Direct measures of the proportion of variance accounted for by individual predictor variables are not available for hierarchical models, but the independent contribution of multiple predictors can be assessed by including them in a single model. When envy type was predicted from attainability, relationship value, and the social environment measure that includes both relative liking for the envied and other perceived deservingness, all three variables significantly and robustly contributed. When this analysis was repeated with the participant's perception of the envied's deservingness in the place of the social environment measure, attainability was still significant in the model predicting the dichotomous envy type outcome variable, but was no longer significant in the model predicting the continuous probability of envy type. Thus it seems that attainability and deservingness of the envied do share some variance.

Envy Process

Envy experiences often include a variety of felt emotions (Parrott, 1991; Smith & Kim, 2007). For envy to be functional, it should lead to an effective response to the relative inferiority being experienced by the envier, and the felt emotions are proposed to play a role in selecting that response, motivating its performance, and—as part of some responses—in signaling one's own superiority or trustworthiness to those observing the response. Individual responses are not mutually exclusive and more than one could be

used in concert, however hostile types of responses that alienate the envied would tend to decrease the effectiveness of benign responses that rely on assistance or cooperation from the envied, and benign responses requiring increased effort would be wasteful in the face of the hopeless situations in which hostile envy is expected. By narrowing the set of available responses, the two types of envy prevent the envier from employing responses that work in opposition to each other.

Process within type. Hostile envy was expected to be associated with feelings of injustice and of hostility towards the envied person, thereby motivating hostile responses aimed at removing his or her advantage, and with feelings of helplessness, thereby suppressing self-improving responses. Benign envy was expected to be associated with feeling motivated to enact self-improving responses, and with affiliative feelings toward the envied in order to learn from, get help from, or benefit by association with, him or her.

As expected, hostile envy was associated with feelings of injustice, hostility, and helplessness, and benign envy was associated with affiliative feelings. The expectation that feeling motivated would be associated with benign envy was not supported. Motivation was not measured by self-report, but content coding was used to measure whether participants explicitly stated in their written descriptions that their motivation level changed as a result of the envy experience. This measure was not significantly related to envy type. The lack of an effect could indicate either that motivation wasn't associated with envy type, or that changes in motivation were not a salient part of the envy experience and were therefore rarely mentioned, even if they occurred.

Hostile envy was also expected to be associated with greater use of responses aimed at pulling the envied down from his or her advantaged position, specifically malicious gossip and wanting to hurt the envied. By contrast benign envy was expected to be associated with greater use of responses aimed at raising the self up to the envied person's superior position, specifically trying harder to achieve one's own goals, being nice to the envied, complimenting the envied, soliciting help from the envied, and imitating the envied. When the various responses were collapsed into a pulling down type and a raising the self up type, the predicted association between the responses and envy type was found for the content coded response measures. The picture was more complicated for the self-reported response measures. Use of pulling down responses did relate to envy type as predicted, but use of raising the self up responses did not, though it did interact with pulling down responses such that the more the participant reported using raising the self up responses, the stronger the relationship between pulling down responses and envy type.

To clarify these effects, each of the self-reported responses was analyzed separately. The unexpected interaction appeared to result from the fact that trying harder, which had been grouped with the raising the self up responses, was actually associated with more hostile envy, not with benign envy as predicted. Across both the self-rated and the content coded responses trying harder was consistently associated with more hostile envy. This finding is inconsistent with the idea put forth by most envy researchers that hostile envy is aimed at tearing the envied person down, and not at gaining the advantage for oneself (Miceli & Caslelfranchi, 2007; Parrott, 1991; Schoeck, 1969; Silver & Sabini,

1978; van de Ven, Zeelenberg, & Pieters). The evolutionary functional hypotheses tested in this study were based on that idea.

Despite the fact that this core assumption about the distinction between hostile and benign envy was contradicted by the data, the majority of the other expected relationships between responses and envy type were found. Hostile envy was associated with more desire to hurt the envied and with malicious gossip, and benign envy was associated with soliciting help from, and congratulating the envied, though not with being nice to or imitating him or her.

The lack of support for the expected relationships between benign envy and being nice to the envied, or imitating him or her, are puzzling. Though hostile, not benign envy led to increased effort, soliciting help from the envied *was* associated with benign envy. If an envious person hopes to get help from the envied, it would seem like a good idea to be nice to him or her. Further, one might expect an envious person to take advantage of the time spent receiving help from the envied to observe and imitate his or her successful actions. Nonetheless, these two responses did not appear to be related to envy type.

A non-hypothesized effect where complaining about the situation was associated with more hostile envy was found for self-reported complaining, but—though in the same direction—the effect was not significant with content coded complaining. If people experiencing hostile envy believe—rightly or not—that the envied isn't truly deserving, and the situation is truly unjust, then they could perceive their behavior as complaining though others might consider it gossip, which could explain the association between complaining and hostile envy.

Process regardless of type. Though envy type was expected to direct an envious person towards either a raising the self up or a pulling the other down response, there are several actions of each type for an envious person to choose from. For envy to function effectively, the particular response chosen should be an effective one for the particular circumstances of the envy experience. The process hypothesis says that the felt emotions are a mechanism by which the situation leads to a response, so responses were expected to be related to elements of the situation, and emotions were expected to mediate those situation–response relationships.

The process hypothesis is a hypothesis about how situations cause responses, and mediation is a causal process. But the non-experimental design of the present study makes it impossible to test for causality. Rather than demonstrating that certain emotions truly do mediate causal effects of situation on responses, the mediation analyses presented here demonstrate that such a process *could* be occurring, and they identify promising situation–emotion–response pathways for future experimental work to focus on.

Emotions significantly mediated the effects of situations on responses for four of the six responses tested. Each emotion mediated the effects of the situation on only one response, even though the situation variables that affected the responses through these mediators sometimes overlapped. Figure 7 summarizes the significant indirect effects. The response of trying harder had two mediating emotions, frustration, and feeling inspired by the envied. The effect of dependence of attainability on trying was mediated by both of those emotions, but in opposite directions. Both emotions led to increased trying, but dependence of attainability had a positive effect on frustration, and a negative

effect on inspiration, so this element of the situation appeared to affect trying both positively and negatively through these two emotions.

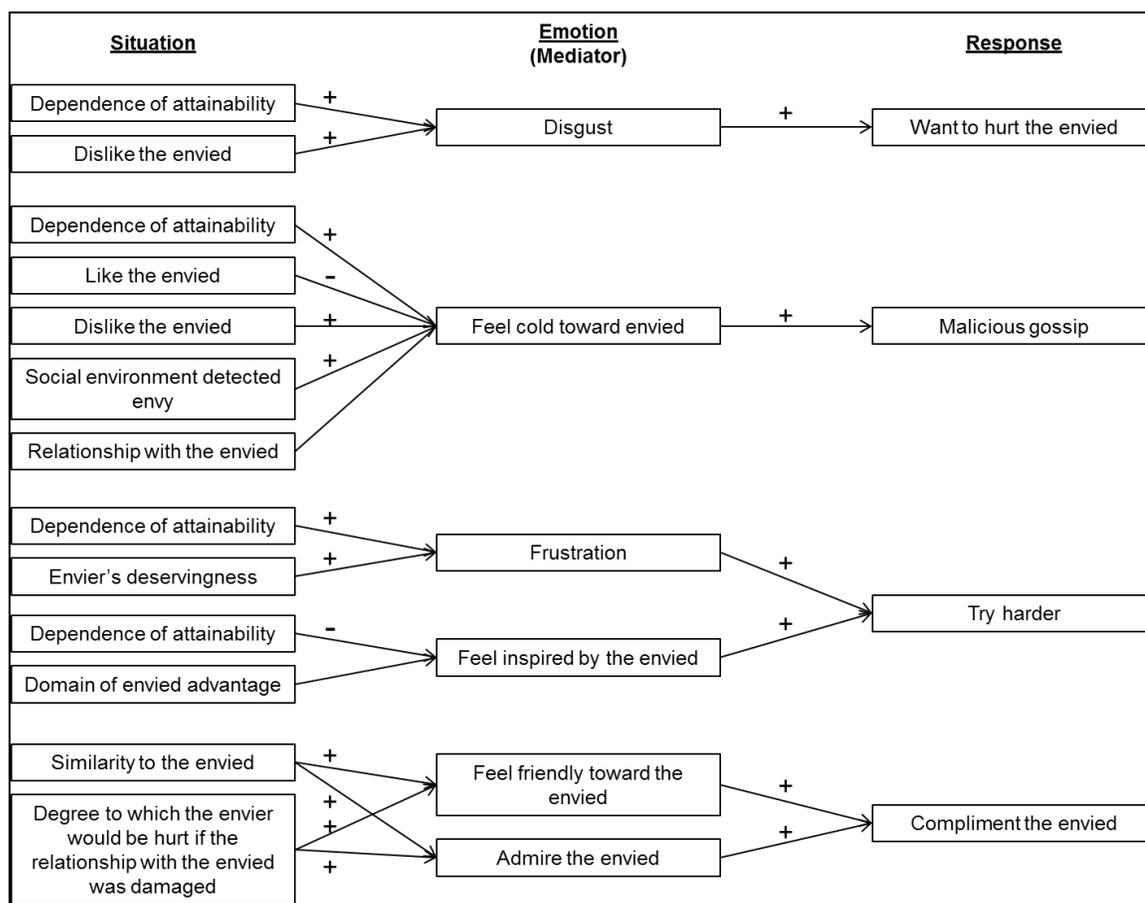


Figure 7. Significant indirect effects of situations on responses, as mediated by emotions. Multicategorical variables were represented with several effect codes so no direction is shown.

Dependence of attainability, or the degree to which the envied person's possession of the advantage makes it harder for the envier to get it, appears to be a particularly important situational element in the selection of a response to hostile envy. Highly dependent, zero-sum advantages, such as status, can be gained only by depriving the envied person of them, so the set of responses that could be effective in reducing a

relative inferiority regarding these resources is limited. Others have proposed that the fact that the envied person's superiority *causes* the envier's inferiority is the reason why there is (often) a hostile element to envy (Miceli & Castelfranchi, 2007; Smith, 1991). This is even more true for highly dependent advantages. Yet the role of the dependence of attainability in selecting a particular response to hostile envy hasn't previously been explored. The present results suggest that it is worthy of more attention.

If the social environment is aware that a person is envious, they are more likely to dismiss that person's commentary about the envied as a product of envy (Silver & Sabini, 1978), rather than as accurate information, so gossip should become less effective as the social environment becomes more aware that a person is envious. It is therefore surprising that the indirect effect of having one's envy detected on gossiping was positive. It is possible that the direction of causality assumed in this analysis was wrong, and instead, feeling cold toward the envied leads to gossiping, and gossiping leads to suspicion that the gossiper is envious. An experimental design is required to disentangle these potential causal effects.

Though only a small set of all possible emotions and responses were measured in the present study, no emotion mediated the effects of situational elements on more than one response. The possibility that emotions contribute to only one response or one class of responses each is an intriguing one. Coldness could be the "gossip" emotion, or perhaps the "social hostility" emotion, frustration and inspiration could be the "try harder" emotions, and so on.

Very little previous research has systematically investigated how people actually respond to envy, and even less has taken the role of felt emotions into account. The

present study identified responses that are associated with each type of envy, and established that particular responses are associated with particular elements of the situation, and the felt emotions that might mediate those relationships. Clearly, more research on the relationship between envy situation, the emotional experience, and the behavioral response is needed, but the results of the present study suggest that such research will be fruitful.

Individual Differences

Envy was experienced a median of two times in 14 days. The type of envy people experienced was related to their scores on the Dispositional Envy Scale, which is not surprising seeing as the scale reflects the authors' definition of envy as necessarily hostile (Smith, Parrott, Diener, Hoyle, & Kim, 1999). Given that several studies have shown that a benign type of envy exists as well, this scale may be more appropriately thought of as the Dispositional *Hostile* Envy Scale. Envy type was also related to the authority/subversion and sanctity/degradation subscales of the Moral Foundations Questionnaire, where greater endorsement of those two scales predicted a higher probability of experiencing hostile envy. Those two scales also tend to differentiate political ideologies, with conservatives endorsing them more than liberals (Graham, Haidt, & Nosek, 2009), yet a direct measure of political orientation did not significantly predict envy type. Perhaps these moral foundations underlie both political orientation and propensity for each type of envy, but in different ways.

Based on the hypothesis that attainability of the envied resource affects envy type, people with higher self-efficacy were expected to experience more benign envy because they would tend to perceive envied advantages as attainable. This prediction was not

supported. Based on the hypothesis that benign envy motivates the envier to affiliate with the envied in order to benefit from his or her possession of the envied advantage, or knowledge about how to attain it, more agreeable people were expected to experience more benign envy. This prediction was not supported either. Due to the negative effects of hostility on cardiovascular health (Everson-Rose & Lewis, 2005; Chida & Steptoe, 2009), blood pressure was expected to be positively related to hostile envy. Surprisingly, the opposite was true. Higher systolic blood pressure was associated with a lower probability of hostile envy. This effect is discussed further below (see Envy and Health).

Few of the individual differences investigated in the present study were related to envy type. This lack of findings could be due, in part, to the fact that only one or two envy experiences were measured for each person, which may not be enough to get a stable estimate of each person's propensity for each type. It is also likely that situational variables play a larger role in envy type than stable elements of the personality do, a possibility that would be consistent with the finding that only about 13% of the variance in type was accounted for by the person.

Comparison with van de Ven, Zeelenberg, and Pieters

The results of the present study are largely consistent with the picture of the envy types that van de Ven, Zeelenberg, and Pieters drew in their 2009, 2011b, and 2012 papers, with a few exceptions. Though the finding that there are two types of envy is consistent with van de Ven et al. (2009), less than a third (28%) of the experiences in the present study were hostile whereas the majority (62%) of van de Ven et al.'s Spanish sample reported hostile envy. When van de Ven et al. (2009) asked an American college student sample to recall an instance of envy 46% of them reported hostile envy.

Although this type of recall method doesn't necessarily elicit a representative sample of envy experiences, the fact that both van de Ven et al.'s American sample and the present American sample had lower rates of hostile envy than van de Ven et al.'s Spanish sample could reflect a difference between the cultures of the two nations.

In their 2012 experiment, van de Ven, Zeelenberg, and Pieters found that the degree to which the envied deserved the advantage was the primary factor in determining whether an envy experience was benign or hostile, so they argued that any effect that liking the envied person has on envy type would be mediated by perceptions of the deservingness of the envied. The evolutionary functional inspired predictions described in this paper differed from van de Ven et al.'s predictions in that the effect of deservingness was expected to be indirect, primarily as mediated through the social environment, and the envier's liking for the envied, in as much as it indicates the value of the relationship to the envier, was expected to directly affect envy type. Though this study was not designed to compare these two perspectives directly, some of the findings do bear on the different predictions they make.

The current findings regarding the envied person's deservingness clearly support van de Ven et al.'s claim of a direct effect of deservingness on type, rather than the indirect effect through the social environment that was expected from the evolutionary functional perspective. At the same time, self-reported relationship value, which was highly related to liking for the envied, significantly affected envy type, even after controlling for deservingness, supporting the evolutionary functional prediction of a direct effect of liking on envy type, rather than van de Ven et al.'s prediction that an effect of liking would be mediated by deservingness.

These results do not clearly support one perspective more than the other. The envier's perception of the degree to which the envied person deserved his or her advantage did seem to be especially important in determining envy type, as van de Ven et al. claimed, but other factors were important as well. The attainability of the envied advantage and the value of the relationship to the envier both independently contributed to envy type, as predicted by the evolutionary functional perspective, and contrary to van de Ven et al.'s claim that other factors only affect envy type indirectly through their effects on deservingness.

Finally, van de Ven et al. (2011b) found that people are more motivated to improve, and do actually improve more, when they experience benign envy than when they experience hostile envy. In their Studies 1 and 2 they asked participants to recall an instance of either benign or hostile envy. This method evokes memories of actual envy experiences, but it is unlikely that many of the advantages that were envied in those experiences were related to the measures of motivation and performance used in the studies (intentions to study during the subsequent semester and performance on the Remote Associates Task). Van de Ven et al. acknowledged this issue, and in Study 3 participants were given an academically successful target to envy, and were asked to imagine feeling either benign or hostile envy towards him. In Study 4 participants read about the same target and rated how much benign and hostile envy they felt. Across these four studies van de Ven et al. consistently found higher motivation (Studies 1 and 4) and improvement (Studies 2 and 3) with benign envy than hostile envy. In contrast, in the present study trying harder was more associated with hostile envy than benign envy. The present study focused on responses to the immediate situation, while van de Ven et

al.'s Studies 1 and 4 measured intentions for an upcoming semester, and the present study relied on self-report while van de Ven et al.'s Studies 2 and 3 measured performance in such a way that participants may have been unaware of the effect of envy on their behavior. Future work will need to differentiate conscious and unconscious effects of envy as well as immediate and long-term responses. This difference between the present study and van de Ven et al.'s results also highlights the importance of balancing controlled laboratory research with research on actual behavior in natural environments.

Reconceptualization of the Types of Envy

The hypotheses that the present study were designed to test were based on the assumption benign envy is defined by the goal of improving one's own position without depriving the envied of the advantage, and hostile envy is defined by the goal of dragging the envied person down without doing anything to (directly) benefit oneself. The finding that increased effort characterized hostile envy, rather than benign envy, seems contrary to this foundational assumption. Yet most of the situations, emotions, and responses that were hypothesized to differentiate the envy types did so as expected. Described below is a reconceptualization of the two types of envy that could account for the overall consistency of the findings with theory, while also explaining the finding that hostile envy, not benign, led to trying harder.

Benign envy reconceived. In addition to effortful responses aimed at self-improvement, benign envy could also be the trajectory that is selected when the most effective response is to do nothing about the situation at all. When the expected costs of any response outweigh the expected benefits, the best decision is to not respond to the situation. Of the three evolutionary functional inspired predictions about when envy

would be benign, only one—the attainability hypothesis—is particularly linked to a self-improving response. Both the relationship value hypothesis and the social environment hypothesis are more about avoiding harm that could result from a hostile response than they are about the benefits of a self-improving response. Valuing the relationship with the envied, and being in a social environment that favors the envied, could often lead to doing nothing, especially if the advantage is not attainable by non-hostile means.

Experiencing benign emotions in association with a “do nothing” response could also help avoid accidental expression of envious hostility to the envied or to relevant others. Hence, benign envy may occur when the most effective response is a self-improving one *or* when there is no effective response at all.

Hostile envy reconceived. In addition to hostile responses aimed exclusively at dragging the envied down without directly benefitting the envier, hostile envy could also include responses that deprive the envied of the advantage *and* acquire it for the envier. Hostile envy was more likely for advantages that were harder to attain because the envied already possessed them. These types of zero-sum advantages—romantic partner, job promotion, first place in an athletic competition, etc.—can sometimes be gained through increased effort, though for enviers to gain them, envied people must lose them. If hostile envy includes all types of responses that deprive the envied, whether they also raise the envier up or not, then trying harder would be characteristic of a subset of hostile envy.

Relation to Foster’s (1972) model. In 1972, Foster described two types of envy; envy between equals, and envy towards superiors. He described envy between equals as legitimate competition, with a winner who is entitled to the “prize” and a loser who is

expected to submit with good grace, though Foster acknowledged that such graceful submission does not always occur. Envy towards superiors targets someone who is not considered to be a legitimate competitor so the only recourse available to the envier—trying to take the advantage away from the envied—is viewed as aggression. Though some have related Foster’s types to benign and hostile envy respectively (Smith & Kim, 2007; van de Ven, Zeelenberg, & Pieters, 2009), they do not correspond to raising the self up versus pulling the envied down types of responses. Foster viewed all envy as hostile in nature, if not in expression, and he did not include self-improvement as a response to either of his types of envy. It seems, instead, that competitive envy between equals, where there is a prize to be won, corresponds well to hostile envy over zero-sum advantages as described above. Though this type of envy involves depriving the envied person of the advantage, and is therefore hostile, the competition is considered legitimate, so trying harder is a reasonable response. In contrast, envy towards less limited advantages such as being good with the opposite sex, having access to material resources, being athletically talented, etc., corresponds well to Foster’s envy towards superiors. Foster wrote primarily about “peasant societies” in which, he claimed, all goods are thought to be limited, so one person’s advantage is seen as the cause of another’s deprivation, and ambition is an act of aggression. Under these circumstances even unlimited advantages are effectively unattainable. The fact that the envy that Foster reported under these circumstances was hostile is therefore consistent with the attainability hypothesis. In societies in which ambition is viewed positively and individuals are encouraged to try to improve their position in society, including the one in which the present study was conducted, these less limited types of advantages will often

seem attainable to envious people. According to the attainability hypothesis benign envy is expected in such cases. However, when these less limited types of advantages are nonetheless viewed by the envier as not being independently attainable for whatever reason, hostile envy resembling Foster's envy towards superiors may be expected, even in societies that allow upward mobility. Thus the two types of envy that Foster described may correspond to the two types of hostile envy speculated on here, with Foster's competitive envy towards equals corresponding to envy over advantages that can only be gained by taking them from the envied, and his envy towards superiors corresponding to envy over less limited advantages that are, nonetheless, unattainable to the envier.

Broadened conceptualization of the envy types. Expanding benign envy to include "do nothing" responses as well as effortful self-improving responses that don't deprive the envied of the advantage, and expanding hostile envy to include effortful self-gaining responses that do deprive the envied, as well as responses that deprive the envied without gaining the advantage for the envier, could account for the fact that trying harder was found to be more characteristic of hostile, than benign envy. This broader conceptualization also has the benefits of greater specificity regarding a wider range of envy situations and responses, and of correspondence with a distinction previously described in the literature. Finally, broadening the existing conceptualization of the types, rather than overhauling it completely, could account for the consistency of the majority of the present findings with hypotheses that were based on the earlier, more limited, conceptualization. Whether or not this broader conceptualization of the envy types is accurate is a question for future research.

Revised evolutionary functional hypotheses. The hypotheses tested in this study were based on the idea that the goal of hostile envy is solely to deprive the envied of the advantage and the goal of benign envy is solely to benefit the envier without harming the envied. They were derived by applying an evolutionary functional perspective to the question of when each of these response types would be most beneficial to an envier. Broadening the conceptualization of the types requires that these hypotheses be reconsidered.

Attainability hypothesis. Originally, more easily attained advantages were hypothesized to lead to more benign envy. Dependence of attainability was hypothesized to lead to more hostile envy only because of its effect on overall attainability. Under the broadened conceptualization of the types, attainability that is not dependent on possession by the envied is expected to lead to benign envy that is aimed at self-improvement, but not to benign envy with no response. Hostile envy that is aimed at gaining the advantage by depriving the envied of it should be more likely to occur when the envied advantage is attainable and that attainability is dependent on possession by the envied. Hostile envy aimed only at tearing the envied down should be more likely to occur for less attainable advantages. Given this much more complex relationship between attainability and envy type under the broader conceptualization, it is actually somewhat surprising that the hypothesized effect of overall attainability on envy type was found. It is not surprising, though, that the effect of the dependence of attainability on the envied person's possession of the resource was significant given that the broader concept of hostile envy includes gaining the advantage by depriving the envied of it, which is the only way to gain highly dependent advantages.

Relationship value hypothesis. The relationship value hypothesis is not altered by the broadened conceptualization of the envy types. All hostile responses still involve doing harm to the envied, which should be avoided if the relationship with the envied is very valuable to the envier.

Social environment hypothesis. The original justification for the social environment hypothesis is not altered by the broadened conceptualization of the envy types. Hostile responses that involve convincing the social environment to deprive the envied of the advantage, or the benefits afforded by the advantage, should be avoided if the social environment is not likely to be convinced. But the social environment hypothesis was not supported by the data. Instead there was a direct effect of the participants' perception of the envied's deservingness on envy type. This effect may instead be due to the fact that deserved advantages tend to be attainable, and the envied may be able to help the envier attain them, but undeserved advantages are generally unattainable, and the envied can't help the envier attain them. Envied people aren't likely to be willing to help enviers get those advantages that can only be gained by taking them from the envied. Under the broadened conceptualization of the envy types benign envy should be more likely for advantages that are deserved *and* independently attainable. Advantages that are deserved but are only attainable by taking them from the envied should evoke hostile envy. Perhaps envious people perceive dependent advantages as less deserved than objective observers do, accounting for some of the difference between the two perceptions.

Kin Envy in Women

The likelihood of hostile envy was expected to decrease as kinship with the envied increased because kin have a vested genetic interest in each other's success (Hamilton, 1964). In women the opposite pattern was found; the probability of hostile envy *increased* with relatedness, controlling for self-reported value. Though this effect was unexpected, it is consistent with a handful of other, equally unexpected findings by other researchers. Saad and Gill (2005) predicted that there would be no sex differences in kin envy on nine items where kin resources were the envied advantage, two items where the envied person was kin, and two items that combined both elements. Instead they found that women reported significantly more envy than men on 11 out of those 13 items, with women being higher on the two non-significant items as well. DelPriore, Hill, and Buss (2012) asked participants to report instances when they felt envy and classed their responses into 17 categories, two of which were kin related—"comes from a more socially/financially prominent family" and "receives more parental investment" (Table 1 on page 318). Women were significantly more likely to envy others from a prominent family than men were, and women also envied parental investment more often than men, though that difference was not significant. In another study, however, Hill and Buss (2006) did not find a sex difference in the likelihood of envying a family member. Finally, Salmon and Hehman (2013) predicted that full siblings would experience less conflict with each other than half siblings, and that the highest levels of conflict would be between non-biological siblings (step and adopted). That was precisely the pattern that they found in men, but women reported the highest levels of conflict with full siblings. Taken together these unexpected and unexplained sex differences in kin related conflict and envy seem to imply that kin based resources, and competition with other family

members for those resources, have historically been more important to women's reproductive success than to men's. This conclusion seems odd given evidence that, historically, men tended to remain near their kin after marriage and to rely heavily on kinship coalitions while women more often migrated into their husbands' communities (Vigil, 2009 and references therein). Though some argue that human marital residence patterns have traditionally been more evenly divided between the natal communities of both partners, no one claims that settling near the woman's kin has been a dominant pattern in human societies (Marlowe, 2004). Perhaps, when living near kin, men's kin interactions have generally been more cooperative while women's were more competitive. Prior to animal husbandry and the accumulation of wealth, brothers may have had little reason to compete and plenty of reason to cooperate, for example to form hunting and defense coalitions. Women may have had reason to compete with their sisters for childrearing assistance. Research on the effects of grandparents on grandchild health and survival indicates that maternal grandmothers provide more benefits to grandchildren than other grandparents do, probably because maternal grandmothers can be sure of their genetic relatedness to their grandchildren, where all other grandparents face issues of paternity uncertainty (Sear & Mace, 2008; but see Fox, Sear, Beise, Ragsdale, Volland & Knapp, 2009). Therefore, competition between sisters for their mothers' help with childrearing may have been important to women's reproductive success. Future research will need to determine whether this account of competition between sisters explains the observed pattern of sex differences in kin envy and hostility, and if not, to determine what does explain this intriguing pattern..

Envy and Health

Envy is frequently associated with disordered mental health and diminished well-being (Gold, 1996; Habimana & Masse, 2000; Salovey & Rothman, 1991, Smith, Combs, & Thielke, 2008), though the direction of causality is unclear; does envy cause poor mental health or does poor mental health cause envy? Probably some of both. But there is reason to expect that envy, particularly hostile envy, also contributes to poor physical health (Smith, Combs, & Thielke, 2008). Hostility has been consistently linked to cardiovascular disease (Everson-Rose & Lewis, 2005; Chida & Steptoe, 2009).

Consequently, high blood pressure, as a measure of cardiovascular health, was expected to be associated with more envy, particularly more hostile envy. No significant effects were found for envy frequency but there was a surprising effect of systolic blood pressure on envy type where higher systolic blood pressure predicted a *lower* probability of hostile envy. Speculating on a possible explanation for this unexpected finding, social norms that label hostile envy as unacceptable could cause some people to suppress the expression, or even experience, of hostile envy in situations for which it has evolved to function. The effort required to suppress hostile envy could increase stress, leading to higher blood pressure in those who suppress envious hostility. Given the contradictory nature of this association with so much previous research on hostility and health, however, the possibility that this was a spurious relationship must be taken seriously.

Limitations and Future Directions

The non-experimental nature of this study was both a strength and a weakness. To assess whether both benign and hostile types of envy occur, and at what rates, it was necessary to measure naturally occurring envy in everyday life. Recall methods commonly used to measure naturally occurring envy tend to elicit particularly memorable

or socially desirable examples which may not accurately represent the true rates at which each type occurs. Methods commonly used to experimentally evoke envy in the laboratory, such as false feedback on own and others test performance, tend to produce only one type of envy, usually hostile because the envied is generally a stranger and the advantage unattainable. The daily diary method used in the present study is superior to these other methods for the purpose of assessing the frequency and variability with which envy, and the two types of envy, naturally occur in people's everyday lives. But the lack of control inherent to this kind of observational method makes it difficult to tease apart the interrelationships between the person, the situation, the emotional experience, and the response, and it is impossible to determine causality with an observational design. Therefore, causal effects that were hypothesized in the present study will need to be confirmed with experimental methods.

This study also relied exclusively on participants' self-reports, making it impossible to assess whether their envy biased their perceptions of the situation, or to account for that bias. Use of the participants' reports of how others who were present felt about the situation as a measure of the how the social environment actually felt assumes that the participants were able to accurately assess the beliefs of those others. Yet an envious person never *really* knows how others feel, so the envier's beliefs, rather than the actual feelings of the social environment, are most relevant to the envier's response. Nonetheless future research could test the accuracy of enviers' assessments of their social environment by measuring onlookers directly.

Although the observational methods of this study made it possible to investigate how often envy occurs, and what that envy looks like in people's day to day lives, the use

of a college sample limits the generalizability of the results, so it will also be important to replicate these findings in more diverse populations.

There were several unexpected findings in this study, and thus a great deal of speculation about possible explanations. This speculation generated many new possibilities for future research to explore.

Conclusion

Envy is generally considered a negative emotion; it is subjectively unpleasant and it frequently motivates counterproductive or harmful behavior (Ariel de Vidas, 2007; Cohen-Charash & Mueller, 2007; Duffy & Shaw, 2000; Foster, 1965; Grolleau, Mzoughi, & Sutan, 2006; Parks, Rumble, & Posey, 2002; Schoeck, 1969; Vecchio, 1997, 2005; Zizzo & Oswald, 2001). It has such a bad reputation that many scholars claim that envy without hostility isn't really envy at all (Miceli & Castelfranchi, 2007; Sabini & Silver, 1982; Schoeck, 1969; Smith, 1991; Smith & Kim, 2007). Yet, as this study has confirmed, envy can exist in a form that is benign towards the envied, and it can motivate positive, prosocial behavior. Envy is an underexplored and poorly understood emotion. With a more complete understanding of the situations and individual differences that lead to benign, rather than hostile envy, and of the process by which envy leads to a behavioral response, envy can be directed towards its more beneficial and socially acceptable form. The present study demonstrated the utility of an evolutionary functional perspective for generating hypotheses about these processes.

Three factors that affect the type of envy experienced are the envious person's perception of how deserving the envied person is of the advantage, the value to the envier of his or her relationship with the envied person, and the attainability by the envier of the

envied advantage. In addition to general attainability, the degree to which the attainability of the envied advantage depends on the envied person's possession of it is also important, highlighting the special role that zero-sum resources play in eliciting hostile envy. Dependence of attainability is particularly relevant to the selection of a range of responses to hostile envy, including increasing the envier's effort toward his or her own goals. Hostile envy may therefore be best understood as leading to responses intended to deprive the envied person of the advantage *whether or not* the envier acquires the advantage as a result. Benign envy, then, is envy that does not lead to attempts to deprive the envied. It may instead lead to attempts to independently gain the advantage for oneself, or to doing nothing at all.

Inferiority to a competitor in a domain that is important to one's own fitness is an adaptive problem that humans have undoubtedly faced throughout their evolutionary history. Envy appears to be well designed to solve this adaptive problem (Hill & Buss, 2008). The two types of envy differentially direct attention and effort toward either a benign or a hostile response, depending on which would be expected to be more beneficial in the circumstances. The present study created a foundation for future research on the functional differences between benign and hostile envy to build on.

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Appendix A – Demographics and Individual Differences Measures

The following set of questions was presented to participants on a computer during the initial session.

The response format of the demographics items was either a typed response, or selection of the best answer, as appropriate. The demographics items were presented to the participant first.

Following the demographics items, a series of personality measures were presented to the participants. Those were drawn from a variety of published sources. For informational purposes, I have labeled each measure below by topic, and I have listed the relevant publications. That information was not shown to the participants. The personality questions were all responded to on a seven point likert type response scale. The scale anchors for each measure were shown at the beginning of the measure. The personality measures, and the items within them, were presented in random order for each participant.

Demographics and self-ratings

What year were you born? _____

What is your gender: ___ Male ___ Female

Are you (check all that apply)

___ White Non-Hispanic

___ White Hispanic

___ Black

___ Asian

___ American Indian

___ Other _____

Which of the following best describes the socioeconomic status of your household growing up?

___ Lower Class

___ Lower-Middle Class

___ Middle Class

___ Upper-Middle Class

___ Upper Class

Compared to your peers would you say you are:

___ A lot less wealthy

___ Less wealthy

___ Equally wealthy

___ More wealthy

___ A lot more wealthy

Compared to your peers would you say:

- Far fewer people have heard of you
 Fewer people have heard of you
 About the same number of people have heard of you
 More people have heard of you
 Far more people have heard of you

What is your current relationship status?

- Single
 Dating someone casually
 In a committed relationship, living apart
 In a committed relationship, living together
 Engaged
 Married

How many children do you have? _____

With how many different partners have you had sexual intercourse in your entire life?

With how many different partners have you had sexual intercourse in the past 12 months?

Considering your overall health, compared to your peers would you say you are:

- A lot less healthy
 Less healthy
 Equally healthy
 More healthy
 A lot more healthy

Considering only physical attractiveness, compared to your peers would you say you are:

- A lot less attractive
 Less attractive
 Equally attractive
 More attractive
 A lot more attractive

What is your religion?

- | | | |
|-----------------------------------|--------------------------------------|--|
| <input type="checkbox"/> Atheist | <input type="checkbox"/> Agnostic | <input type="checkbox"/> Protestant |
| <input type="checkbox"/> Catholic | <input type="checkbox"/> Mormon | <input type="checkbox"/> Other Christian |
| <input type="checkbox"/> Jewish | <input type="checkbox"/> Muslim | <input type="checkbox"/> Buddhist |
| <input type="checkbox"/> Hindu | <input type="checkbox"/> Other _____ | |

How often do you attend religious services?

- Never
 Once or twice a month
 Occasionally
 Once or more per week

Self-perceived Mate Value

Fisher, M., Cox, A., Bennett, S. & Gavric, D. (2008). Components of self-perceived mate value. Special Issue: Proceedings of the 2nd Annual Meeting of the NorthEastern Evolutionary Psychology Society. *Journal of Social, Evolutionary, and Cultural Psychology*, 2(4), 156-168.

1	2	3	4	5	6	7
Extremely Easy						Extremely Difficult

If you were single, how easy would it be for you to find a short-term mate for romance?
 If you were single, how easy would it be for you to find a short-term mate for sex?
 If you were single, how easy would it be for you to find a potential long term mate for marriage?

Political Orientation

Carney, D. R., Jost, J. T., Gosling, S. D., & Potter, J. (2008). The Secret Lives of Liberals and Conservatives: Personality Profiles, Interaction Styles, and the Things They Leave Behind. *Political Psychology*, 29(6), 807-840. doi:10.1111/j.1467-9221.2008.00668.x

1	2	3	4	5	6	7
Extremely Liberal						Extremely Conservative

Overall, where would you place yourself, on the above scale of liberalism – conservatism?

In terms of social and cultural issues (e.g., abortion, separation of church and state, affirmative action), where would you place yourself on the above scale of liberalism – conservatism?

In terms of economic issues (e.g., taxation, welfare, privatization of social security), where would you place yourself on the above scale of liberalism – conservatism?

Dispositional Envy Scale (DES)

Smith, R. H., Parrott, W. G., Diener, E. F., Hoyle, R. H. & Kim, S. H. (1999). Dispositional envy. *Personality and Social Psychology Bulletin*, 25, 1007–1020.

1	2	3	4	5	6	7
Strongly Disagree		Neither Agree nor Disagree				Strongly Agree

I feel envy every day.
 The bitter truth is that I generally feel inferior to others.
 Feelings of envy constantly torment me.
 It is so frustrating to see some people succeed so easily.
 No matter what I do, envy always plagues me.
 I am troubled by feelings of inadequacy.
 It somehow doesn't seem fair that some people seem to have all the talent.
 Frankly, the success of my neighbors makes me resent them.

Big Five Personality – BFI

- John, O. P., Naumann, L. P., & Soto, C. J. (2008). Paradigm Shift to the Integrative Big-Five Trait Taxonomy: History, Measurement, and Conceptual Issues. In O. P. John, R. W. Robins, & L. A. Pervin (Eds.), *Handbook of personality: Theory and research* (pp. 114-158). New York, NY: Guilford Press.
- John, O. P., Donahue, E. M., & Kentle, R. L. (1991). *The Big Five Inventory--Versions 4a and 54*. Berkeley, CA: University of California, Berkeley, Institute of Personality and Social Research.
- Benet-Martinez, V., & John, O. P. (1998). *Los Cinco Grandes* across cultures and ethnic groups: Multitrait multimethod analyses of the Big Five in Spanish and English. *Journal of Personality and Social Psychology*, 75, 729-750.

1	2	3	4	5	6	7
Strongly Disagree		Neither Agree nor Disagree				Strongly Agree

I am someone who is talkative
 I am someone who tends to find fault with others
 I am someone who does a thorough job
 I am someone who is depressed, blue
 I am someone who is original, comes up with new ideas
 I am someone who is reserved
 I am someone who is helpful and unselfish with others
 I am someone who can be somewhat careless
 I am someone who is relaxed, handles stress well.
 I am someone who is curious about many different things
 I am someone who is full of energy
 I am someone who starts quarrels with others
 I am someone who is a reliable worker
 I am someone who can be tense
 I am someone who is ingenious, a deep thinker
 I am someone who generates a lot of enthusiasm
 I am someone who has a forgiving nature
 I am someone who tends to be disorganized
 I am someone who worries a lot

- I am someone who has an active imagination
 I am someone who tends to be quiet
 I am someone who is generally trusting
 I am someone who tends to be lazy
 I am someone who is emotionally stable, not easily upset
 I am someone who is inventive
 I am someone who has an assertive personality
 I am someone who can be cold and aloof
 I am someone who perseveres until the task is finished
 I am someone who can be moody
 I am someone who values artistic, aesthetic experiences
 I am someone who is sometimes shy, inhibited
 I am someone who is considerate and kind to almost everyone
 I am someone who does things efficiently
 I am someone who remains calm in tense situations
 I am someone who prefers work that is routine
 I am someone who is outgoing, sociable
 I am someone who is sometimes rude to others
 I am someone who makes plans and follows through with them
 I am someone who gets nervous easily
 I am someone who likes to reflect, play with ideas
 I am someone who has few artistic interests
 I am someone who likes to cooperate with others
 I am someone who is easily distracted
 I am someone who is sophisticated in art, music, or literature

Self-Efficacy - New General Self-Efficacy Scale

Chen, G., Gully, S. M. & Eden, D. (2001). Validation of a new general self-efficacy scale. *Organizational Research Methods*, 4, 62-83. doi: 10.1177/109442810141004

1	2	3	4	5	6	7
Strongly Disagree		Neither Agree nor Disagree				Strongly Agree

- I will be able to achieve most of the goals that I have set for myself.
 When facing difficult tasks, I am certain that I will accomplish them.
 In general, I think that I can obtain outcomes that are important to me.
 I believe I can succeed at most any endeavor to which I set my mind.
 I will be able to successfully overcome many challenges.
 I am confident that I can perform effectively on many different tasks.
 Compared to other people, I can do most tasks very well.
 Even when things are tough, I can perform quite well.

Emotional Intelligence – TEIQue-SF

Petrides, K. V. & Furnham, A. (2006). The role of trait emotional intelligence in a gender-specific model of organizational variables. *Journal of Applied Social Psychology, 36*, 552-569.

Cooper, A. & Petrides, K. V. (2010). A Psychometric Analysis of the Trait Emotional Intelligence Questionnaire-Short Form (TEIQue-SF) Using Item Response Theory. *Journal of Personality Assessment, 92*, 449-457. DOI: 10.1080/00223891.2010.497426

1	2	3	4	5	6	7
Strongly Disagree		Neither Agree nor Disagree				Strongly Agree

Expressing my emotions with words is not a problem for me.
 I often find it difficult to see things from another person's viewpoint.
 On the whole, I'm a highly motivated person.
 I usually find it difficult to regulate my emotions.
 I generally don't find life enjoyable.
 I can deal effectively with people.
 I tend to change my mind frequently.
 Many times, I can't figure out what emotion I'm feeling.
 I feel that I have a number of good qualities.
 I often find it difficult to stand up for my rights.
 I'm usually able to influence the way other people feel.
 On the whole, I have a gloomy perspective on most things.
 Those close to me often complain that I don't treat them right.
 I often find it difficult to adjust my life according to the circumstances.
 On the whole, I'm able to deal with stress.
 I often find it difficult to show my affection to those close to me.
 I'm normally able to "get into someone's shoes" and experience their emotions.
 I normally find it difficult to keep myself motivated.
 I'm usually able to find ways to control my emotions when I want to.
 On the whole, I'm pleased with my life.
 I would describe myself as a good negotiator.
 I tend to get involved in things I later wish I could get out of.
 I often pause and think about my feelings.
 I believe I'm full of personal strengths.
 I tend to "back down" even if I know I'm right.
 I don't seem to have any power at all over other people's feelings.
 I generally believe that things will work out fine in my life.
 I find it difficult to bond well even with those close to me.
 Generally, I'm able to adapt to new environments.
 Others admire me for being relaxed.

Dark Triad of Machiavellianism, Narcissism and Psychopathy – Short Dark Triad Scale

Paulhus, D.L., & Jones, D.N. (2011, January). *Introducing a short measure of the Dark Triad*. Poster presented at the meeting of the Society for Personality and Social Psychology, San Antonio.

1	2	3	4	5	6	7
Strongly Disagree		Neither Agree nor Disagree				Strongly Agree

It's not wise to tell your secrets.
 Generally speaking, people won't work hard unless they have to.
 Whatever it takes, you must get the important people on your side.
 Avoid direct conflict with others because they may be useful in the future.
 It's wise to keep track of information that you can use against people later.
 You should wait for the right time to get back at people.
 There are things you should hide from other people because they don't need to know.
 Make sure your plans benefit you, not others.
 Most people are suckers.
 Most people deserve respect.
 People see me as a natural leader.
 I hate being the center of attention.
 Many group activities tend to be dull without me.
 I know that I am special because everyone keeps telling me so.
 I like to get acquainted with important people.
 I feel embarrassed if someone compliments me.
 I have been compared to famous people.
 I am an average person.
 I insist on getting the respect I deserve.
 I like to get revenge on authorities.
 I avoid dangerous situations.
 Payback needs to be quick and nasty.
 People often say I'm out of control.
 It's true that I can be cruel.
 People who mess with me always regret it.
 I have never gotten into trouble with the law.
 I like to pick on losers.
 I'll say anything to get what I want.

Social Comparison Orientation

Gibbons, F.X. & Buunk, B.P. (1999). Individual differences in social comparison: The development of a scale of social comparison orientation. *Journal of Personality and Social Psychology*, 76, 129-142.

Buunk, B.P., Belmonte, J., Peiró, J.M., Zurriaga, R., & Gibbons, F.X. (2005). Diferencias individuales en la comparación social: Propiedades de la escala española de orientación hacia la comparación social. *Revista Latinoamericana de Psicología*, 37, 561-581.

Buunk, A.P., & Gibbons, F.X. (2006). Social comparison orientation: a new perspective on those who do and those who don't compare with others. In Guimond, S. (Ed.) *Social Comparison and Social Psychology: Understanding cognition, intergroup relations and culture* (pp. 15-33). Cambridge: Cambridge University Press.

1	2	3	4	5	6	7
Strongly Disagree		Neither Agree nor Disagree				Strongly Agree

I often compare myself with others with respect to what I have accomplished in life

If I want to learn more about something, I try to find out what others think about it

I always pay a lot of attention to how I do things compared with how others do things

I often compare how my loved ones (boy or girlfriend, family members, etc.) are doing with how others are doing

I always like to know what others in a similar situation would do

I am not the type of person who compares often with others

If I want to find out how well I have done something, I compare what I have done with how others have done

I often try to find out what others think who face similar problems as I face

I often like to talk with others about mutual opinions and experiences

I never consider my situation in life relative to that of other people

I often compare how I am doing socially (e.g., social skills, popularity) with other people

Moral Foundations Questionnaire – Judgments

Graham, J., Nosek, B. A., Haidt, J., Iyer, R., Koleva, S., & Ditto, P. H. (2011). Mapping the moral domain. *Journal of Personality and Social Psychology*, 101, 366-385.

The Moral Foundations Questionnaire (short version, July 2008) by Jesse Graham, Jonathan Haidt, and Brian Nosek.

1	2	3	4	5	6	7
Strongly Disagree		Neither Agree nor Disagree				Strongly Agree

Compassion for those who are suffering is the most crucial virtue.

When the government makes laws, the number one principle should be ensuring that everyone is treated fairly.

I am proud of my country's history.

Respect for authority is something all children need to learn.

People should not do things that are disgusting, even if no one is harmed.

It is better to do good than to do bad.

One of the worst things a person could do is hurt a defenseless animal.
 Justice is the most important requirement for a society.
 People should be loyal to their family members, even when they have done something wrong.
 Men and women each have different roles to play in society.
 I would call some acts wrong on the grounds that they are unnatural.

Moral Foundations Questionnaire – Relevance

- 0 = not at all relevant (This consideration has nothing to do with my judgments of right and wrong)
 1 = not very relevant
 2 = slightly relevant
 3 = somewhat relevant
 4 = very relevant
 5 = extremely relevant (This is one of the most important factors when I judge right and wrong)

Whether or not someone suffered emotionally
 Whether or not some people were treated differently than others
 Whether or not someone's action showed love for his or her country
 Whether or not someone showed a lack of respect for authority
 Whether or not someone violated standards of purity and decency
 Whether or not someone was good at math
 Whether or not someone cared for someone weak or vulnerable
 Whether or not someone acted unfairly
 Whether or not someone did something to betray his or her group
 Whether or not someone conformed to the traditions of society
 Whether or not someone did something disgusting

Appendix B – Envy Experience Questionnaire

The following is the questionnaire that participants completed during the online evening check-ins on the first two occasions that they reported experiencing envy.

Some questions only appeared if a specific answer was given in a previous question. The text in **bold** explains when these skips occur and was not visible to the participants.

Question numbers were not be visible to the participants and are shown here only so that the question skipping can be understood.

Text in *italics* gives instructions and was visible to the participants.

Every Evening for two weeks the participants answered the following question:

Did you feel envy today?

Yes

No

Answering *Yes* to this question reveals the next question.

How many times did you feel envy today?

Answering *Yes* to this question moved the participant to the following questionnaire.

Please describe the situation in which you felt envy today in as much detail as you can recall. You may want to describe the context, including the events that led to the envy, your own thoughts and feelings, how other people behaved (including the person you envied), how you behaved, or anything else that seems important to you. Try to spend about 10 – 15 minutes on this description.

Next you will be asked several questions about the envy you experienced today. Even though you may have already answered some of these questions in your written description, please answer each of the following questions as precisely as possible. Some questions are similar to others. Please read each question carefully to make sure you are answering the question being asked. Also make sure to read all the instructions that come up throughout the questionnaire because these will explain some of the terms used in the questions. If you feel that a particular question doesn't apply to your situation, or you have any other issues with a question, please give the best answer you can and then, in the comments section at the end, explain what question(s) you had trouble with and why.

From now on the word “advantage” will be used to refer to whatever it is that you were envious of the other person for. In other words, the reason you were envious of the other person was because of their advantage. The term “other person” refers to the person you were envious of.

The following questions ask about the envied advantage:

1. What did the other person have or get that made you envious (What was the envied advantage in this situation)?

1.5 To what degree do you believe you deserved to get the advantage that you are envious of?

Didn't deserve it at all	0	1	2	3	4	5	6	Totally deserved it
-----------------------------	---	---	---	---	---	---	---	------------------------

2. How do you think that having that advantage benefits the other person?

3. Think of the domain that the envied advantage is in. For example, if you are envious of someone's good grade, the domain is academic achievement, if you are envious because someone won an athletic competition, the domain is athletic achievement. What domain would you say this envied advantage is in?

4. How important is it to you to do well in this domain?

Not at all important	0	1	2	3	4	5	6	Extremely important
-------------------------	---	---	---	---	---	---	---	------------------------

5. How much does your success in this domain influence how you feel about yourself?

Not at all	0	1	2	3	4	5	6	Essential
------------	---	---	---	---	---	---	---	-----------

6. How important do you think this domain is to the other person?

Not at all important	0	1	2	3	4	5	6	Extremely important
-------------------------	---	---	---	---	---	---	---	------------------------

7. In general, how easily can someone get an advantage like this one?

Very easy	0	1	2	3	4	5	6	Impossible
-----------	---	---	---	---	---	---	---	------------

8. How easily can you get the envied advantage now that the other person has it?

Very easy	0	1	2	3	4	5	6	Impossible
-----------	---	---	---	---	---	---	---	------------

8.5. Would it change how easily you can get the envied advantage if the other person didn't have it and wasn't going to get it?

Would make it easier	0	1	2	3	4	5	6	Would make it harder
-------------------------	---	---	---	---	---	---	---	-------------------------

16. In general, how much do you think they like the person you envied?

Don't like at all 0 1 2 3 4 5 6 Like extremely well

17. In general, how much do you think they like you?

Don't like at all 0 1 2 3 4 5 6 Like extremely well

18. In general, how much do you think they believe the other person deserved the envied advantage?

Didn't deserve it at all 0 1 2 3 4 5 6 Totally deserved it

19. To what degree do you think they could tell that you were envious?

Couldn't tell at all 0 1 2 3 4 5 6 Could tell for certain

20. How could they tell?

21. Do you think other people will find out about the situation?

Yes No

Answering *No* to #21 skipped the participant to #29

With respect to the people you think will find out about the situation in which you felt envy:

22. How are they associated with you? (e.g. are they your friends, family, teammates, etc.)

23. How are they associated with the person you envied?

24. In general, how much do you think they like the person you envied?

Don't like at all 0 1 2 3 4 5 6 Like extremely well

25. In general, how much do you think they like you?

Don't like at all 0 1 2 3 4 5 6 Like extremely well

26. In general, how much do you think they will believe the other person deserved the envied advantage?

Didn't deserve it at all 0 1 2 3 4 5 6 Totally deserved it

27. To what degree do you think they will be able to tell that you were envious?

Won't be able to tell at all 0 1 2 3 4 5 6 Will be able to tell for certain

28. How will they be able to tell?

With respect to the person you felt envious of:

29. How old is the person you envied? (give an estimate if you don't know) _____

30. Is the age you provided an estimate? ___ Yes ___ No

31. What is the gender of the person you envied? ___ Male ___ Female

32. Compared to his/her peers would you say the person you envied is:

- ___ A lot less wealthy
 ___ Less wealthy
 ___ Equally wealthy
 ___ More wealthy
 ___ A lot more wealthy
 ___ Absolutely no idea

33. Compared to his/her peers would you say:

- ___ Far fewer people have heard of the person you envied
 ___ Fewer people have heard of the person you envied
 ___ About the same number of people have heard of the person you envied
 ___ More people have heard of the person you envied
 ___ Far more people have heard of the person you envied
 ___ Absolutely no idea

34. What is the current relationship status of the person you envied?

- ___ Single
 ___ Dating someone casually
 ___ In a committed relationship, living apart
 ___ In a committed relationship, living together
 ___ Engaged
 ___ Married
 ___ Absolutely no idea

35. Considering overall health, compared to his/her peers would you say the person you envied is:

- A lot less healthy
 Less healthy
 Equally healthy
 More healthy
 A lot more healthy
 Absolutely no idea

36. Considering only *physical* attractiveness, compared to his/her peers would you say the person you envied is:

- A lot less attractive
 Less attractive
 Equally attractive
 More attractive
 A lot more attractive
 Absolutely no idea

37. If the person you envied was single, how easy would it be for him/her to find a short-term mate for romance?

Extremely Easy 0 1 2 3 4 5 6 Extremely Difficult

38. If the person you envied was single, how easy would it be for him/her to find a short-term mate for sex?

Extremely Easy 0 1 2 3 4 5 6 Extremely Difficult

39. If the person you envied was single, how easy would it be for him/her to find a potential long term mate for marriage?

Extremely Easy 0 1 2 3 4 5 6 Extremely Difficult

40. How many children does the person you envied have? (Type N/A if you have no idea) _____

41. How many different partners do you think the person you envied has had sexual intercourse with in his/her entire life? (Type N/A if you have no idea) _____

42. How many different partners do you think the person you envied has had sexual intercourse with in the past 12 months? (Type N/A if you have no idea) _____

43. Which of the following describes your relationship to the person you envied? (check all that apply)

- Family
- Significant Other
- Friend
- Coworker
- Classmate
- Acquaintance
- Stranger
- Other (Explain)

#44 only appeared if *Family* was checked in #43

44. How are you related to this person? (e.g. brother, cousin, husband's niece...) Be sure to indicate whether the relationship is "by blood" or not (by marriage, adoption, etc.)

45. How much do you like the person you envied?

Don't like at all	0	1	2	3	4	5	6	Like extremely well
----------------------	---	---	---	---	---	---	---	------------------------

45.5. How much do you dislike the person you envied?

Don't dislike at all	0	1	2	3	4	5	6	Dislike extremely
-------------------------	---	---	---	---	---	---	---	----------------------

46. How much would you feel hurt if your relationship with this person was damaged?

Not at all hurt	0	1	2	3	4	5	6	Extremely hurt
--------------------	---	---	---	---	---	---	---	-------------------

47. How similar are you to this person?

Not at all similar	0	1	2	3	4	5	6	Extremely similar
-----------------------	---	---	---	---	---	---	---	----------------------

48. In what ways are you similar?

49. In what ways are you different?

50. How often do people compare you with this person?

Never	0	1	2	3	4	5	6	All the time
-------	---	---	---	---	---	---	---	--------------

51. Approximately how often are you around, or in contact with, this person? (Check one)

- 5-7 days/week
- 3-4 days/week
- 1-2 days/week
- less often than once per week but at least once per month
- a few times per year
- Never or almost never

52. To what degree do you believe that this person deserved the advantage that you are envious of?

Didn't deserve it at all	0	1	2	3	4	5	6	Totally deserved it
-----------------------------	---	---	---	---	---	---	---	------------------------

53. To what degree do you think that objective observers would say this person deserved the advantage that you are envious of?

Didn't deserve it at all	0	1	2	3	4	5	6	Totally deserved it
-----------------------------	---	---	---	---	---	---	---	------------------------

54. To what degree do you feel this person acted wrongly in how they gained the envied advantage?

Didn't act wrongly at all	0	1	2	3	4	5	6	Acted entirely wrongly
------------------------------	---	---	---	---	---	---	---	---------------------------

55. To what degree do you feel this person acted wrongly in how they kept the envied advantage?

Didn't act wrongly at all	0	1	2	3	4	5	6	Acted entirely wrongly
------------------------------	---	---	---	---	---	---	---	---------------------------

56. To what degree do you feel this person acted wrongly in how they reacted to getting the envied advantage?

Didn't act wrongly at all	0	1	2	3	4	5	6	Acted entirely wrongly
------------------------------	---	---	---	---	---	---	---	---------------------------

57. To what degree would other people say this person acted wrongly in how they gained the envied advantage?

Didn't act wrongly at all	0	1	2	3	4	5	6	Acted entirely wrongly
------------------------------	---	---	---	---	---	---	---	---------------------------

58. To what degree would other people say this person acted wrongly in how they kept the envied advantage?

Didn't act wrongly at all 0 1 2 3 4 5 6 Acted entirely wrongly

59. To what degree would other people say this person acted wrongly in how they reacted to getting the envied advantage?

Didn't act wrongly at all 0 1 2 3 4 5 6 Acted entirely wrongly

With respect to the emotions and feelings you experienced when you were envious:

60. How intense was the emotional experience overall?

Not at all intense 0 1 2 3 4 5 6 Extremely intense

61. How envious did you feel?

Not at all envious 0 1 2 3 4 5 6 Extremely envious

62. How frustrated did you feel?

Not at all frustrated 0 1 2 3 4 5 6 Extremely frustrated

63. How inadequate did you feel?

Not at all inadequate 0 1 2 3 4 5 6 Extremely inadequate

64. How inferior did you feel?

Not at all inferior 0 1 2 3 4 5 6 Extremely inferior

65. How guilty did you feel?

Not at all guilty 0 1 2 3 4 5 6 Extremely guilty

66. How helpless did you feel?

Not at all helpless 0 1 2 3 4 5 6 Extremely helpless

67. What did you feel helpless about?

68. How much did you long for the envied advantage?

Not at all	0	1	2	3	4	5	6	Longed for it intensely
------------	---	---	---	---	---	---	---	-------------------------

69. How pleasant was the experience?

Not at all pleasant	0	1	2	3	4	5	6	Extremely pleasant
---------------------	---	---	---	---	---	---	---	--------------------

70. How inspired did you feel by the person you envied?

Not at all inspired	0	1	2	3	4	5	6	Extremely inspired
---------------------	---	---	---	---	---	---	---	--------------------

71. How friendly did you feel toward the person you envied?

Not at all friendly	0	1	2	3	4	5	6	Extremely friendly
---------------------	---	---	---	---	---	---	---	--------------------

72. How much did you admire the person you envied?

Not at all	0	1	2	3	4	5	6	Admired them intensely
------------	---	---	---	---	---	---	---	------------------------

73. How angry were you at the person you envied?

Not at all angry	0	1	2	3	4	5	6	Extremely angry
------------------	---	---	---	---	---	---	---	-----------------

74. How much did you resent the person you envied?

Not at all	0	1	2	3	4	5	6	Resented them intensely
------------	---	---	---	---	---	---	---	-------------------------

75. How disgusted were you by the person you envied?

Not at all disgusted	0	1	2	3	4	5	6	Extremely disgusted
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76. How cold did you feel toward the person you envied?

Not at all cold	0	1	2	3	4	5	6	Extremely cold
-----------------	---	---	---	---	---	---	---	----------------

Answer the following questions whether you have responded to this situation already or not. If you have not yet responded to this situation in which you felt envy, but you think that you will in the future, answer the following questions as though they were asking what you will do instead of what you did do.

87. To what degree did you compliment the envied person on their success?

Didn't do this 0 1 2 3 4 5 6 Did this
at all completely

88. To what degree did you say something mean or hurtful to the envied person?

Didn't do this 0 1 2 3 4 5 6 Did this
at all completely

89. To what degree did you talk negatively about the envied person behind their back?

Didn't do this 0 1 2 3 4 5 6 Did this
at all

Answering 0 to #89 skipped the participant to #92.

90. When you talked behind their back, did you talk about the envied advantage?

Yes No

91. When you talked behind their back, did you talk about something unrelated to the envied advantage?

Yes No

92. Did you do anything else to the envied person that was mean or harmful? (e.g. steal from them, sabotage their efforts etc.)?

Yes No

Answering No to #92 skipped the participant to #96.

93. What was the harmful thing you did?

94. How harmful was the thing you did?

Not at all 0 1 2 3 4 5 6 Extremely
harmful harmful

95. How secret was the thing you did?

Not at all 0 1 2 3 4 5 6 Extremely
secret secret

96. To what degree did you try harder to achieve your own goals?

Didn't try at all 0 1 2 3 4 5 6 Tried extremely hard

Answering 0 to #96 skipped the participant to #101.

97. What goal or goals were you trying to achieve?

98. How did you try harder to achieve these goal(s)?

99. Did you try to get the person you envied involved in your efforts to achieve your goals (e.g. ask them for help)

Yes No

Answering No to #99 skipped the participant to #101.

100. How involved did you want the envied person to be in helping you achieve your goals?

Not at all involved 0 1 2 3 4 5 6 Extremely involved

101. To what degree did you attempt to imitate the envied person?

Didn't try to imitate at all 0 1 2 3 4 5 6 Tried to imitate completely

102. Did you complain about the situation to anyone?

Yes No

103. Who did you complain to?

Space for additional comments etc.

Appendix C – Original Codebooks

Descriptions Codebook (Original)

Background

Domain of the envied advantage-1: (*What is the domain of the advantage that the participant is envious of the other person for having? Select the most appropriate*)

1. Money (e.g. income, wealth)
2. Other Material Possessions (e.g. clothes, electronics, car, house)
3. Sexual or Romantic Partner
4. Child or Children
5. Other Social Relationship (e.g. friends, relatives)
6. Physical Attractiveness
7. Other Physical Attributes (e.g. height, endurance, health)
8. Physical Talents or Skills (e.g. athletic skill, dance skill)
9. General Intelligence
10. Mental Attributes (e.g. memory, creativity, imagination)
11. General Knowledge or Education Level
12. Special Knowledge or Skill (e.g. foreign language, math skills, computer skills)
13. Personality traits (e.g. warmth, openness, confidence)
14. Moral virtues (e.g. generosity, fairness, loyalty, honesty)
15. Popularity/Social Status
16. General accomplishment, not otherwise specified (e.g. successful career, achieved many life goals) (*This category specifically refers to accomplishments that are general in nature. If the advantage is in a more specific domain, select that domain.*)
17. Specific Award or Achievement (e.g. Olympic medal, Nobel prize, Academy award)
18. Experience or Event, not otherwise specified (e.g. meet a famous person, travel somewhere exotic)

Domain of the envied advantage-2: (*What is the domain of the advantage that the participant is envious of the other person for having? Select the most appropriate*)

1. Social
 - a. Romantic/sexual
 - i. Possession of a (good) relationship in general
 - ii. Attentions of a specific person

- b. Family
 - i. Quality/supportiveness of relationship, access to
 - ii. Possession of (e.g. has a wife and kids)
- c. Friends
 - i. Has (lots of) friends
 - ii. Attention of specific person
- d. Status/Recognition
- 2. Academic
 - a. Performance (*about the instance, not underlying ability, e.g. grade*)
 - b. Access to (*the academic opportunity itself is the focus, not financial gain that might result, e.g. got accepted to grad school*)
 - c. Ability (*more about ability than specific performance, e.g. everything comes easy to him*)
- 3. Job/Career (*about job success, not merely occurring at work*)
 - a. Possession of/success at a job/good job in general
 - i. More about the money
 - ii. More about the career success
 - b. Got a specific job, promotion etc.
 - i. More about the money
 - ii. More about the career success
 - c. Special achievement/recognition (e.g. employee of month)
- 4. Material Resources
 - a. Has money/access to money/financial stability/stuff that indicates money
 - b. Specific valued possession (*about THAT thing, not the ability to have nice things in general*)
- 5. Physical attractiveness or appearance
 - a. Inherent (e.g. body, face, hair)
 - b. External (e.g. clothes)
- 6. Personality traits (e.g. People skills, self-confidence, creativity)
- 7. Specific skill, knowledge, ability
- 8. Physical skill/ability/talent (e.g. sports, dance)
- 9. Freedom from responsibility/restraint (e.g. free time)
- 10. Specific unusual/exotic experience/opportunity (e.g. *travel*)
- 11. Specific missed/lost opportunity (e.g. tickets sold out, didn't join team)
- 12. Generally good life (*only use if said, don't use as a catch all*)
- 13. Other (*explain in comments*)
- 14. Can't tell

Relationship with envied person:

- | | |
|---------------|----------------------|
| 1. Family | 2. Significant Other |
| 3. Friend | 4. Coworker |
| 5. Classmate | 6. Acquaintance |
| 7. Stranger | 8. Other (Explain) |
| 9. Can't tell | |

Specific or General:

1. The envy is aimed at one or a few specific individuals (e.g. my sister, the other members of our group)
2. The envy is aimed at some general (anonymous) class of people (e.g. people in relationships)

Sociality of the context

Direct Indication that others (aside from the participant or the envied person) were aware of the situation or involved in the situation. It is not necessary for others to be aware that the P is envious, they could be aware of the situation that is the cause of the envy:

- 1 mentions lack of awareness in others (e.g. I didn't say anything so no one knew how I felt, no one noticed, no one else was there to see).
- 0 no explicit mention (*Use 0 even if info is given, but only as background for another point*).
- 1 mentions that others were aware or involved (e.g. my friend noticed that my expression changed, I told someone about it, we all looked at each other when she said that, everyone there felt a little jealous, everyone was so interested, they couldn't stop listening to her)

How social is the situation? (9 NEI)

This is about the environment in which the participant's envy could be perceived and responded to by others or in which the participant could enact a social response to their envy (gossip about envied person, convince others to ostracize envied person, etc.) It is specifically about the social presence/awareness of people other than the envied person and the participant. Include all info (explicit or not) about the presence of observers or the likelihood that relevant others will know/be involved, how important the others are to the envied, how invested the others are in the situation and how aware the others are.

Factors that increase the sociality rating:

- *The social environment is relevant to the envied person or the participant.*
- *The social environment is important to the possession of the advantage by the envied person.*
- *The social environment is aware of, or likely to take notice of, the situation.*
- *A social response is possible in the social environment.*

Not at all social 0 1 2 3 4 5 6 Extremely social

Direct Indication of the Social perception of envied: (*Did the participant make a point of saying something about how people (other than the participant) feel about the envied person?*)

- 1 Envied is perceived poorly by others
 - a. Anonymous aversion (*usually regarding physical appearance*)
 - b. By people who know the envied (e.g. everyone in the office thinks he is a suck up)
- 0 Not Mentioned
- 1 Envied is perceived positively by others
 - a. Anonymous admiration (e.g. men always look at her because she is so pretty)
 - b. By people who know the envied (e.g. He is a great person, everyone loves him)

Direct Indication that the Lack of the envied advantage reflects poorly on participant: (*Did the participant indicate that they feel their lack of the envied advantage, or the envied person's possession of it, "makes them look bad" or reflects poorly on them?*)

- 0 Not Mentioned
- 1 Indicated the lack makes them look bad (e.g. Now people will think I can't do it)

Acquirability or replaceability of the envied advantage: (*This is about the underlying thing, the real reason for the participant's envy, which may not be the specific thing mentioned. To identify this, think about a few different things the participant would go out and get or do if they magically could.*)

Direct Indication of something blocking acquisition of the advantage

- 0 Not mentioned
- 1 Participant makes a point of mentioning something that prevented them from gaining the envied advantage (*Look for "but I couldn't because" or similar phrases*)

How easy would it be for *this person* to acquire or replace the advantage? (9 is NEI)
(*Take into account information about this person's particular circumstances*)

Very easy 0 1 2 3 4 5 6 Impossible

In general, how easy is this sort of advantage to acquire or replace? (9 is NEI)

(*This is the sort of thing that a person can manage to get for themselves in general e.g. A smile from a stranger would be a 0, getting a decent job within one's qualifications would be about 3 and possession of the Hope Diamond would be a 6*)

Very easy 0 1 2 3 4 5 6 Impossible

Independence: *(Is the possession of the advantage by the participant independent of its possession by the envied? Requires a bit more than the fact that there is one less of something in the world)*

- 0 Dependent – *(Whether or not the envied person gets the advantage affects whether the participant can or could have gotten it. e.g. promotion the participant was eligible for)*
- 1 Independent – *(Whether or not the envied person gets or has the advantage has no bearing on whether the participant gets it. e.g. salary of someone who works in a different company)*
- 9 NEI or unclear

Response: *(behavioral responses; actual acts that the participant did (or will do) because they were envious, or because of the situation that caused their envy. Include responses to this particular instance only, even if previous occasions are mentioned. If a general response to this type of situation is described, and it isn't clear whether it was enacted this time, include it. The word "response" will be used to refer to behaviors. Don't include feelings the participant had as a result of the situation)*
(If no response, code "Response 1" as such so all scenarios will have Response 1 coded. Use additional spaces if multiple responses reported.)

Response # Type:

- 1 The response is hostile toward envied person and/or is aimed at removing the advantage from the envied person
- 0 No response or none mentioned
- 1 The response is neutral or prosocial toward envied person and/or is aimed at improving oneself without harming the envied person
- 9 other/unclear/NEI

Response #:

(Pick the best. Use additional rows if multiple separate responses are indicated. If a response is ambiguous, or seems to cross 2 categories, pick the best, don't check multiple. Explain all responses in comments column)

No response indicated (Type 0)

- 1. Not mentioned
- 2. Indicates no response *(Specifically said they didn't do anything)*

Neutral (Type 9) Responses

- 3. Actively hide or suppress one's envy
- 4. Physically distance self from envied

Hostile (Type -1) Responses

5. Say something mean or hurtful to the envied person
6. Talk negatively about the envied person behind their back
7. Devalue the quality or value of the advantage
8. Other socially hostile response (ostracize, give cold shoulder etc.) (Explain)
9. Steal resource for self
10. Deprive envied of resource without gaining it (break or damage, etc.)
11. Other non-social hostile response (Explain)

Beneficial (Type 1) Responses

12. Compliment/congratulate the envied person on their success
13. Increase own effort or resource expenditure
14. Be nice to, befriend, or affiliate with the envied person
15. Solicit help from envied person
16. Emulate envied person
17. Other non-hostile response (Explain)

Can be Type -1, 1, or 9 depending on context

18. Tell others about one's envy
19. Tell envied person about one's envy
20. Convince others (including envied resource) (e.g. Talked her into leaving her boyfriend for me (-1) Got the prof to curve the grades so everyone's score went up (1)
21. OTHER (Explain)

Worked For Advantage: (*refers to effort or any other expenditure of time or resources, e.g. I had to pay for it but she got it for free*)

Direct Indication of Participant's Effort:

- 1 direct indication of no or insufficient effort (e.g. I didn't really study, I shouldn't have goofed off so much)
- 0 not mentioned
- 1 direct indication of effort (e.g. I studied for days, I applied so many times)

Direct Indication of Envied Person's Effort:

- 1 direct indication of no or insufficient effort (e.g. he didn't even try, she studied some but not as much as I did)
- 0 not mentioned
- 1 direct indication of effort (e.g. I know she works hard)

Feelings and Tone

Direct Indication that the Participant's Motivation was affected by situation:

(Referring to motivation to expend effort or resources or otherwise pay costs to gain advantage. Specific to a change in motivation due to the envy experience, don't include effort generally expended)

- 1 Motivation went down as a result of the situation (e.g. I got discouraged, it made me not want to try anymore)
- 0 Not Mentioned
- 1 Motivation went up as a result of the situation (e.g. I felt motivated, I got pumped)

Wrote in a rude, mean, or disparaging way about the envied person: *(Refers to the tone of the description. Must be personal commentary, not simply repeating what others have said about the envied. It is possible for a single description may have both rude and nice elements, not necessarily either/or)*

- 0 Description was NOT rude, mean or disparaging
- 1 Description WAS rude, mean or disparaging

Wrote in a nice, kind or respectful way about the envied person: *(Refers to the tone of the description. Must be personal commentary, not simply listing the reasons for the envy. It is possible for a single description may have both rude and nice elements, not necessarily an either/or)*

- 0 Description was NOT nice, kind, or respectful
- 1 Description WAS nice, kind, or respectful

Direct indication of unfairness or injustice: *(Refers to a statement about the unfairness of the situation specifically. It is not blaming the envied person. This code requires more than just a comparison of amount of effort put in, there must be a specific statement about the unfairness. E.g. why should he get it and not me? We both tried, should I get recognized as well? It isn't fair, it isn't right)*

- 0 Not Mentioned
- 1 Statement of unfairness

Direct Indication that the envied person doesn't (sufficiently) appreciate their advantage

- 0 Not Mentioned
- 1 Statement of lack of appreciation

Direct indication that the situation or discrepancy isn't the envied person's fault: *(It isn't sufficient for the description to say that the envied person is "naturally" a certain*

way (smarter, prettier, etc.), it must actually point out that their superiority isn't their fault. E.g. I know it isn't his fault but...)

- 0 Not Mentioned
- 1 Statement of lack of fault

Direct indication that participant felt they had little or no control, felt helpless:

- 0 Not Mentioned
- 1 Stated they felt helpless (e.g. nothing I could do, can't do anything about it, feel helpless)

Direct Indication that the Participant made an internal resolution of self-acceptance: (Some kind of statement about acceptance of oneself, the situation, etc. e.g. but then I realized everyone has problems and I should be happy for what I have, I decided to be happy with myself just the way I am)

- 0 Not Mentioned
- 1 Resolution of Acceptance

Other Emotions: (List [in order] all other emotions the participant mentions feeling as a result of the envy or the situation that caused it. Don't include "Envious" or "Jealous". For all coded emotions, give the wording the code is based on in the comments column)

1. Frustration (e.g. frustrated, frustration, frustrating)
2. Hostility (List target: envied, unspecified, self, other) (e.g. angry, hate him, mad at myself)
3. Inferiority (e.g. inadequate, insecure, not as good as, better than me)
4. Admiration of the envied person (e.g. Admire her, look up to him)
5. Sad/depressed (e.g. down, hurt in the generic emotional pain sense)
6. Guilt/shame (e.g. felt like a bad person)
7. Longing/Desire (e.g. Really wanted it) (Only code really wanting something if it was stated specifically as a feeling and not just as description of the events)
8. Socially isolated (e.g. lonely, unwanted, left out)
9. Injured (e.g. Hurt, betrayed)
10. Happy for envied person
0. Other (List)

Timescale of experience of envy

Direct Indication of the duration of the envy (e.g. just for a moment, lasted all day)

- 0 Not Mentioned
- 1 Statement of Duration

(If "Yes") How long did the envy last?

- | | | |
|----------------------------|-----------------|---------------|
| 1. Over immediately | 2. Seconds | 3. Minutes |
| 4. Hours / Rest of the day | 5. Days/Ongoing | 9. Can't tell |

Open-Ended Questions Codebook (Original)

What did the other person have or get that made you envious (What was the envied advantage in this situation)?

How do you think that having that advantage benefits the other person?

Think of the domain that the envied advantage is in. For example, if you are envious of someone's good grade, the domain is academic achievement, if you are envious because someone won an athletic competition, the domain is athletic achievement. What domain would you say this envied advantage is in?

(Multiple Available)

Domain: (What is the domain of the advantage that the participant is envious of the other person for having? Select the most appropriate)

1. Social
 - a. Romantic/sexual
 - i. Possession of a (good) relationship in general
 - ii. Attentions of a specific person
 - b. Family
 - i. Quality/supportiveness of relationship, access to
 - ii. Possession of (e.g. *has a wife and kids*)
 - c. Friends
 - i. Has (lots of) friends
 - ii. Attention of specific person
 - d. Status/Recognition
2. Academic
 - a. Performance (about the instance, not underlying ability, e.g. *grade*)
 - b. Access to (the academic opportunity itself is the focus, not financial gain that might result, e.g. *got accepted to grad school*)
 - c. Ability (more about ability than specific performance, e.g. *everything comes easy to him*)
3. Job/Career (about job success, not merely occurring at work)
 - a. Possession of/success at a job/good job in general
 - i. More about the money
 - ii. More about the career success
 - b. Got a specific job, promotion etc.
 - i. More about the money
 - ii. More about the career success
 - c. Special achievement/recognition (e.g. *employee of month*)
4. Material Resources
 - a. Has money/access to money/financial stability/stuff that indicates money
 - b. Specific valued possession (about THAT thing, not the ability to have nice things in general)
5. Physical attractiveness or appearance
 - a. Inherent (e.g. *body, face, hair*)

- b. External (e.g. *clothes*)
6. Personality traits (e.g. *People skills, self-confidence, creativity*)
 7. Specific skill, knowledge, ability
 8. Physical skill/ability/talent (e.g. *sports, dance*)
 9. Freedom from responsibility/restraint (e.g. *free time*)
 10. Specific unusual/exotic experience/opportunity (e.g. *travel*)
 11. Specific missed/lost opportunity (e.g. *tickets sold out, didn't join team*)
 12. Generally good life (only use if said, don't use as a catch all)
 13. Other (explain in comments)
 14. Can't tell

Acquire: In general, how easy is this sort of advantage to acquire or replace?

(This is about the underlying thing, the real reason for the participant's envy, which may not be the specific thing mentioned. To identify this, think about a few different things the participant would go out and get or do if they magically could.), e.g. *A smile from a stranger would be a 0, a decent job within one's qualifications would be about 3 and possession of the Hope Diamond would be a 6* (9 is NEI)

Very easy 0 1 2 3 4 5 6 Impossible

Independence: (Is the possession of the advantage by the participant independent of its possession by the envied? Requires a bit more than the fact that there is one less of something in the world)

- | | |
|---|---|
| 0 | Dependent – (Whether or not the envied person gets the advantage affects whether the participant can or could have gotten it. e.g. <i>promotion the participant was eligible for</i>) |
| 1 | Independent – (Whether or not the envied person gets or has the advantage has no bearing on whether the participant gets it. e.g. <i>salary of someone who works in a different company</i>) |
| 9 | NEI or unclear |

With respect to others (aside from the Participant and the Envied) who were present when the Participant felt envy:

How are they associated with you?

How are they associated with the person you envied?

Who would OP favor? Compare how the others who were present are associated with the participant versus the envied, and code who they would be expected to favor or like better (e.g. *If the others are friends of the Participant and strangers to Envied, code -1. If the others are strangers to both the Participant and the Envied, code 0. If the others are closer to the Envied than the Participant, code +1*)

Treat “family” as on par with “friend” unless more info is given (*so if the “other” is the Participant’s best friend of 30 years and 2nd cousin to the Envied, the Participant is probably favored so code -1*)

- 1 Expected to favor the Participant
- 0 Same relationship to both
- +1 Expected to favor the Envied
- 9 Can’t tell

How could they tell [that you were envious]?

How could OP tell P was envious? How could the others who were present tell that the Participant was envious? (Multiple Available)

1. How the Participant acted (including demeanor/expression)
 - a. Became quiet, unresponsive
 - b. Withdrew, left, kept distance
 - c. Focus or shift of attention (e.g. *staring*)
 - d. Anger
 - e. Insulting (e.g. *roll eyes, laugh*)
 - f. Facial expression
2. Told them
 - a. As a compliment/congratulations
 - b. Explained/complained about situation
 - c. Said envious specifically
3. Knows you, your goals, your history
4. Knows that the situation warrants envy/has common goal
5. Envied responded
6. Other (explain in comments)
9. NEI can’t tell

With respect to others who the Participant thinks will find out about the Participant's envy

How are they associated with you?

How are they associated with the person you envied?

Who would OFO favor? Compare how the others who were present are associated with the participant and the envied and code who they would be expected to favor or like better (e.g. *If the others are friends of the Participant and strangers to Envied, code -1. If the others are strangers to both the Participant and the Envied, code 0. If the others are closer to the Envied than the Participant, code +1*)

Treat “family” as on par with “friend” unless more info is given (*so if the “other” is the Participant’s best friend of 30 years and 2nd cousin to the Envied, the Participant is probably favored so code -1*)

- 1 Expected to favor the Participant
- 0 Same relationship to both
- +1 Expected to favor the Envied
- 9 Can’t tell

How will they be able to tell [that you were envious]?

Code OFO: How can the others who will find out tell that the Participant was envious?
(Multiple Available)

1. How the Participant acted (including demeanor/expression)
 - a. Became quiet, unresponsive
 - b. Withdrew, left, kept distance
 - c. Focus or shift of attention (e.g. *staring*)
 - d. Anger
 - e. Insulting (e.g. *roll eyes, laugh*)
 - f. Facial expression
2. Told them
 - a. As a compliment/congratulations
 - b. Explained/complained about situation
 - c. Said envious specifically
3. Knows you, your goals, your history
4. Knows that the situation warrants envy/has common goal
5. Envied responded
6. Other (explain in comments)
9. NEI can’t tell

In what ways are you similar?

Similar: (Multiple Available) Enter codes in the order listed in the answer

1. Gender
2. Age
3. Ethnicity/Race/Nationality
4. Physical Appearance/fitness
5. Social class, background
6. Financial Status
7. Relationship Status
8. Life stage (e.g. *college student, just starting career*)
9. Goals (e.g. *academic, career, life*)
10. Where from (geographic location)
11. Family
12. Friends

13. Religion
14. Experiences (similar/shared)
15. Sense of humor
16. Outgoingness/sociability
17. Intelligence
18. Other personality
19. Values/morals
20. Hobbies/interests/activities
21. Preferences/tastes
22. Skill/ability/talent
23. Opinions/perspective on life (e.g. *we think alike*)
24. Specific achievement/success/possession
25. Doesn't Apply

In what ways are you different?

Different: (Multiple Available) Enter codes in the order listed in the answer

1. Gender
2. Age
3. Ethnicity/Race/Nationality
4. Physical Appearance/fitness
5. Social class, background
6. Financial Status
7. Relationship Status
8. Life stage (e.g. *college student, just starting career*)
9. Goals (e.g. *academic, career, life*)
10. Where from (geographic location)
11. Family
12. Friends
13. Religion
14. Experiences (similar/shared)
15. Sense of humor
16. Outgoingness/sociability
17. Intelligence
18. Other personality
19. Values/morals
20. Hobbies/interests/activities
21. Preferences/tastes
22. Skill/ability/talent
23. Opinions/perspective on life (e.g. *we think alike*)
24. Specific achievement/success/possession
25. Doesn't Apply

What did you feel helpless about?

Can't BE vs. Can't DO

1 – Can't BE language – ability, (e.g. *not able to improve, my ability to achieve*)

2 – Can't DO Language – situational, restricted action (*e.g. can't fix situation, can't get that*)

9 – Other/Ambiguous

Go Back: Mentions going back in time, or changing the past

1 – Yes

0 – No

Inferior: Indicates inferiority (*e.g. not good enough, not as good as*)

1 – Yes

0 – No

Comparison: Compares self to the Envied Person (*e.g. can't be like her, can't have what he has*)

1 – Yes

0 – No

Future Positive: Mentions that the future will be better or that the situation could improve with time

1 – Yes

0 – No

Did you do anything (respond) as a result of the situation in which you felt envy?

IF YES: What did you do?

Only code actual behaviors that the participant did as a result of the situation in which they felt envy. (Multiple Available)

Hostility: How hostile was the response toward the envied person? (9 is NEI)

Not Hostile 0 1 2 3 4 5 6 Extremely Hostile

Sociality: How social was the response?

If the response didn't involve or include anyone besides the participant, code 0 (*e.g. studied more*)

If the response involved ONLY the participant and the Envied, code 1 (*e.g. asked the envied person to study together*)

Elements that affect the Sociality rating of the response:

- The more people that were involved, the more social the response
 - The more involved, or important, the people are to the situation, the more social
 - The more the effectiveness of the response depends on the people, the more social
- (9 is NEI)

Not at all social 0 1 2 3 4 5 6 Extremely social

Objective Social Approval: How would people in general feel about the response?
(9 is NEI)

Strongly Disapprove 0 1 2 3 4 5 6 Strongly Approve

Independent: Does the Participant's response affect the Envied person or their possession of the advantage? (e.g. *steal their car would be 0, dependent, because it affects whether the Envied has the car. Workout more would be 1, independent, because the fitness level of the Participant doesn't affect the fitness level of the Envied*)

- 1 Independent – (Response does NOT affect possession of the advantage by the envied)
- 0 Dependent – (Response affects possession of the advantage by the envied)
- 9 NEI or unclear

Type:

1. Response moves Participant up toward the position of the Envied without removing their advantage (e.g. *Studied more to get a good grade*)
2. Response pulls the Envied down to the Participants position without benefitting the Participant (e.g. *told everyone how she didn't deserve it*)
3. Response Moves Participant up AND pulls Envied down (e.g. *flirted with his girlfriend*)
4. Response is positive or benign but doesn't gain the advantage for the Participant
5. Response is hostile or negative but doesn't remove the advantage from the Envied
6. Response is neutral, does no harm nor benefit
9. NEI or Doesn't Apply

Action Code: Explain in the comments

1. Actively hide or suppress one's envy
2. Physically distance self from envied
3. Say something mean or hurtful to the envied person
4. Talk negatively about the envied person behind their back
5. Devalue the quality or value of the advantage
6. Other socially hostile response (e.g. *ostracize, give cold shoulder*)
7. Steal resource for self
8. Deprive envied of resource without gaining it (e.g. *break or damage*)
9. Other non-social hostile response
10. Compliment/congratulate the envied person on their success

11. Increase own effort or resource expenditure
12. Be nice to, befriend, or affiliate with the envied person
13. Solicit help from envied person
14. Emulate envied person
15. Other non-hostile response
16. Tell others about one's envy
17. Tell envied person about one's envy
18. Convince others (including envied resource)
19. OTHER
20. Doesn't Apply

Was there something you would have liked to have done but didn't? (include anything that crossed your mind, even for a moment) IF YES: What did you want to do?

Only code actual behaviors that the participant wanted to do as a result of the situation in which they felt envy. (Multiple Available)

Hostility: How hostile was the desired response toward the envied person? (9 is NEI)

Not Hostile 0 1 2 3 4 5 6 Extremely Hostile

Sociality: How social was the desired response?

If the response didn't involve or include anyone besides the participant, code 0 (e.g. *studied more*)

If the response involved ONLY the participant and the Envied, code 1 (e.g. *asked the envied person to study together*)

Elements that affect the Sociality rating of the response:

- The more people that were involved, the more social the response
- The more involved, or important, the people are to the situation, the more social
- The more the effectiveness of the response depends on the people, the more social (9 is NEI)

Not at all social 0 1 2 3 4 5 6 Extremely Social

Objective Social Approval: How would people in general feel about the response? (9 is NEI)

Strongly Disapprove 0 1 2 3 4 5 6 Strongly Approve

Independent: Would the desired response affect the Envied person or their possession of the advantage? (e.g. *steal their car would be 0, dependent, because it affects whether the*

Envied has the car. Workout more would be 1, independent, because the fitness level of the Participant doesn't affect the fitness level of the Envied)

- 1 Independent – (Response would NOT affect possession of the advantage by the envied)
- 0 Dependent – (Response would affect possession of the advantage by the envied)
- 9 NEI or unclear

Type:

- 1. Response moves Participant up toward the position of the Envied without removing their advantage (*e.g. Studied more to get a good grade*)
- 2. Response pulls the Envied down to the Participants position without benefitting the Participant (*e.g. told everyone how she didn't deserve it*)
- 3. Response Moves Participant up AND pulls Envied down (*e.g. flirted with his girlfriend*)
- 4. Response is positive or benign but doesn't gain the advantage for the Participant
- 5. Response is hostile or negative but doesn't remove the advantage from the Envied
- 6. Response is neutral, does no harm nor benefit
- 9. NEI or Doesn't Apply

Action Code: Explain in the comments

- 1. Actively hide or suppress one's envy
- 2. Physically distance self from envied
- 3. Say something mean or hurtful to the envied person
- 4. Talk negatively about the envied person behind their back
- 5. Devalue the quality or value of the advantage
- 6. Other socially hostile response (*e.g. ostracize, give cold shoulder*)
- 7. Steal resource for self
- 8. Deprive envied of resource without gaining it (*e.g. break or damage*)
- 9. Other non-social hostile response
- 10. Compliment/congratulate the envied person on their success
- 11. Increase own effort or resource expenditure
- 12. Be nice to, befriend, or affiliate with the envied person
- 13. Solicit help from envied person
- 14. Emulate envied person

15. Other non-hostile response
16. Tell others about one's envy
17. Tell envied person about one's envy
18. Convince others (including envied resource)
19. OTHER
20. Doesn't Apply

Why didn't you do it?

Reported Social Approval: Did Participant indicate that they didn't do the response because of concern with other people's (not the Envied's) approval?

- 1 Yes (e.g. *That would make me look bad*)
- 0 No
- 9 NEI or unclear

Fear of Consequences: Did Participant indicate that they didn't do the response because of fear of some consequence(s)? [Don't include loss of social approval or hurting the Envied]

- 1 Yes (e.g. *I'd get caught cheating*)
- 0 No
- 9 NEI or unclear

Morals/Values: Did Participant indicate that they didn't do the response because it goes against their morals or values?

- 1 Yes (e.g. *I'm not that kind of person*)
- 0 No
- 9 NEI or unclear

Perceived Effectiveness: Did Participant indicate that they didn't do the response because it wouldn't work or wasn't likely to work?

- 1 Yes (e.g. *wouldn't have made any difference*)
- 0 No
- 9 NEI or unclear

Concern for E: Did Participant indicate that they didn't do the response because of a concern about hurting or harming the Envied?

- 1 Yes (Participant expressed concern for Envied)
- 0 No (Participant did not express concern for Envied)
- 9 NEI or unclear

To what degree did you try harder to achieve your own goals?
 IF > 0: What goal or goals were you trying to achieve?

Domain: (Multiple Available)

1. Social
 - a. Romantic/sexual
 - i. Possession of a (good) relationship in general
 - ii. Attentions of a specific person
 - b. Family
 - i. Quality/supportiveness of relationship, access to
 - ii. Possession of (e.g. *has a wife and kids*)
 - c. Friends
 - i. Has (lots of) friends
 - ii. Attention of specific person
 - d. Status/Recognition
2. Academic
 - a. Performance (about the instance, not underlying ability, e.g. *grade*)
 - b. Access to (the academic opportunity itself is the focus, not financial gain that might result, e.g. *got accepted to grad school*)
 - c. Ability (more about ability than specific performance, e.g. *everything comes easy to him*)
3. Job/Career (about job success, not merely occurring at work)
 - a. Possession of/success at a job/good job in general
 - i. More about the money
 - ii. More about the career success
 - b. Got a specific job, promotion etc.
 - i. More about the money
 - ii. More about the career success
 - c. Special achievement/recognition (e.g. *employee of month*)
4. Material Resources
 - a. Has money/access to money/financial stability/stuff that indicates money
 - b. Specific valued possession (about THAT thing, not the ability to have nice things in general)
5. Physical attractiveness or appearance
 - a. Inherent (e.g. *body, face, hair*)
 - b. External (e.g. *clothes*)
6. Personality traits (e.g. *People skills, self-confidence, creativity*)
7. Specific skill, knowledge, ability
8. Physical skill/ability/talent (e.g. *sports, dance*)
9. Freedom from responsibility/restraint (e.g. *free time*)
10. Specific unusual/exotic experience/opportunity (e.g. *travel*)

11. Specific missed/lost opportunity (e.g. *tickets sold out, didn't join team*)
12. Generally good life (only use if said, don't use as a catch all)
13. Other (explain in comments)
14. Can't tell

How did you try harder to achieve these goals?

Effort: How much effort did the Participant put into "trying harder"? (9 is NEI)

No Effort 0 1 2 3 4 5 6 Extreme Effort

Trade-offs: Did the Participant indicate making a trade-off between conflicting goals?

- | | |
|---|----------------|
| 1 | Yes |
| 0 | No |
| 9 | NEI or unclear |

**Did you complain about the situation to anyone?
you complain to?**

IF YES: Who did

(Multiple Available)

Kin to P: Code relatedness to the Participant

Coefficient of relatedness for blood kin

Identical twins = 1

Other twins or full siblings = .5

Half sibling = .25

First cousin = .125

Second cousin = .031

Parent = .5

Offspring = .5

Aunt/Uncle = .25

Niece/Nephew = .25

Grandparent = .25

Grandchild = .25

Code non-blood kin as .001 (Including kin by adoption or marriage: step-relations or in-laws)

Code all other non-relatives as 0

(9 is NEI)

Kin to E: Code relatedness to the Envied

Coefficient of relatedness for blood kin

Identical twins = 1

Other twins or full siblings = .5

Half sibling = .25

First cousin = .125

Second cousin = .031

Parent = .5

Offspring = .5

Aunt/Uncle = .25

Niece/Nephew = .25

Grandparent = .25

Grandchild = .25

Code non-blood kin as .001 (Including kin by adoption or marriage: step-relations or in-laws)

Code all other non-relatives as 0

(9 is NEI)

Close to P: How emotionally close is this person to the Participant? (9 is NEI)

Not Close At All	0	1	2	3	4	5	6	Extremely Close
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Close to E: How emotionally close is this person to the Envied? (9 is NEI)

Not Close At All	0	1	2	3	4	5	6	Extremely Close
------------------	---	---	---	---	---	---	---	-----------------

Involvement: To what degree was the person involved in the situation that caused the envy?

The person is merely present = 1

He person is present, paying attention, and mildly interested in the situation = 3

The outcome of the situation depends on the person, and the person cares a lot about the situation = 6

(9 is NEI)

Not At All Involved	0	1	2	3	4	5	6	Completely Involved
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Appendix D – Adjusted Codebooks

Descriptions Codebook (After Adjustments)

Note: Changes from the original Descriptions Codebook are underlined and in bold.

Background

Domain of the envied advantage-1: (*What is the domain of the advantage that the participant is envious of the other person for having? Select the most appropriate*)

19. Money (e.g. income, wealth)
20. Other Material Possessions (e.g. clothes, electronics, car, house)
21. Sexual or Romantic Partner
22. Child or Children
23. Other Social Relationship (e.g. friends, relatives)
24. Physical Attractiveness
25. Other Physical Attributes (e.g. height, endurance, health)
26. Physical Talents or Skills (e.g. athletic skill, dance skill)
27. General Intelligence
28. Mental Attributes (e.g. memory, creativity, imagination)
29. General Knowledge or Education Level
30. Special Knowledge or Skill (e.g. foreign language, math skills, computer skills)
31. Personality traits (e.g. warmth, openness, confidence)
32. Moral virtues (e.g. generosity, fairness, loyalty, honesty)
33. Popularity/Social Status
34. General accomplishment, not otherwise specified (e.g. successful career, achieved many life goals) (*This category specifically refers to accomplishments that are general in nature. If the advantage is in a more specific domain, select that domain.*)
35. Specific Award or Achievement (e.g. Olympic medal, Nobel prize, Academy award)
36. Experience or Event, not otherwise specified (e.g. meet a famous person, travel somewhere exotic)

Domain of the envied advantage-2: (*What is the domain of the advantage that the participant is envious of the other person for having? Select the most appropriate*)

1. Social
 - a. Romantic/sexual
 - i. Possession of a (good) relationship in general
 - ii. Attentions of a specific person
 - b. Family

- i. Quality/supportiveness of relationship, access to
 - ii. Possession of (e.g. has a wife and kids)
 - c. Friends
 - i. Has (lots of) friends
 - ii. Attention of specific person
 - d. Status/Recognition
- 2. Academic
 - a. Performance (*about the instance, not underlying ability, e.g. grade*)
 - b. Access to (*the academic opportunity itself is the focus, not financial gain that might result, e.g. got accepted to grad school*)
 - c. Ability (*more about ability than specific performance, e.g. everything comes easy to him*)
- 3. Job/Career (*about job success, not merely occurring at work*)
 - a. Possession of/success at a job/good job in general
 - i. More about the money
 - ii. More about the career success
 - b. Got a specific job, promotion etc.
 - i. More about the money
 - ii. More about the career success
 - c. Special achievement/recognition (e.g. employee of month)
- 4. Material Resources
 - a. Has money/access to money/financial stability/stuff that indicates money
 - b. Specific valued possession (*about THAT thing, not the ability to have nice things in general*)
- 5. Physical attractiveness or appearance
 - a. Inherent (e.g. body, face, hair)
 - b. External (e.g. clothes)
- 6. Personality traits (e.g. People skills, self-confidence, creativity)
- 7. Specific skill, knowledge, ability
- 8. Physical skill/ability/talent (e.g. sports, dance)
- 9. Freedom from responsibility/restraint (e.g. free time)
- 11.** Specific unusual/exotic experience/opportunity (e.g. *travel*) (**Collapsed into code 11**)
- 11. Specific missed/lost opportunity (e.g. tickets sold out, didn't join team)
- 12. Generally good life (*only use if said, don't use as a catch all*)
- 13. Other (*explain in comments*)
- 13.** Can't tell (**Collapsed into code 13**)

Relationship with envied person:

- | | |
|---------------|------------------------------------|
| 1. Family | 2. Significant Other |
| 3. Friend | 4. Coworker |
| 5. Classmate | 6. Acquaintance |
| 7. Stranger | 8. Other (Explain) |
| 9. Can't tell | <u>10. Roommate (Added)</u> |

11. Teammate (Added)
(Added)

12. Those who have what the envier lacks

Specific or General:

1. The envy is aimed at one or a few specific individuals (e.g. my sister, the other members of our group)
2. The envy is aimed at some general (anonymous) class of people (e.g. people in relationships)

Sociality of the context

Direct Indication that others (aside from the participant or the envied person) were aware of the situation or involved in the situation. It is not necessary for others to be aware that the P is envious, they could be aware of the situation that is the cause of the envy:

- 1 mentions lack of awareness in others (e.g. I didn't say anything so no one knew how I felt, no one noticed, no one else was there to see).
- 0 no explicit mention (*Use 0 even if info is given, but only as background for another point*).
- 1 mentions that others were aware or involved (e.g. my friend noticed that my expression changed, I told someone about it, we all looked at each other when she said that, everyone there felt a little jealous, everyone was so interested, they couldn't stop listening to her)

How social is the situation? (9 NEI)

This is about the environment in which the participant's envy could be perceived and responded to by others or in which the participant could enact a social response to their envy (gossip about envied person, convince others to ostracize envied person, etc.) It is specifically about the social presence/awareness of people other than the envied person and the participant. Include all info (explicit or not) about the presence of observers or the likelihood that relevant others will know/be involved, how important the others are to the envied, how invested the others are in the situation and how aware the others are.

Factors that increase the sociality rating:

- *The social environment is relevant to the envied person or the participant.*
- *The social environment is important to the possession of the advantage by the envied person.*
- *The social environment is aware of, or likely to take notice of, the situation.*
- *A social response is possible in the social environment.*

Not at all social 0 1 2 3 4 5 6 Extremely social

Direct Indication of the Social perception of envied: (*Did the participant make a point of saying something about how people (other than the participant) feel about the envied person?*)

- 1 Envied is perceived poorly by others
 - a. Anonymous aversion (*usually regarding physical appearance*)
 - b. By people who know the envied (e.g. everyone in the office thinks he is a suck up)
- 0 Not Mentioned
- 1 Envied is perceived positively by others
 - c. Anonymous admiration (e.g. men always look at her because she is so pretty)
 - d. By people who know the envied (e.g. He is a great person, everyone loves him)

Direct Indication that the Lack of the envied advantage reflects poorly on participant: (*Did the participant indicate that they feel their lack of the envied advantage, or the envied person's possession of it, "makes them look bad" or reflects poorly on them?*)

- 0 Not Mentioned
- 1 Indicated the lack makes them look bad (e.g. Now people will think I can't do it)

Acquirability or replaceability of the envied advantage: (*This is about the underlying thing, the real reason for the participant's envy, which may not be the specific thing mentioned. To identify this, think about a few different things the participant would go out and get or do if they magically could.*)

Direct Indication of something blocking acquisition of the advantage

- 0 Not mentioned
- 1 Participant makes a point of mentioning something that prevented them from gaining the envied advantage (*Look for "but I couldn't because" or similar phrases*)

How easy would it be for *this person* to acquire or replace the advantage? (9 is NEI)
(*Take into account information about this person's particular circumstances*)

Very easy 0 1 2 3 4 5 6 Impossible

In general, how easy is this sort of advantage to acquire or replace? (9 is NEI)

(*This is the sort of thing that a person can manage to get for themselves in general e.g. A smile from a stranger would be a 0, getting a decent job within one's qualifications would be about 3 and possession of the Hope Diamond would be a 6*)

Very easy 0 1 2 3 4 5 6 Impossible

Independence: *(Is the possession of the advantage by the participant independent of its possession by the envied? Requires a bit more than the fact that there is one less of something in the world)*

- 0 Dependent – *(Whether or not the envied person gets the advantage affects whether the participant can or could have gotten it. e.g. promotion the participant was eligible for)*
- 1 Independent – *(Whether or not the envied person gets or has the advantage has no bearing on whether the participant gets it. e.g. salary of someone who works in a different company)*
- 9 NEI or unclear

Response: *(behavioral responses; actual acts that the participant did (or will do) because they were envious, or because of the situation that caused their envy. Include responses to this particular instance only, even if previous occasions are mentioned. If a general response to this type of situation is described, and it isn't clear whether it was enacted this time, include it. The word "response" will be used to refer to behaviors. Don't include feelings the participant had as a result of the situation)*
(If no response, code "Response 1" as such so all scenarios will have Response 1 coded. Use additional spaces if multiple responses reported.)

Response # Type:

- 1 The response is hostile toward envied person and/or is aimed at removing the advantage from the envied person
- 0 No response or none mentioned
- 1 The response is neutral or prosocial toward envied person and/or is aimed at improving oneself without harming the envied person
- 9 other/unclear/NEI

Response #:

(Pick the best. Use additional rows if multiple separate responses are indicated. If a response is ambiguous, or seems to cross 2 categories, pick the best, don't check multiple. Explain all responses in comments column)

No response indicated (Type 0)

1. Not mentioned
2. Indicates no response *(Specifically said they didn't do anything)*

Neutral (Type 9) Responses

3. Actively hide or suppress one's envy
4. Physically distance self from envied

Hostile (Type -1) Responses

5. ~~Say something mean or hurtful to the envied person (Collapsed into code 8)~~
6. ~~Reduce social attention/kindness/availability toward the envied (e.g. act cold, be short) (Added) Talk negatively about the envied person behind their back (Deleted)~~
7. ~~Gather information about/focus attention on the envied or the envied resource (e.g. stare, ask questions about) (Added) Devalue the quality or value of the advantage (Deleted)~~
8. Other socially hostile response (ostracize, give cold shoulder etc.) (Explain)
~~“Say something mean or hurtful to the envied person” was collapsed into code 8 and “Direct the attention of envied advantage (if a person) towards self and away from the envied” was added to it~~
9. ~~Steal resource for self (Deleted)~~
10. ~~Deprive envied of resource without gaining it (break or damage, etc.) (Deleted)~~
11. Other non-social hostile response (Explain)

Beneficial (Type 1) Responses

12. Compliment/congratulate the envied person on their success
13. Increase own effort or resource expenditure
14. Be nice to, befriend, or affiliate with the envied person
15. Solicit help from envied person
16. Emulate envied person
17. Other non-hostile response (Explain)

Can be Type -1, 1, or 9 depending on context

18. Tell others about one's envy
19. Tell envied person about one's envy
20. ~~Convince others (including envied resource) (e.g. Talked her into leaving her boyfriend for me (-1) Got the prof to curve the grades so everyone's score went up (-1) (Deleted)~~
21. OTHER (Explain)

Worked For Advantage: (*refers to effort or any other expenditure of time or resources, e.g. I had to pay for it but she got it for free*)

Direct Indication of Participant's Effort:

- 1 direct indication of no or insufficient effort (e.g. I didn't really study, I shouldn't have goofed off so much)
- 0 not mentioned
- 1 direct indication of effort (e.g. I studied for days, I applied so many times)

Direct Indication of Envid Person's Effort:

- 1 direct indication of no or insufficient effort (e.g. he didn't even try, she studied some but not as much as I did)
- 0 not mentioned
- 1 direct indication of effort (e.g. I know she works hard)

Feelings and Tone**Direct Indication that the Participant's Motivation was affected by situation:**

(Referring to motivation to expend effort or resources or otherwise pay costs to gain advantage. Specific to a change in motivation due to the envy experience, don't include effort generally expended)

- 1 Motivation went down as a result of the situation (e.g. I got discouraged, it made me not want to try anymore)
- 0 Not Mentioned
- 1 Motivation went up as a result of the situation (e.g. I felt motivated, I got pumped)

Wrote in a rude, mean, or disparaging way about the envied person: *(Refers to the tone of the description. Must be personal commentary, not simply repeating what others have said about the envied. It is possible for a single description may have both rude and nice elements, not necessarily either/or)*

- 0 Description was NOT rude, mean or disparaging
- 1 Description WAS rude, mean or disparaging

Wrote in a nice, kind or respectful way about the envied person: *(Refers to the tone of the description. Must be personal commentary, not simply listing the reasons for the envy. It is possible for a single description may have both rude and nice elements, not necessarily an either/or)*

- 0 Description was NOT nice, kind, or respectful
- 1 Description WAS nice, kind, or respectful

Direct indication of unfairness or injustice: *(Refers to a statement about the unfairness of the situation specifically. It is not blaming the envied person. This code requires more than just a comparison of amount of effort put in, there must be a specific statement about the unfairness. E.g. why should he get it and not me? We both tried, should I get recognized as well? It isn't fair, it isn't right)*

- 0 Not Mentioned
- 1 Statement of unfairness

Direct Indication that the envied person doesn't (sufficiently) appreciate their advantage

- 0 Not Mentioned
- 1 Statement of lack of appreciation

Direct indication that the situation or discrepancy isn't the envied person's fault: (*It isn't sufficient for the description to say that the envied person is "naturally" a certain way (smarter, prettier, etc.), it must actually point out that their superiority isn't their fault. E.g. I know it isn't his fault but...*)

- 0 Not Mentioned
- 1 Statement of lack of fault

Direct indication that participant felt they had little or no control, felt helpless:

- 0 Not Mentioned
- 1 Stated they felt helpless (e.g. nothing I could do, can't do anything about it, feel helpless, hopeless)

Direct Indication that the Participant made an internal resolution of self-acceptance: (*Some kind of statement about acceptance of oneself, the situation, etc. e.g. but then I realized everyone has problems and I should be happy for what I have, I decided to be happy with myself just the way I am*)

- 0 Not Mentioned
- 1 Resolution of Acceptance

Other Emotions: (*List [in order] all other emotions the participant mentions feeling as a result of the envy or the situation that caused it. Don't include "Envious" or "Jealous". For all coded emotions, give the wording the code is based on in the comments column*)

1. Frustration (e.g. frustrated, frustration, frustrating)
2. Hostility (*List target: envied, unspecified, self, other*) (e.g. angry, hate him, mad at myself) **irritated, aggravated, upset (at someone or something)** (**Added based on coder usage**)
3. Inferiority (e.g. inadequate, insecure, not as good as, better than me)
4. **Fear, worry, anxious, stressed (Added) Admiration of the envied person (e.g. Admire her, look up to him) (Collapsed into code 10)**
5. Sad/depressed (e.g. down, hurt in the generic emotional pain sense) **upset unless in a targeted, hostile sense** (**Added based on coder usage**)
6. Guilt/shame (e.g. felt like a bad person)
7. Longing/Desire (e.g. Really wanted it) (*Only code really wanting something if it was stated specifically as a feeling and not just as description of the events*)
8. Socially isolated (e.g. lonely, unwanted, left out)
9. Injured (e.g. Hurt, betrayed)

10. Happy for envied person, **Admiration of the envied person (e.g. Admire her, look up to him) (Collapsed into code 10)**
0. Other (List)
- 11. Shocked, Surprised, Confused (Added)**
- 12. Annoyed, Bothered (Added)**

Timescale of experience of envy

Direct Indication of the duration of the envy (e.g. just for a moment, lasted all day)

- 2 Not Mentioned
- 3 Statement of Duration

(If “Yes”) How long did the envy last?

- | | | |
|----------------------------|-----------------|---------------|
| 1. Over immediately | 2. Seconds | 3. Minutes |
| 4. Hours / Rest of the day | 5. Days/Ongoing | 9. Can't tell |

Open-Ended Question Codebook (After Adjustments)

Note: Changes from the original Open-Ended Questions Codebook are underlined and in bold.

What did the other person have or get that made you envious (What was the envied advantage in this situation)?

How do you think that having that advantage benefits the other person?

Think of the domain that the envied advantage is in. For example, if you are envious of someone's good grade, the domain is academic achievement, if you are envious because someone won an athletic competition, the domain is athletic achievement. What domain would you say this envied advantage is in?

(Multiple Available)

Domain: (What is the domain of the advantage that the participant is envious of the other person for having? Select the most appropriate)

1. Social
 - a. Romantic/sexual
 - i. Possession of a (good) relationship in general
 - ii. Attentions of a specific person
 - b. Family
 - i. Quality/supportiveness of relationship, access to
 - ii. Possession of (e.g. *has a wife and kids*)
 - c. Friends
 - i. Has (lots of) friends
 - ii. Attention of specific person
 - d. Status/Recognition
2. Academic
 - a. Performance (about the instance, not underlying ability, e.g. *grade*)
 - b. Access to (the academic opportunity itself is the focus, not financial gain that might result, e.g. *got accepted to grad school*)
 - c. Ability (more about ability than specific performance, e.g. *everything comes easy to him*)
3. Job/Career (about job success, not merely occurring at work)
 - a. Possession of/success at a job/good job in general
 - i. More about the money
 - ii. More about the career success
 - b. Got a specific job, promotion etc.
 - i. More about the money
 - ii. More about the career success
 - c. Special achievement/recognition (e.g. *employee of month*)
4. Material Resources
 - a. Has money/access to money/financial stability/stuff that indicates money

- b. Specific valued possession (about THAT thing, not the ability to have nice things in general)
- 5. Physical attractiveness or appearance
 - a. Inherent (e.g. *body, face, hair*)
 - b. External (e.g. *clothes*)
- 6. Personality traits (e.g. *People skills, self-confidence, creativity*)
- 7. Specific skill, knowledge, ability
- 8. Physical skill/ability/talent (e.g. *sports, dance*)
- 9. Freedom from responsibility/restraint (e.g. *free time*)
- 11.** Specific unusual/exotic experience/opportunity (e.g. *travel*) **(Collapsed into code 11)**
- 11. Specific missed/lost opportunity (e.g. *tickets sold out, didn't join team*)
- 12. Generally good life (only use if said, don't use as a catch all)
- 13. Other (explain in comments)
- 13.** Can't tell **(Collapsed into code 13)**

Acquire: In general, how easy is this sort of advantage to acquire or replace?

(This is about the underlying thing, the real reason for the participant's envy, which may not be the specific thing mentioned. To identify this, think about a few different things the participant would go out and get or do if they magically could.), e.g. *A smile from a stranger would be a 0, a decent job within one's qualifications would be about 3 and possession of the Hope Diamond would be a 6* (9 is NEI)

Very easy 0 1 2 3 4 5 6 Impossible

Independence: (Is the possession of the advantage by the participant independent of its possession by the envied? Requires a bit more than the fact that there is one less of something in the world)

- 0 Dependent – (Whether or not the envied person gets the advantage affects whether the participant can or could have gotten it. e.g. *promotion the participant was eligible for*)
- 1 Independent – (Whether or not the envied person gets or has the advantage has no bearing on whether the participant gets it. e.g. *salary of someone who works in a different company*)
- 9 NEI or unclear

With respect to others (aside from the Participant and the Envied) who were present when the Participant felt envy:

How are they associated with you?

How are they associated with the person you envied?

Who would OP favor? Compare how the others who were present are associated with the participant versus the envied, and code who they would be expected to favor or like better (e.g. *If the others are friends of the Participant and strangers to Envied, code -1. If the others are strangers to both the Participant and the Envied, code 0. If the others are closer to the Envied than the Participant, code +1*)

Treat “family” as on par with “friend” unless more info is given (so if the “other” is the Participant’s best friend of 30 years and 2nd cousin to the Envied, the Participant is probably favored so code -1)

- 1 Expected to favor the Participant
- 0 Same relationship to both
- +1 Expected to favor the Envied
- 9 Can’t tell

How could they tell [that you were envious]?

How could OP tell P was envious? How could the others who were present tell that the Participant was envious? (Multiple Available)

1. How the Participant acted (including demeanor/expression)
 - a. Became quiet, unresponsive
 - b. Withdrew, left, kept distance
 - c. Focus or shift of attention (e.g. *staring*)
 - d. Anger
 - e. Insulting (e.g. *roll eyes, laugh*)
 - f. Facial expression
2. Told them
 - a. As a compliment/congratulations
 - b. Explained/complained about situation
 - c. Said envious specifically
3. Knows you, your goals, your history
4. Knows that the situation warrants envy/has common goal
- ~~5. **Envied responded (Deleted)**~~
- 9. Other (explain in comments) (Collapsed into code 9)**
9. NEI can’t tell

With respect to others who the Participant thinks will find out about the Participant's envy

How are they associated with you?

How are they associated with the person you envied?

Who would OFO favor? Compare how the others who were present are associated with the participant and the envied and code who they would be expected to favor or like better (e.g. *If the others are friends of the Participant and strangers to Envied, code -1. If*

the others are strangers to both the Participant and the Envied, code 0. If the others are closer to the Envied than the Participant, code +1)

Treat “family” as on par with “friend” unless more info is given (so if the “other” is the Participant’s best friend of 30 years and 2nd cousin to the Envied, the Participant is probably favored so code -1)

- 1 Expected to favor the Participant
- 0 Same relationship to both
- +1 Expected to favor the Envied
- 9 Can’t tell

How will they be able to tell [that you were envious]?

Code OFO: How can the others who will find out tell that the Participant was envious?
(Multiple Available)

1. How the Participant acted (including demeanor/expression)
 - a. Became quiet, unresponsive
 - b. Withdrew, left, kept distance
 - c. Focus or shift of attention (e.g. *staring*)
 - d. Anger
 - e. Insulting (e.g. *roll eyes, laugh*)
 - f. Facial expression
2. Told them
 - a. As a compliment/congratulations
 - b. Explained/complained about situation
 - c. Said envious specifically
3. Knows you, your goals, your history
4. Knows that the situation warrants envy/has common goal
- ~~5. **Envied responded (Deleted)**~~
- 9. Other (explain in comments) (Collapsed into code 9)**
9. NEI can’t tell

In what ways are you similar?

Similar: (Multiple Available) Enter codes in the order listed in the answer

1. Gender
2. Age
3. Ethnicity/Race/Nationality
4. Physical Appearance/fitness
5. Social class, background
6. Financial Status
7. Relationship Status
8. Life stage (e.g. *college student, married with children, just starting career*)
9. Goals (e.g. *academic, career, life*)
10. Where from (geographic location)
11. Family

12. Friends
13. Religion
14. Experiences (similar/shared)
15. Sense of humor
16. Outgoingness/sociability
17. Intelligence
18. Other personality
19. Values/morals
20. Hobbies/interests/activities
21. Preferences/tastes
22. Skill/ability/talent
23. Opinions/perspective on life (e.g. *we think alike*)
24. Specific achievement/success/possession
25. Doesn't Apply (**not similar or can't compare**)
27. **Other or unclear (Added)**

In what ways are you different?

Different: (Multiple Available) Enter codes in the order listed in the answer

1. Gender
2. Age
3. Ethnicity/Race/Nationality
4. Physical Appearance/fitness
5. Social class, background
6. Financial Status
7. Relationship Status
8. Life stage (e.g. *college student, married with children, just starting career*)
9. Goals (e.g. *academic, career, life*)
10. Where from (geographic location)
11. Family
12. Friends
13. Religion
14. Experiences (similar/shared)
15. Sense of humor
16. Outgoingness/sociability
17. Intelligence
18. Other personality
19. Values/morals
20. Hobbies/interests/activities
21. Preferences/tastes
22. Skill/ability/talent
23. Opinions/perspective on life (e.g. *we think alike*)
24. Specific achievement/success/possession
25. Doesn't Apply (**not similar or can't compare**)
27. **Other or unclear (Added)**

What did you feel helpless about?

Can't BE vs. Can't DO

1 – Can't BE language – ability, (*e.g. not able to improve, my ability to achieve*)

2 – Can't DO Language – situational, restricted action (*e.g. can't fix situation, can't get that*)

9 – Other/Ambiguous

Go Back: Mentions going back in time, or changing the past

1 – Yes

0 – No

Inferior: Indicates inferiority (*e.g. not good enough, not as good as*)

1 – Yes

0 – No

Comparison: Compares self to the Envied Person (*e.g. can't be like her, can't have what he has*)

1 – Yes

0 – No

Future Positive: Mentions that the future will be better or that the situation could improve with time

1 – Yes

0 – No

Did you do anything (respond) as a result of the situation in which you felt envy?

IF YES: What did you do?

Only code actual behaviors that the participant did as a result of the situation in which they felt envy. (Multiple Available)

Hostility: How hostile was the response toward the envied person? (9 is NEI)

Not Hostile 0 1 2 3 4 5 6 Extremely Hostile

Sociality: How social was the response?

If the response didn't involve or include anyone besides the participant, code 0 (*e.g. studied more*)

If the response involved ONLY the participant and the Envied, code 1 (*e.g. asked the envied person to study together*)

Elements that affect the Sociality rating of the response:

- The more people that were involved, the more social the response
 - The more involved, or important, the people are to the situation, the more social
 - The more the effectiveness of the response depends on the people, the more social
- (9 is NEI)

Not at all social 0 1 2 3 4 5 6 Extremely social

Objective Social Approval: How would people in general feel about the response?
(9 is NEI)

Strongly Disapprove 0 1 2 3 4 5 6 Strongly Approve

Independent: Does the Participant's response affect the Envied person or their possession of the advantage? (e.g. *steal their car would be 0, dependent, because it affects whether the Envied has the car. Workout more would be 1, independent, because the fitness level of the Participant doesn't affect the fitness level of the Envied*)

- 1 Independent – (Response does NOT affect possession of the advantage by the envied)
- 0 Dependent – (Response affects possession of the advantage by the envied)
- 9 NEI or unclear

Type:

1. Response moves Participant up toward the position of the Envied without removing their advantage (e.g. *Studied more to get a good grade*) **(Re-coded as Beneficial)**
2. Response pulls the Envied down to the Participants position without benefitting the Participant (e.g. *told everyone how she didn't deserve it*) **(Re-coded as Hostile)**
3. Response Moves Participant up AND pulls Envied down (e.g. *flirted with his girlfriend*) **(Re-coded as Hostile)**
4. Response is positive or benign but doesn't gain the advantage for the Participant **(Re-coded as Other)**
5. Response is hostile or negative but doesn't remove the advantage from the Envied **(Re-coded as Hostile)**
6. Response is neutral, does no harm nor benefit **(Re-coded as Other)**
9. NEI or Doesn't Apply **(Re-coded as Other)**

Action Code: Explain in the comments

1. Actively hide or suppress one's envy
2. Physically distance self from envied
3. Say something mean or hurtful to the envied person
4. Talk negatively about the envied person behind their back
5. Devalue the quality or value of the advantage
6. Other socially hostile response (e.g. *ostracize, give cold shoulder*)
7. Steal resource for self
8. Deprive envied of resource without gaining it (e.g. *break or damage*)
9. Other non-social hostile response
10. Compliment/congratulate the envied person on their success
11. Increase own effort or resource expenditure
12. Be nice to, befriend, or affiliate with the envied person

13. Solicit help from envied person
14. Emulate envied person
15. Other non-hostile response
16. Tell others about one's envy
17. Tell envied person about one's envy
18. Convince others (including envied resource)
19. OTHER
20. Doesn't Apply

Was there something you would have liked to have done but didn't? (include anything that crossed your mind, even for a moment) IF YES: What did you want to do?

Only code actual behaviors that the participant wanted to do as a result of the situation in which they felt envy. (Multiple Available)

Hostility: How hostile was the desired response toward the envied person? (9 is NEI)

Not Hostile 0 1 2 3 4 5 6 Extremely Hostile

Sociality: How social was the desired response?

If the response didn't involve or include anyone besides the participant, code 0 (e.g. *studied more*)

If the response involved ONLY the participant and the Envied, code 1 (e.g. *asked the envied person to study together*)

Elements that affect the Sociality rating of the response:

- The more people that were involved, the more social the response
- The more involved, or important, the people are to the situation, the more social
- The more the effectiveness of the response depends on the people, the more social (9 is NEI)

Not at all social 0 1 2 3 4 5 6 Extremely social

Objective Social Approval: How would people in general feel about the response? (9 is NEI)

Strongly Disapprove 0 1 2 3 4 5 6 Strongly Approve

Independent: Would the desired response affect the Envied person or their possession of the advantage? (e.g. *steal their car would be 0, dependent, because it affects whether the Envied has the car. Workout more would be 1, independent, because the fitness level of the Participant doesn't affect the fitness level of the Envied*)

- 1 Independent – (Response would NOT affect possession of the advantage by the envied)
- 0 Dependent – (Response would affect possession of the advantage by the envied)
- 9 NEI or unclear

Type:

- 1. Response moves Participant up toward the position of the Envied without removing their advantage (e.g. *Studied more to get a good grade*) **(Re-coded as Beneficial)**
- 2. Response pulls the Envied down to the Participants position without benefitting the Participant (e.g. *told everyone how she didn't deserve it*) **(Re-coded as Hostile)**
- 3. Response Moves Participant up AND pulls Envied down (e.g. *flirted with his girlfriend*) **(Re-coded as Hostile)**
- 4. Response is positive or benign but doesn't gain the advantage for the Participant **(Re-coded as Other)**
- 5. Response is hostile or negative but doesn't remove the advantage from the Envied **(Re-coded as Hostile)**
- 6. Response is neutral, does no harm nor benefit **(Re-coded as Other)**
- 9. NEI or Doesn't Apply **(Re-coded as Other)**

Action Code: Explain in the comments

- 1. Actively hide or suppress one's envy
- 2. Physically distance self from envied
- 3. Say something mean or hurtful to the envied person
- 4. Talk negatively about the envied person behind their back
- 5. Devalue the quality or value of the advantage
- 6. Other socially hostile response (e.g. *ostracize, give cold shoulder*)
- 7. Steal resource for self
- 8. Deprive envied of resource without gaining it (e.g. *break or damage*)
- 9. Other non-social hostile response
- 10. Compliment/congratulate the envied person on their success
- 11. Increase own effort or resource expenditure
- 12. Be nice to, befriend, or affiliate with the envied person
- 13. Solicit help from envied person
- 14. Emulate envied person
- 15. Other non-hostile response
- 16. Tell others about one's envy
- 17. Tell envied person about one's envy
- 18. Convince others (including envied resource)
- 19. OTHER
- 20. Doesn't Apply

Why didn't you do it?

Reported Social Approval: Did Participant indicate that they didn't do the response because of concern with other people's (not the Envied's) approval?

- 1 Yes (e.g. *That would make me look bad*)
- 0 No
- 9 NEI or unclear

Fear of Consequences: Did Participant indicate that they didn't do the response because of fear of some consequence(s)? [Don't include loss of social approval or hurting the Envied]

- 1 Yes (e.g. *I'd get caught cheating*)
- 0 No
- 9 NEI or unclear

Morals/Values: Did Participant indicate that they didn't do the response because it goes against their morals or values?

- 1 Yes (e.g. *I'm not that kind of person*)
- 0 No
- 9 NEI or unclear

Perceived Effectiveness: Did Participant indicate that they didn't do the response because it wouldn't work or wasn't likely to work?

- 1 Yes (e.g. *wouldn't have made any difference*)
- 0 No
- 9 NEI or unclear

Concern for E: Did Participant indicate that they didn't do the response because of a concern about hurting or harming the Envied?

- 1 Yes (Participant expressed concern for Envied)
- 0 No (Participant did not express concern for Envied)
- 9 NEI or unclear

To what degree did you try harder to achieve your own goals?

IF > 0: What goal or goals were you trying to achieve?

Domain: (Multiple Available)

1. Social
 - a. Romantic/sexual
 - i. Possession of a (good) relationship in general
 - ii. Attentions of a specific person

- b. Family
 - i. Quality/supportiveness of relationship, access to
 - ii. Possession of (e.g. *has a wife and kids*)
 - c. Friends
 - i. Has (lots of) friends
 - ii. Attention of specific person
 - d. Status/Recognition
2. Academic
 - a. Performance (about the instance, not underlying ability, e.g. *grade*)
 - b. Access to (the academic opportunity itself is the focus, not financial gain that might result, e.g. *got accepted to grad school*)
 - c. Ability (more about ability than specific performance, e.g. *everything comes easy to him*)
 3. Job/Career (about job success, not merely occurring at work)
 - a. Possession of/success at a job/good job in general
 - i. More about the money
 - ii. More about the career success
 - b. Got a specific job, promotion etc.
 - i. More about the money
 - ii. More about the career success
 - c. Special achievement/recognition (e.g. *employee of month*)
 4. Material Resources
 - a. Has money/access to money/financial stability/stuff that indicates money
 - b. Specific valued possession (about THAT thing, not the ability to have nice things in general)
 5. Physical attractiveness or appearance
 - a. Inherent (e.g. *body, face, hair*)
 - b. External (e.g. *clothes*)
 6. Personality traits (e.g. *People skills, self-confidence, creativity*)
 7. Specific skill, knowledge, ability
 8. Physical skill/ability/talent (e.g. *sports, dance*)
 9. Freedom from responsibility/restraint (e.g. *free time*)
 - 11.** Specific unusual/exotic experience/opportunity (e.g. *travel*) (**Collapsed into code 11**)
 11. Specific missed/lost opportunity (e.g. *tickets sold out, didn't join team*)
 12. Generally good life (only use if said, don't use as a catch all)
 13. Other (explain in comments)
 - 13.** Can't tell (**Collapsed into code 13**)

How did you try harder to achieve these goals?

Effort: How much effort did the Participant put into “trying harder”? (9 is NEI)

No Effort 0 1 2 3 4 5 6 Extreme Effort

Trade-offs: Did the Participant indicate making a trade-off between conflicting goals?

- 1 Yes
- 0 No
- 9 NEI or unclear

Did you complain about the situation to anyone?

IF YES: Who did you complain to?

(Multiple Available)

Kin to P: Code relatedness to the Participant

Coefficient of relatedness for blood kin

Identical twins = 1

Other twins or full siblings = .5

Half sibling = .25

First cousin = .125

Second cousin = .031

Parent = .5

Offspring = .5

Aunt/Uncle = .25

Niece/Nephew = .25

Grandparent = .25

Grandchild = .25

Code non-blood kin as .001 (Including kin by adoption or marriage: step-relations or in-laws)

Code all other non-relatives as 0

(9 is NEI)

Kin to E: Code relatedness to the Envied

Coefficient of relatedness for blood kin

Identical twins = 1

Other twins or full siblings = .5

Half sibling = .25

First cousin = .125

Second cousin = .031

Parent = .5

Offspring = .5

Aunt/Uncle = .25

Niece/Nephew = .25

Grandparent = .25

Grandchild = .25

Code non-blood kin as .001 (Including kin by adoption or marriage: step-relations or in-laws)

Code all other non-relatives as 0

(9 is NEI)

Close to P: How emotionally close is this person to the Participant? (9 is NEI)

Not Close At All 0 1 2 3 4 5 6 Extremely
Close

Close to E: How emotionally close is this person to the Envied? (9 is NEI)

Not Close At All 0 1 2 3 4 5 6 Extremely
Close

Involvement: To what degree was the person involved in the situation that caused the envy?

The person is merely present = 1

He person is present, paying attention, and mildly interested in the situation = 3

The outcome of the situation depends on the person, and the person cares a lot about the situation = 6

(9 is NEI)

Not At All Involved 0 1 2 3 4 5 6 Completely
Involved

Appendix E – Additional Tables

Table E-1
Inter-coder Reliabilities

Item	Krippendorff's α	95% Confidence Interval	
		Lower Limit	Upper Limit
Descriptions			
Domain of the envied advantage (2 nd scale)	.715 [†]	.697	.732
Relationship with the envied person	.838*	.815	.860
The envied is a specific person/general class of people	.548	.241	.783
DI that others were aware of or involved in the situation	.231	.067	.390
How social is the situation?	.385	.324	.447
DI of how the envied is perceived by others	.324	.150	.481
DI that lacking the envied advantage reflects poorly on participant	.213	-.608	.799
DI of something blocking access to the advantage	.502	.314	.682
How easy it would be for this person to acquire the advantage	.365	.306	.427
How easy this sort of advantage is to acquire in general	.281	.206	.350
Independence of possession by the participant and the envied	.329 [†]	.017	.615
Type of response	.849*	.724	.950
Response action code	.761*	.717	.806
DI of participant's effort	.732*	.588	.850
DI of envied person's effort	.702*	.539	.862
DI that the participant's motivation was affected by the situation	.692*	.439	.898
Rude, mean, or disparaging toward the envied person	.401	-.156	.790
Nice, kind or respectful toward the envied person	.348	-.119	.760
DI of unfairness or injustice	.696*	.297	1.000
DI that the envied person doesn't appreciate the	.748*	.264	1.000

advantage			
DI that the situation isn't the envied person's fault	.412	-1.000	1.000
DI that the participant felt helpless	.163	-1.000	1.000
DI that the participant made a resolution of self-acceptance	.467	-.077	.902
Other emotions	.902*	.877	.925
DI of the duration of the envy	.419	-.012	.783
(If "Yes") Length of time the envy lasted	.500	.242	.709
Responses to the open-ended questions			
Domain of the envied advantage	.781 [†]	.731	.827
How easy this sort of advantage is to acquire in general	.291	.167	.395
Independence of possession by the participant and the envied	.499 [†]	.128	.813
Who the others who were present (OP) would favor	.760 [†]	.627	.875
How OP could tell that the participant was envious	.671 [†]	.527	.794
Who the others who will find out (OFO) would favor	.816 [†]	.644	.945
How OFO could tell that the participant was envious	.816 [†]	.572	1.000
Similarities to the envied person	.786 [†]	.745	.834
Differences from the envied person	.801 [†]	.752	.851
Reason(s) for feeling helpless			
Used can't BE language or can't DO language	.409	.223	.580
Mentions going back in time, or changing the past	.945*	.765	1.000
Indicates inferiority	.615	.177	1.000
Compares self to the envied person	.614	.335	.634
Positive outlook for the future	.798*	.000	1.000
Participant's actual response(s) to the situation			
How hostile was the actual response?	.397 [†]	-.157	.799
How social was the actual response?	.742 [†]	.543	.901
Degree to which objective observers would approve	.700 [†]	.586	.806
Independence of actual response and possession by the envied	.441 [†]	.023	.791

Actual response type	.479 [†]	.325	.634
Actual response type recoded as Hostile/Beneficial	.653 [†]	.446	.825
Actual response action code	.494 [†]	.364	.625
Response(s) the participant considered but rejected			
How hostile was the desired response?	.679 [†]	.554	.785
How social was the desired response?	.514 [†]	.193	.745
Degree to which objective observers would approve	.657 [†]	.522	.759
Independence of desired response and possession by the envied	.384 [†]	.162	.581
Desired response type	.564 [†]	.434	.695
Desired response type recoded as Hostile/Beneficial	.717 [†]	.571	.845
Desired response action code	.374 [†]	.254	.494
Reason the participant rejected the desired response(s)			
Concern that others would disapprove	-.029	-.812	.799
Fear of consequence(s)	.652	.463	.842
Participant's morals or values	.694*	.490	.864
Wouldn't be effective	.552	.254	.801
Didn't want to hurt the envied person	.203	-.232	.638
Domain of goal	.792 [†]	.723	.855
Effort toward goal	.507	.390	.617
Person(s) the participant complained to			
Emotional closeness to the Participant	.970 [†]	.950	.983
Emotional closeness to the Envied	.606 [†]	.328	.815
Involvement in the envy situation	.769*	.614	.883
Averages			
Domain	.763*		
Independence	.413		
Who others would favor	.788*		
How others could tell the participant was envious	.744*		
Similarities/Differences from the envied person	.794*		
How hostile was the response?	.538		

How social was the response?	.628
Degree to which objective observers would approve	.679*
Response type	.522
Response type recoded as Hostile/Beneficial	.685*
Response action code	.434
Emotional closeness	.788*

Note. * $\alpha > .667$. DI stands for Direct Indication. †Inclusion based on average alpha.

Table E-2
Want to Hurt the Envied

X	Total Effect	p	Direct Effect	p	Mediator	Indirect Effect	95% CI	
							LL	UL
Dependence of Attainability	.145	.007	0.067	.162	Unfair	0.002	-0.015	0.024
					Disgust Toward Envied	0.043	0.017	0.077
Dislike Envied	.482	< .001	0.188	.001	Unfair	-0.015	-0.037	0.002
					Disgust Toward Envied	0.122	0.065	0.184
Dislike * Disgust			0.281	< .001	Disgust at Dislike = -1	-0.009	-0.088	0.069
					Disgust at Dislike = 1	0.253	0.187	0.326

Note. Tests of X*M interactions: Dependence of Attainability * Unfair $p = .193$, Dependence of Attainability * Disgust Toward Envied $p = .503$, Dislike Envied * Unfair $p = .125$, Dislike Envied * Disgust Toward Envied $p < .001$.

Table E-3
Say Something Mean to the Envied, Others Present Only

X	Total Effect	p	Direct Effect	p	Mediator	Indirect Effect	95% CI [†]	
							LL	UL
Others Detect Envy	0.338	< .001	0.314	< .001	Inferior	0.000	-0.016	0.017
Detect * Inferior			-0.142	.036	At Inferior = -1	-0.000	-0.018	0.017
					At Inferior = 1	0.001	-0.034	0.036
Similar to Envied	-0.148	.063	-0.151	.056	Inferior	-0.003	-0.024	0.014
Relationship to Envied								
Family	1.14	< .001	1.063	.001	Inferior	-0.008	-0.129	0.093
Friend	0.467	.018	0.433	.028	Inferior	-0.011	-0.082	0.038
Classmate	0.184	.406	0.117	.603	Inferior	-0.035	-0.167	0.052
Acquaintance	0.091	.747	0.163	.568	Inferior	-0.055	-0.249	0.078
Coworker	-0.104	.722	-0.290	.470	Inferior	0.013	-0.076	0.135

Note. The significance of all effects involving the five relationship variables, including their interactions with mediators, are tested at $p < .01$

[†]Confidence intervals for the multicategorical variable, relationship to envied, have been Bonferroni corrected

Tests of X*M interactions: Others Detect Envy * Inferior $p = .018$, Similar to Envied * Inferior $p = .208$, Family * Inferior $p = .049$, Friend * Inferior $p = .183$, Classmate * Inferior $p = .414$, Acquaintance * Inferior $p = .979$, Coworker * Inferior $p = .721$

Table E-4

Say Something Mean to the Envied, Others Present or Absent

X	Total Effect	p	Direct Effect	p	Mediator	Indirect Effect	95% CI [†]	
							LL	UL
Similar to Envied	-0.198	.002	-0.198	.002	Inferior	> -0.001	-0.013	0.013
Relationship to Envied								
Family	0.795	.001	0.795	.001	Inferior	< 0.001	-0.049	0.050
Friend	0.219	.145	0.219	.146	Inferior	< 0.001	-0.028	0.028
Classmate	-0.119	.540	-0.119	.543	Inferior	> -0.001	-0.059	0.057
Acquaintance	0.070	.759	0.070	.760	Inferior	> -0.001	-0.102	0.099
Coworker	-0.334	.204	-0.334	.206	Inferior	< 0.001	-0.074	0.073

Note. The significance of all effects involving the five relationship variables, including their interactions with mediators, are tested at $p < .01$

[†]Confidence intervals for the multicategorical variable, relationship to envied, have been Bonferroni corrected

Tests of X*M interactions: Similar to Envied * Inferior $p = .114$, Family * Inferior $p = .522$, Friend * Inferior $p = .061$, Classmate * Inferior $p = .308$, Acquaintance * Inferior $p = .191$, Coworker * Inferior $p = .541$.

Table E-5
Talk about Envied Behind Back, Others Present Only

X	Total Effect	p	Direct Effect	p	Mediator	Indirect Effect	95% CI [†]	
							LL	UL
Dependence of Attainability	0.252	.017	0.095	.330	Disgust Toward Envied	0.012	-0.026	0.060
					Cold Toward Envied	0.147	0.040	0.276
Others Detect Envy	0.307	.009	0.122	.278	Disgust Toward Envied	0.017	-0.036	0.081
					Cold Toward Envied	0.201	0.077	0.351
Detect * Cold			-0.129	.173	At Detect = -1	0.233	0.088	0.413
					At Detect = 1	0.170	0.061	0.308
Like Envied	-0.710	< .001	-0.469	.009	Disgust Toward Envied	-0.030	-0.140	0.064
					Cold Toward Envied	-0.228	-0.456	-0.038
Dislike Envied	0.448	.006	0.185	.233	Disgust Toward Envied	0.029	-0.060	0.130
					Cold Toward Envied	0.295	0.122	0.507

Table E-5 Continued

X	Total Effect	p	Direct Effect	p	Mediator	Indirect Effect	95% CI [†]	
							LL	UL
Relationship to Envied								
Family	1.729	.001	1.126	.017	Disgust Toward Envied	0.083	-0.285	0.518
					Cold Toward Envied	0.673	0.021	1.516
Friend	1.279	< .001	0.546	.112	Disgust Toward Envied	0.084	-0.268	0.480
					Cold Toward Envied	0.695	0.210	1.355
Classmate	0.033	.924	0.005	.987	Disgust Toward Envied	0.005	-0.114	0.145
					Cold Toward Envied	0.062	-0.413	0.553
Acquaintance	0.219	.632	< .001	> .999	Disgust Toward Envied	0.083	-0.281	0.500
					Cold Toward Envied	0.268	-0.339	0.945
Coworker	0.637	.189	0.379	.394	Disgust Toward Envied	0.057	-0.214	0.393
					Cold Toward Envied	0.253	-0.399	0.985

Note. The significance of all effects involving the five relationship variables, including their interactions with mediators, are tested at $p < .01$

[†]Confidence intervals for the multicategorical variable, relationship to envied, have been Bonferroni corrected

Tests of X*M interactions: Dependence of Attainability * Disgust $p = .159$, Dependence of Attainability * Cold $p = .437$, Others Detect Envy * Disgust $p = .813$, Others Detect Envy * Cold $p = .015$, Like Envied * Disgust $p = .178$, Like Envied * Cold $p = .977$, Dislike Envied * Disgust $p = .190$, Dislike Envied * Cold $p = .146$, Family * Disgust $p = .583$, Family * Cold $p = .359$, Friend * Disgust $p = .425$, Friend * Cold $p = .938$, Classmate * Disgust $p = .797$, Classmate * Cold $p = .373$, Acquaintance * Disgust $p = .616$, Acquaintance * Cold $p = .425$, Coworker * Disgust $p = .680$, Coworker * Cold $p = .465$.

Table E-6

Talk about Envied Behind Back, Others Present or Absent

X	Total Effect	p	Direct Effect	p	Mediator	Indirect Effect	95% CI [†]	
							LL	UL
Others Present	0.344	.027	0.351	.012	Disgust Toward Envied	> -0.001	-0.030	0.027
					Cold Toward Envied			
Others Present *			0.380	.006	At Others Present = 0	-0.006	-0.101	0.088
Cold					At Others Present = 1	-0.011	-0.180	0.154
Dependence of Attainability	0.179	.021	0.067	.349	Disgust Toward Envied	0.014	-0.009	0.045
					Cold Toward Envied	0.046	0.021	0.077
Like Envied	-0.434	.001	-0.231	.050	Disgust Toward Envied	-0.032	-0.094	0.020
					Cold Toward Envied	-0.102	-0.202	-0.025
Dislike Envied	0.565	< .001	0.208	.062	Disgust Toward Envied	0.033	-0.021	0.096
					Cold Toward Envied	0.227	0.112	0.361

Table E-6 Continued

X	Total Effect	p	Direct Effect	p	Mediator	Indirect Effect	95% CI [†]	
							LL	UL
Relationship to Envied								
Family	1.376	< .001	0.699	.025	Disgust Toward Envied	0.085	-0.104	0.317
					Cold Toward Envied			
Family * Cold			0.365	.120	At Family = 0	0.348	0.077	0.741
					At Family = 1	0.630	0.126	1.392
Friend	1.050	< .001	0.559	.008	Disgust Toward Envied	0.067	-0.080	0.243
					Cold Toward Envied	0.242	0.055	0.51
Classmate	0.101	.706	0.225	.350	Disgust Toward Envied	-0.007	-0.094	0.061
					Cold Toward Envied	-0.084	-0.330	0.126
Acquaintance	0.580	.063	0.489	.086	Disgust Toward Envied	0.059	-0.074	0.242
					Cold Toward Envied	0.008	-0.255	0.269
Coworker	0.551	.144	0.395	.245	Disgust Toward Envied	0.043	-0.062	0.214
					Cold Toward Envied	0.044	-0.265	0.378

Note. The significance of all effects involving the five relationship variables, including their interactions with mediators, are tested at $p < .01$

[†]Confidence intervals for the multicategorical variable, relationship to envied, have been Bonferroni corrected

Tests of X*M interactions: Others Present * Disgust $p = .593$, Others Present * Cold $p = .021$, Dependence of Attainability * Disgust $p = .703$, Dependence of Attainability * Cold $p = .800$, Like Envied * Disgust $p = .992$, Like Envied * Cold $p = .325$, Dislike Envied * Disgust $p = .777$, Dislike Envied * Cold $p = .051$, Family * Disgust $p = .429$, Family * Cold $p = .006$, Friend * Disgust $p = .991$, Friend * Cold $p = .064$, Classmate * Disgust $p = .851$, Classmate * Cold $p = .225$, Acquaintance * Disgust $p = .793$, Acquaintance * Cold $p = .357$, Coworker * Disgust $p = .993$, Coworker * Cold $p = .657$.

Table E-7
Try Harder

X	Total Effect	p	Direct Effect	p	Mediator	Indirect Effect	95% CI [†]	
							LL	UL
Participant Deserved	0.448	< .001	0.248	.051	Frustrated	0.129	0.054	0.225
					Longing	0.040	-0.011	0.105
					Inspired by Envied	0.006	-0.046	0.061
Dependence of Attainability	0.311	.009	0.285	.015	Frustrated	0.087	0.026	0.167
					Longing	0.007	-0.016	0.039
					Inspired by Envied	-0.051	-0.114	-0.003
Dependence of Attainability * Longing			0.367	.001	At Longing = -1	-0.010	-0.051	0.020
					At Longing = 1	0.024	-0.044	0.099
Domain of Envy								
Money/Material Possessions	-0.367	.168	-0.153	.556	Frustrated	-0.019	-0.219	0.169
					Longing	-0.047	-0.198	0.043
					Inspired by Envied	-0.125	-0.340	0.022
Relationships	-1.329	< .001	-1.270	< .001	Frustrated	0.052	-0.109	0.241
					Longing	0.001	-0.084	0.091
					Inspired by Envied	-0.168	-0.382	-0.027
Physical Attractiveness	-0.200	.491	-0.295	.297	Frustrated	-0.031	-0.251	0.174
					Longing	0.043	-0.046	0.201
					Inspired by Envied	0.094	-0.068	0.312

Table E-7 Continued

X	Total Effect	p	Direct Effect	p	Mediator	Indirect Effect	95% CI [†]	
							LL	UL
Other Physical Attributes	0.558	.262	0.717	.133	Frustrated	-0.106	-0.503	0.231
					Longing	-0.022	-0.225	0.137
					Inspired by Envied	0.035	-0.269	0.365
Physical Talents or Skills	1.223	.007*	0.867	.047	Frustrated	0.094	-0.212	0.455
					Longing	0.081	-0.075	0.341
					Inspired by Envied	0.141	-0.110	0.469
Intelligence/General Knowledge	0.841	.021	0.624	.077	Frustrated	0.118	-0.128	0.422
					Longing	0.007	-0.123	0.147
					Inspired by Envied	0.091	-0.121	0.358
Popularity/Social Status	-1.593	.002	-1.288	.009	Frustrated	-0.093	-0.494	0.253
					Longing	-0.036	-0.263	0.119
					Inspired by Envied	-0.137	-0.513	0.155

Note. The significance of all effects involving the seven domain variables, including their interactions with mediators, are tested at $p < .007$

[†]Confidence intervals for the multicategorical variable, domain, have been Bonferroni corrected

Tests of X*M interactions: Participant Deserved * Frustrated $p = .895$, Participant Deserved * Longing $p = .657$, Participant Deserved * Inspired $p = .259$, Dependence of Attainability * Frustrated $p = .801$, Dependence of Attainability * Longing $p = .001$, Dependence of Attainability * Inspired $p = .092$, Possessions * Frustrated $p = .691$, Possessions * Longing $p = .439$, Possessions * Inspired $p = .215$, Relationships * Frustrated $p = .082$, Relationships * Longing $p = .049$, Relationships * Inspired $p = .731$, Physical Attractiveness * Frustrated $p = .162$, Physical Attractiveness * Longing $p = .951$, Physical Attractiveness * Inspired $p = .987$, Physical Attributes * Frustrated $p = .599$, Physical Attributes * Longing $p = .851$, Physical Attributes * Inspired $p = .027$, Talent/Skill * Frustrated $p = .942$, Talent/Skill * Longing $p = .848$, Talent/Skill * Inspired $p = .989$, Intelligence/Knowledge * Frustrated $p = .965$, Intelligence/Knowledge * Longing $p = .592$, Intelligence/Knowledge * Inspired $p = .693$, Popularity/Status * Frustrated $p = .459$, Popularity/Status * Longing $p = .681$, Popularity/Status * Inspired $p = .258$.

Table E-8
Imitate Envied

X	Total Effect	p	Direct Effect	p	Mediator	Indirect Effect	95% CI	
							LL	UL
Participant Popularity	0.210*	.022	0.228*	.007	Inspired by Envied	-0.054	-0.141	0.032
					Cold Toward Envied	0.037	-0.011	0.093
Often Compared with Envied	0.303*	< .001	0.267*	.001	Inspired by Envied	0.038	-0.042	0.121
					Cold Toward Envied	-0.006	-0.055	0.041

Note. Tests of X*M interactions: Participant Popularity * Inspired $p = .126$, Participant Popularity * Cold $p = .388$, Compared * Inspired $p = .940$, Compared * Cold $p = .846$.

Table E-9
Compliment Envied

X	Total Effect	p	Direct Effect	p	Mediator	Indirect Effect	95% CI	
							LL	UL
Hurt if Relationship Damaged	0.752	< .001	0.447	.001	Unfair	0.017	-0.012	0.058
					Friendly toward Envied	0.178	0.089	0.286
					Admire Envied	0.113	0.044	0.201
Similar to Envied	0.249	.048	0.072	.564	Unfair	-0.020	-0.065	0.014
					Friendly Toward Envied	0.097	0.026	0.185
					Admire Envied	0.105	0.039	0.190

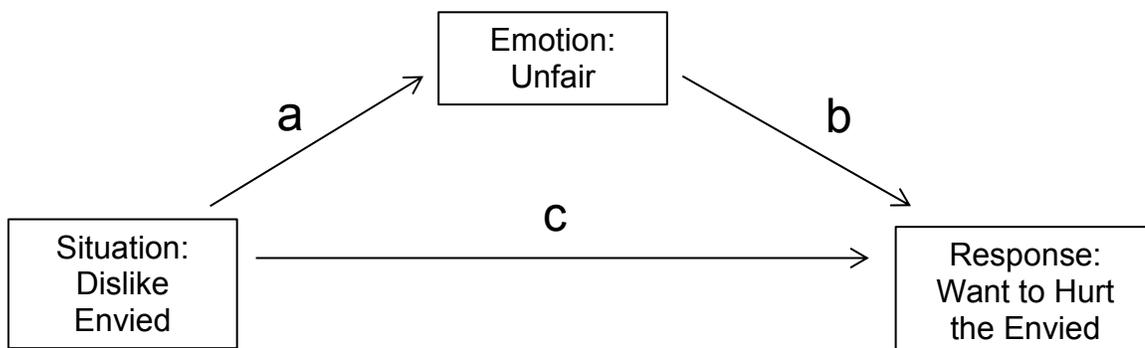
Note. Tests of X*M interactions: Hurt if Relationship Damaged * Unfair $p = .836$, Hurt if Relationship Damaged * Friendly Toward Envied $p = .889$, Hurt if Relationship Damaged * Admire Envied $p = .559$, Similar to Envied * Unfair $p = .960$, Similar to Envied * Friendly Toward Envied $p = .484$, Similar to Envied * Admire Envied $p = .709$.

Appendix F - Example R Syntax for Generating Monte Carlo Confidence Intervals

Example 1: Simple indirect effect of Dislike of the Envied on Wanting to Hurt the Envied, mediated through feeling the situation is Unfair (diagram provided).

Text in boldface is adjusted by the user for each analysis.

Text following # explains each user adjusted value.



```

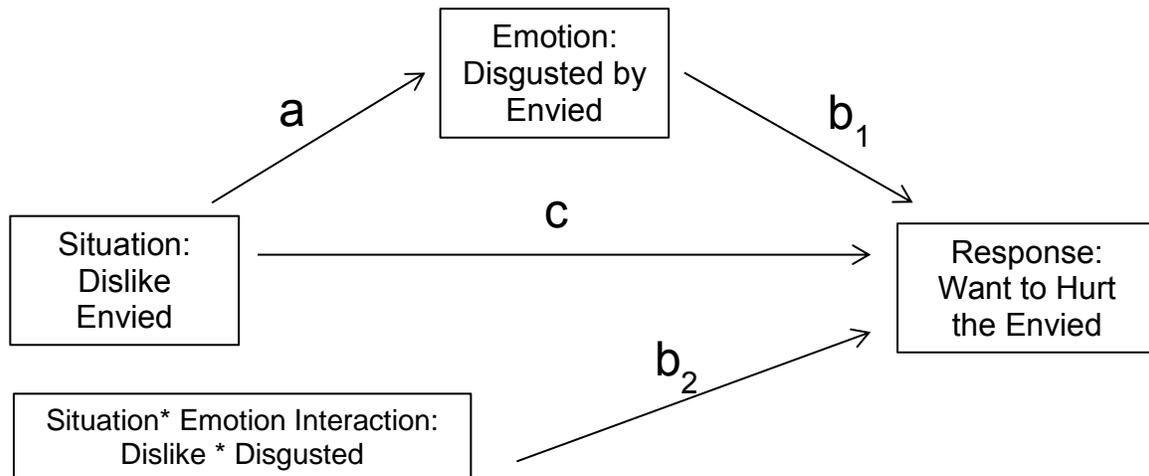
require(MASS)
a <- 0.189389 # Coefficient estimate for path a
b <- -0.080401 # Coefficient estimate for path b
rep=100000 # Number of Monte Carlo samples to draw
conf=95 # Degree of confidence for Confidence Intervals
pest <- c(a,b)
acov <- matrix(c(
0.002278146126021531, 0.0000028953228105331153,
0.0000028953228105331153, 0.0023027013361155762
),2,2) # 2x2 matrix of the variances and covariances of the a and b parameter estimates
mcmc <- mvrnorm(rep,pest,acov,empirical=FALSE)
cie <- mcmc[,1]*mcmc[,2]
low=(1-conf/100)/2
upp=((1-conf/100)/2)+(conf/100)
LL=quantile(cie,low)
UL=quantile(cie,upp)
LL4=format(LL,digits=4)
UL4=format(UL,digits=4)
print(c(a*(b),LL,UL))
  
```

Example 2: Conditional indirect effect of Dislike of the Envied on Wanting to Hurt the Envied, mediated through feeling Disgusted by the Envied (diagram provided).

Text in boldface is adjusted by the user for each analysis.

Text following # explains each user adjusted value.

Each estimate is conditional on the specified value of X.



```

require(MASS)
a <- 0.466297 # Coefficient estimate for path a
b1 <- 0.261215 # Coefficient estimate for path b1
b2 <- 0.281360 # Coefficient estimate for path b2
rep=100000 # Number of Monte Carlo samples to draw
conf=95 # Degree of confidence for Confidence Intervals
pest <- c(a,b1,b2)
acov <- matrix(c(
0.0019414413625363752, -0.000011548336560404737, -0.0000049271030286024795,
-0.000011548336560404737, 0.0036482049998685013, -0.001059726381237684,
-0.0000049271030286024795, -0.001059726381237684, 0.0015906895336377925
),3,3) # 3x3 matrix of the variances and covariances of the a, b1 and b2 parameter
estimates
mcmc <- mvrnorm(rep,pest,acov,empirical=FALSE)
cie <- mcmc[,1]*(mcmc[,2]+mcmc[,3]*0) # Value of X to assess the indirect effect at
low=(1-conf/100)/2
upp=((1-conf/100)/2)+(conf/100)
LL=quantile(cie,low)
UL=quantile(cie,upp)
LL4=format(LL,digits=4)
UL4=format(UL,digits=4)
print(c(a*(b1+b2*0),LL,UL)) # Value of X to assess the indirect effect at
  
```

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