

Perspectives on Dispositional Envy: Stability, Correlated Change, and Vaccine Envy

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vorgelegt von
M.Sc. Elina Greta Muriel Erz
aus Oberwesel

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Dekan: Universitätsprofessor Dr. Claus H. Carstensen

Betreuerin: Universitätsprofessorin Dr. Katrin Rentzsch

Weitere Gutachterin: Universitätsprofessorin Dr. Astrid Schütz

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TABLE OF CONTENTS

SUMMARY	IV
ZUSAMMENFASSUNG	VI
ARTICLES INCLUDED IN THE DISSERTATION.....	IX
1) GENERAL INTRODUCTION	1
1.1 THE SOCIAL EMOTION OF ENVY.....	3
1.2 DISPOSITIONAL ENVY AS A DOMAIN-SPECIFIC EMOTIONAL TRAIT	6
1.3 GAPS IN THE FIELD OF DISPOSITIONAL ENVY RESEARCH FROM A PERSONALITY PERSPECTIVE.....	9
1.4 OUTLINE OF THE DISSERTATION.....	16
2) EMPIRICAL WORK.....	21
ARTICLE 1: STABILITY AND CHANGE IN DISPOSITIONAL ENVY: LONGITUDINAL EVIDENCE ON ENVY AS A STABLE TRAIT	22
ARTICLE 2: DOES INSECURITY LEAD TO ENVY? THE LONGITUDINAL INTERPLAY BETWEEN DISPOSITIONAL ENVY AND SELF-ESTEEM	72
ARTICLE 3: VACCINE ENVY DURING THE COVID-19 PANDEMIC	127
3) GENERAL DISCUSSION	153
3.1 SUMMARY OF THE FINDINGS	154
3.2 THEORETICAL AND PRACTICAL IMPLICATIONS.....	157
3.3 STRENGTHS AND LIMITATIONS	164
3.4 DIRECTIONS FOR FUTURE RESEARCH	167
3.5 CONCLUSION	171
REFERENCES.....	172

SUMMARY

Some people have a stronger tendency to experience envy than others, marking individual differences in dispositional envy. Dispositional envy has been conceptualized as an emotional trait that varies between individuals and across the comparison domains of attraction, competence, and wealth. Given that envy is connected to low well-being on the individual level as well as to harmful behavior in social interactions and groups, it is extremely important to understand how individual differences in dispositional envy unfold across time and how they are connected to experiences of envy in specific situations. In three articles, the present dissertation therefore aimed to extend existing knowledge on dispositional envy by employing a personality psychology perspective and large longitudinal data sets.

Article 1 investigated stability and change in global and domain-specific dispositional envy over time. In a preregistered longitudinal study across 6 years, data from $N = 1,229$ adult participants were analyzed. In line with conceptualizations of dispositional envy as a stable emotional trait, dispositional envy was found to be stable across time spans of several years with stability coefficients similar to those of established trait characteristics reported in the literature (e.g., self-esteem and the Big Five). Moreover, the results indicated that domain-specific dispositional envy is as stable as the global construct. By providing evidence that dispositional envy can rightfully be considered a stable emotional trait, these findings place research on dispositional envy on more solid ground.

With previous theoretical and empirical accounts emphasizing a close and reciprocal association between dispositional envy and low self-esteem, Article 2 examined the interplay of these two constructs across time. In two preregistered longitudinal studies with a total sample size of more than 7,000 adult participants, change in dispositional envy across 2 to 6 years was found to be negatively correlated with concurrent change in self-esteem at the global level and within comparison domains, such that people who increased in dispositional envy were likely to experience a decrease in self-esteem within the same time span and vice versa. Moreover, there was initial evidence that change in dispositional envy could be predicted by the previous level of or antecedent change in self-esteem, suggesting a directional effect of self-esteem on envy. By illustrating that the development of dispositional envy is closely intertwined with self-esteem development, these findings

can inform theoretical models on the association between envy and self-esteem as well as practical approaches on how to reduce a person's level of dispositional envy.

In Article 3, an applied focus was adopted by investigating *vaccine envy*, a new phenomenon that emerged during the COVID-19 pandemic. Vaccine envy describes envy that is experienced when becoming aware that others are given the opportunity to receive a COVID-19 vaccine while one is still waiting for the vaccination. In two preregistered online surveys conducted in May 2021 ($N = 1,174$) and October/November 2021 ($N = 535$), almost half of the unvaccinated participants reported experiencing vaccine envy at least sometimes during the early stages of the vaccination campaign, but vaccine envy had almost disappeared by the end of 2021 when vaccines had become more accessible. As hypothesized, vaccine envy was found to be associated with dispositional envy, low self-esteem, victim sensitivity, social comparison orientation, and appraisals of injustice and undeservingness. Moreover, vaccine envy was connected to subjective perceptions of being threatened by the pandemic and an increased willingness to be vaccinated. These findings significantly advance the understanding of the psychological impact of the COVID-19 pandemic and provide important implications for policies and interventions aimed at reducing health-related envy. At the same time, Article 3 can be seen as an illustration of how experiences of envy in specific situations emerge from a complex interplay between person variables (e.g., dispositional envy and self-esteem) and envy-specific appraisals.

Overall, the present dissertation significantly advances the understanding of dispositional envy as a stable and domain-specific emotional trait. The findings shed light on stability and change in dispositional envy across time, on its reciprocal interplay with self-esteem, and on processes of envy generation in specific situations and might thus be used to substantiate theoretical models in envy research. Moreover, the present findings have important practical implications, as they may be used to help identify ways to reduce envy in individuals and society as a whole.

ZUSAMMENFASSUNG

Manche Menschen haben eine stärkere Neigung zu Neid als andere. Das Konstrukt „dispositioneller Neid“ beschreibt solche individuellen Unterschiede in der Tendenz, Neid zu empfinden. Dispositioneller Neid wurde als emotionaler Trait konzeptualisiert, der sich von Person zu Person sowie zwischen den Vergleichsdomänen Attraktivität, Kompetenz und Wohlstand unterscheiden kann. Da Neid auf individueller Ebene mit einem geringeren Wohlbefinden einhergeht und zudem mit schädlichen Verhaltensweisen in sozialen Interaktionen und Gruppen in Verbindung gebracht wurde, ist es äußerst wichtig zu verstehen, wie sich individuelle Unterschiede in dispositionellem Neid über die Zeit hinweg entwickeln und wie sie mit dem Neiderleben in konkreten Situationen zusammenhängen. Die vorliegende, aus drei Artikeln bestehende Dissertation hatte daher zum Ziel, das vorhandene Wissen über dispositionellen Neid mit Hilfe einer persönlichkeitspsychologischen Perspektive und großen Längsschnittdatensätzen zu erweitern.

In Artikel 1 wurde die Stabilität und Veränderung von globalem und domänen-spezifischem dispositionellen Neid im Zeitverlauf untersucht. In einer präregistrierten Längsschnittstudie über sechs Jahre wurden dazu Daten von $N = 1229$ erwachsenen Teilnehmenden analysiert. In Einklang mit Konzeptualisierungen von dispositionellem Neid als einem stabilen emotionalen Trait wurde festgestellt, dass dispositioneller Neid über Zeiträume von mehreren Jahren stabil war. Die dabei gefundenen Ergebnisse ähnelten den in bisheriger Literatur berichteten Stabilitätskoeffizienten von etablierten Traits wie Selbstwert und den Big Five. Außerdem zeigten die Ergebnisse, dass domänenspezifischer dispositioneller Neid ähnlich stabil war wie das globale Konstrukt. Diese Befunde weisen darauf hin, dass dispositioneller Neid zurecht als stabiler emotionaler Trait angesehen werden kann, und stellen damit die Forschung zu dispositionellem Neid auf eine solidere Grundlage.

Da frühere theoretische und empirische Darstellungen einen engen und wechselseitigen Zusammenhang zwischen dispositionellem Neid und niedrigem Selbstwert betonten, wurde in Artikel 2 das Zusammenspiel dieser beiden Konstrukte über die Zeit hinweg untersucht. In zwei präregistrierten Längsschnittstudien mit einer Gesamtstichprobe von über 7000 erwachsenen Teilnehmenden wurde festgestellt, dass Veränderungen in dispositionellem Neid über einen Zeitraum von zwei bis sechs Jahren

sowohl auf globaler Ebene als auch innerhalb von Vergleichsdomänen negativ mit gleichzeitigen Veränderungen im Selbstwert korrelierten. Ein Anstieg von dispositionellem Neid ging also häufig mit einer Abnahme des Selbstwerts innerhalb derselben Zeitspanne einher und umgekehrt. Darüber hinaus gab es erste Hinweise darauf, dass Veränderungen der Neidneigung durch das vorherige Niveau bzw. vorausgehende Veränderungen des Selbstwerts vorhergesagt werden konnten, was auf einen gerichteten Effekt von Selbstwert auf Neid hindeutet. Diese Befunde zeigen, dass die Entwicklung von dispositionellem Neid eng mit der Selbstwertentwicklung verwoben ist, und können somit theoretische Modelle zum Zusammenhang von Neid und Selbstwert bereichern sowie praktische Ansätze zur Reduktion der Neidneigung einer Person liefern.

In Artikel 3 wurde ein anwendungsbezogener Schwerpunkt gesetzt, indem Impfneid untersucht wurde, ein neues Phänomen, das erstmals während der COVID-19-Pandemie auftrat. „Impfneid“ beschreibt Neid, der empfunden wird, wenn andere die Möglichkeit bekommen, eine COVID-19-Impfung zu erhalten, während man selbst noch auf die Impfung wartet. In zwei präregistrierten Online-Umfragen, die im Mai 2021 ($N = 1174$) und im Oktober/November 2021 ($N = 535$) durchgeführt wurden, gab fast die Hälfte der ungeimpften Teilnehmenden in der Anfangsphase der Impfkampagne an, manchmal bis sehr oft Impfneid zu empfinden. Ende 2021 hingegen spielte Impfneid fast keine Rolle mehr, nachdem der Impfstoff leichter verfügbar geworden war. In Übereinstimmung mit den Hypothesen wurde festgestellt, dass Impfneid mit dispositionellem Neid, geringem Selbstwert, Opfersensibilität, sozialer Vergleichsorientierung und Appraisals (d.h. subjektiven Einschätzungen der Situation) als ungerecht und unverdient einherging. Außerdem hing Impfneid mit der subjektiven Wahrnehmung der Pandemie als bedrohlich sowie mit einer erhöhten Impfbereitschaft zusammen. Diese Befunde tragen wesentlich zum Verständnis der psychologischen Auswirkungen der COVID-19-Pandemie bei und liefern wichtige Anhaltspunkte für politische Maßnahmen und Interventionen zur Reduktion von gesundheitsbezogenem Neid. Gleichzeitig zeigt Artikel 3, wie Neiderleben in bestimmten Situationen aus einem komplexen Zusammenspiel zwischen Personenvariablen (z.B. dispositionellem Neid und Selbstwert) und neidspezifischen Appraisals entsteht.

Insgesamt leistet die vorliegende Arbeit einen wichtigen Beitrag zum Verständnis von dispositionellem Neid als einem stabilen und domänenspezifischem emotionalen Trait. Die Ergebnisse geben Aufschluss über die Stabilität und Veränderung von dispositionellem

Neid über die Zeit hinweg, über sein Zusammenspiel mit Selbstwert sowie über Prozesse der Neidentstehung in bestimmten Situationen. Sie können somit dazu genutzt werden, theoretische Modelle in der Neidforschung zu untermauern. Darüber hinaus kann die vorliegende Forschung dazu beitragen, Wege zur Verringerung von Neid bei Einzelpersonen und in der Gesellschaft aufzuzeigen, und hat daher wichtige praktische Implikationen.

ARTICLES INCLUDED IN THE DISSERTATION

The present dissertation is based on three independent articles that are embedded in the text. All articles have been published in or have been submitted to international, peer-reviewed journals throughout the dissertation process. The articles included are:

Erz, E., & Rentzsch, K. (2022). Stability and change in dispositional envy: Longitudinal evidence on envy as a stable trait. *European Journal of Personality*, 38(1), 67-84. <https://doi.org/10.1177/08902070221128137>

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1

GENERAL INTRODUCTION

Snow-White grew up and became ever more beautiful. When she was seven years old she was as beautiful as the light of day, even more beautiful than the queen herself. One day when the queen asked her mirror:

*Mirror, mirror, on the wall,
Who in this land is fairest of all?*

It answered:

*You, my queen, are fair; it is true.
But Snow-White is a thousand times fairer than you.*

The queen took fright and turned yellow and green with envy. From that hour on whenever she looked at Snow-White her heart turned over inside her body, so great was her hatred for the girl. The envy and pride grew ever greater, like a weed in her heart, until she had no peace day and night. Then she summoned a huntsman and said to him, "Take Snow-White out into the woods. I never want to see her again. Kill her, and as proof that she is dead bring her lungs and her liver back to me."

Excerpt from Little Snow-White (Grimm & Grimm, 1857, pp. 264-265)

Envy has fascinated people for many centuries. Folktales such as “Snow White” and “Cinderella”, the biblical story of King Saul and David, the movie “Amadeus”: A large number of literary and pop-cultural works have portrayed characters suffering from envy, in many cases with disastrous consequences. These manifold cultural expressions indicate that envy plays an important role in the daily lives of many people, which is further underlined by empirical research showing that a substantial proportion of people report experiencing envy on a regular basis (Gesellschaft für Konsumforschung, 2015; Henniger & Harris, 2015). However, it is important to note that not all people are equally prone to envy, with some people having a stronger tendency to experience envy than others (Lange & Crusius, 2015; Rentzsch & Gross, 2015; Smith et al., 1999). In recent years, research has increasingly focused on such stable individual differences in people’s tendencies to experience envy, a construct referred to as *dispositional envy*.

As illustrated by the detailed description of the evil queen’s suffering and the hardships experienced by Snow White as a consequence of the queen’s envy in Grimms’ fairy tale, a strong tendency to experience envy might have detrimental effects for both the envious and the people who are envied. It is therefore crucial to better understand how dispositional envy develops over time and how it translates into experiences of envy in daily life. In order to attain this goal, the present dissertation aims to extend the existing knowledge on dispositional envy by employing a personality psychology perspective and large-scale longitudinal data sets. Specifically, the present research investigates the temporal stability of dispositional envy and its longitudinal associations with self-esteem, a construct that has been shown to be closely related to envy in previous research (Rentzsch & Gross, 2015; Smith et al., 1999; Vrabell et al., 2018). Moreover, I examine an applied case of envy by investigating how dispositional envy is related to experiences of vaccine envy during the COVID-19 pandemic.

1.1 The Social Emotion of Envy

Envy has been defined as an “unpleasant, often painful emotion characterized by feelings of inferiority, hostility, and resentment produced by an awareness of another person or group of persons who enjoy a desired possession” (Smith & Kim, 2007, p. 47). This definition contains three particularly important aspects: First, envy is experienced as the result of an upward comparison with another person who has something that the envious person wants for themselves (Alicke & Zell, 2008; Smith & Kim, 2007; White et al., 2006). This

desired possession does not necessarily have to be an object but can be an immaterial attribute, such as status or beauty (as experienced by the evil queen in Grimms' fairy tale). Second, experiences of envy can range from mildly unpleasant to severely painful (see the description of the evil queen as having "no peace day and night"), which is underlined by evidence that episodes of envy are connected to neural activation in cerebral areas that process social pain (Takahashi et al., 2009). Third, while the evil queen's plot to kill Snow White is an extreme reaction to envy, there is indeed evidence of envy being connected to hostile and destructive behaviors (Behler et al., 2020; Duffy et al., 2012; Rentzsch et al., 2015). However, envy might not be quite as bad as its reputation, as there might also be benign forms of envy that can motivate people to improve themselves and increase their performance (Lange & Crusius, 2015; van de Ven, 2017).

In order to avoid confusion, it is important to distinguish envy from *jealousy*, a related construct that is often used synonymously in everyday language (e.g., "I'm so jealous that you went to the Bahamas"). Whereas envy is an emotional reaction to an upward comparison with another person who enjoys something that we want for ourselves, jealousy is typically experienced when one fears losing a beloved relationship partner to another person (Smith & Kim, 2007). It has been shown in previous research that, while envy and jealousy often co-occur, they have distinctive affective qualities, with envy being associated with longing and feelings of inferiority and jealousy being accompanied by fear of rejection, distrust, and anxiety (Parrott & Smith, 1993).

Like other emotions (e.g., gratitude, compassion, and jealousy), envy has been classified as a social emotion. Social emotions are a subcategory of emotions that have evolved specifically in order to help individuals navigate social interactions and are associated with social appraisal processes and action tendencies (Hareli & Parkinson, 2008; Tracy & Weidman, 2021). Envy clearly fulfills these criteria, as its goal is to warn individuals against being outperformed by others in relevant life domains (DelPriore et al., 2012; Hill & Buss, 2008). Moreover, previous research has shown that envy is typically accompanied by the social appraisals of injustice and undeservingness (Smith et al., 1994; van de Ven et al., 2012) as well as by the motivation to level the difference between oneself and the envied person (Lange & Crusius, 2015; van de Ven et al., 2009), which might lead to hostile or harmful interpersonal behavior (Behler et al., 2020; Rentzsch et al., 2015). These findings are also in line with component approaches in emotion research that

emphasize that emotions include cognitive, motivational, and behavioral aspects in addition to the subjective emotional experience (see Scherer & Moors, 2019).

Understanding envy is important from both an individual and a societal perspective. Envy seems to be widespread in our society: In a representative survey with more than 2,000 German participants aged 14 and older, almost two out of three respondents reported feeling envious from time to time (Gesellschaft für Konsumforschung, 2015). Considering that the expression of envy is stigmatized (Miceli & Castelfranchi, 2007), which might cause individuals to understate how often they experience envy, its true prevalence might be even higher. With episodes of envy ranging from uncomfortable to severely painful, it can be concluded that envy is responsible for a large amount of emotional pain, a phenomenon that is further underpinned by research showing that people who frequently experience envy report lower well-being and increased symptoms of mental disorders, including depression and anxiety (Gold, 1996; Mujcic & Oswald, 2018; Oren-Yagoda et al., 2021).

Moreover, envy has been shown to have detrimental effects that go beyond the individual's suffering. First, there is a growing body of research indicating that envy can lead to destructive behaviors in relationships and groups. For instance, a previous study showed that being envious can lead high school students to label envied classmates as nerds, a form of interpersonal aggression (Rentzsch et al., 2015). Similarly, in the work context, envy has been shown to be related to social undermining (e.g., talking bad about co-workers behind their backs; Duffy et al., 2012) and to reduce group cohesiveness and performance (Duffy & Shaw, 2000). Second, as pointed out by the Stereotype Content Model (Cuddy et al., 2008; Fiske, 2010; Fiske et al., 2002), envy might be toxic for society as a whole, as it reinforces stereotypes about outgroups that are perceived as competent but cold (e.g., Asians, Jews, career women). On the basis of these aspects, it has been argued that the detrimental effects of envy might go as far as inciting anti-Semitism and genocide (Smith & Hoogland, 2019). These findings underscore the importance of envy research, which might eventually inspire interventions to mitigate the negative effects of envy. On the other hand, a number of studies have begun to examine envy's positive effects (e.g., Lange & Crusius, 2015; van de Ven, 2017), which suggest that envy might also yield beneficial outcomes for society if channeled in the right direction.

While many of the earlier contributions to the field of envy research were made by social psychologists (e.g., Salovey & Rodin, 1988; Silver & Sabini, 1978), research on envy is now being conducted in many psychological subdisciplines. For instance, in evolutionary psychology, envy is viewed as an emotional adaptation that has evolved as an indicator of being outperformed by another person in life domains that are relevant for survival and reproductive success (DelPriore et al., 2012; Hill & Buss, 2008). At the same time, neuropsychologists are looking for the neural correlates of envy (Takahashi et al., 2009). In the applied fields, media psychologists are investigating whether social media use might instigate envy (see Meier & Johnson, 2022, for a critical review), and business psychologists are examining the impact of envy on consumption (Belk, 2011; Belk, 2008) and workplace behavior (Cohen-Charash & Mueller, 2007; Thompson et al., 2016). Moreover, research investigating the consequences of envy for mental health has found that envy is related to a number of negative consequences, such as reduced well-being, low life satisfaction, and mental disorders (Gold, 1996; Mujcic & Oswald, 2018; Oren-Yagoda et al., 2021; Rentzsch & Gross, 2015). Last but not least, personality psychologists are investigating stable individual differences in people's tendencies to experience envy (i.e., dispositional envy).

1.2 Dispositional Envy as a Domain-Specific Emotional Trait

The present dissertation conceptualizes dispositional envy as an emotional trait that varies across comparison domains. This approach distinguishes this research from studies that are investigating state envy or that conceptualize envy as a unidimensional construct. In the following, I elaborate further on these important distinctions in the field of envy research, including their theoretical backgrounds and a brief review of relevant research. I begin by explaining the distinction between state envy and dispositional envy (Section 1.2.1) and then differentiate between global and domain-specific dispositional envy (Section 1.2.2).

1.2.1 State Envy vs. Dispositional Envy

Envy can be investigated as a state or as a trait. *State envy* (sometimes also referred to as episodic envy) describes a person's momentary experience of envy that emerges in a specific situation (e.g., the painful sting experienced by the evil queen after the mirror pronounces Snow White as being a thousand times fairer). *Dispositional envy* (i.e., trait envy), on the other hand, refers to individual differences in the extent to which people are

prone to experiencing envy. For instance, the queen from Grimms' fairy tale is described as having an "envious heart" (Grimm & Grimm, 1857, p. 271), suggesting that she might be prone to envy, thereby experiencing envy often and in a wide range of different situations. By contrast, Snow White herself might not be very susceptible to envy.

The differentiation between emotional states and traits can be traced back to classical state-trait theories of emotions (Endler & Hunt, 1966; Spielberger, 1972). In these theories, affective states are defined as transient emotional experiences that vary in intensity and fluctuate over time as a function of the situation encountered by the individual, whereas affective traits, such as dispositional envy, represent a person's habitual tendency to experience a certain emotion, which determines how often and intensely this emotion is experienced (Spielberger & Reheiser, 2009). A similar concept was brought forward in the hierarchical model of affective organization (Rosenberg, 1998), which also differentiates between more transient (i.e., states) and more enduring (i.e., traits) levels of affect. In this model, affective traits are understood as an individual's threshold for experiencing a certain emotion. This means that a person with a pronounced disposition toward envy should have a low threshold for the experience of envy and will therefore experience envy in situations that would not lead to an activation of an envious state in people who are less prone to experiencing envy.

Whereas early empirical research on emotional traits focused mainly on the basic emotions of anxiety and anger (Spielberger, 1972, 1983, 1988), recent years have brought about an uptick in interest in dispositional social emotions (e.g., dispositional gratitude, dispositional contempt, and dispositional greed; see McCullough et al., 2002; Schriber et al., 2017; Seuntjens et al., 2015). With the Materialism Scale (Belk, 1985), which includes a scale assessing dispositional envy as a subtrait of materialism, a first measure of dispositional envy was developed in the mid-80s. Ten years later, the first instruments explicitly designed to assess dispositional envy were introduced: the York Enviousness Scale (Gold, 1996) and the Dispositional Envy Scale (Smith et al., 1999). More recently, measures developed to assess subtypes of dispositional envy have become increasingly popular (Lange & Crusius, 2015; Rentzsch & Gross, 2015).

Both ways of conceptualizing envy (i.e., state envy and dispositional envy) have stimulated fruitful research. On the one hand, studies that assess or induce state envy have been used to identify the immediate antecedents and consequences of envy. For instance,

it has been shown that state envy is especially likely to be experienced in situations in which the advantage of the other person is appraised as undeserved (van de Ven et al., 2012). Moreover, experiencing envy has short-term consequences on cognition (Hill et al., 2011), behavior (Montal-Rosenberg & Moran, 2020), and motivation (see also component approaches of emotions, Scherer & Moors, 2019). On the other hand, studies investigating envy from a trait perspective have been used to identify the long-term consequences and life outcomes of dispositional envy (Mujcic & Oswald, 2018; Ng et al., 2021). Similarly, a number of studies have investigated the nomological network of envy by looking at its relationships with other emotional traits (Crusius et al., 2021) or established trait constructs, such as the Big Five and the dark triad traits, including narcissism (Krizan & Johar, 2012; Milić et al., 2023; Rogier et al., 2023). For instance, a recent study showed that narcissism, neuroticism, and low conscientiousness predicted dispositional envy across different measures (Milić et al., 2023). Moreover, a growing body of research has highlighted the association between dispositional envy and low self-esteem (Rentzsch & Gross, 2015; Smith et al., 1999; Vrabel et al., 2018).

1.2.2 Global vs. Domain-Specific Dispositional Envy

Knowing a person's general disposition to experience envy (i.e., their *global dispositional envy*) provides important insights into how often and intensely this person experiences envy in their daily life; however, in order to understand which situations are especially likely to elicit envy in that person, a more fine-grained approach might be needed. For instance, while the evil queen seems to react strongly to others possessing superior beauty ("she could not stand it if anyone might surpass her in beauty"; Grimm & Grimm, 1857, p. 264), she might not be prone to envying others who are more intelligent or who have more money. *Domain-specific* conceptualizations of dispositional envy consider such intraindividual variation in a person's envy proneness by assessing dispositional envy in specific comparison domains (e.g., attraction, competence, and wealth) in addition to global dispositional envy.

A domain-specific perspective might offer distinct advantages when compared with a global perspective. According to a number of theoretical frameworks that stress the importance of symmetry between predictor and criterion (i.e., the symmetry principle, see Wittmann, 1988; specificity-matching, see McWilliams et al., 2013; Swann Jr et al., 2007; the frame-of-reference approach, Lievens et al., 2008), domain-specific outcomes (e.g.,

state envy following an upward comparison with an attractive person) can be predicted more accurately by constructs belonging to the same domain (dispositional envy in the domain of attraction) compared with global constructs (the person's global level of dispositional envy). Supporting this idea, it has been empirically demonstrated that domain-specific constructs show incremental validity over generic measures when predicting domain-specific outcomes (Marsh et al., 2006; Michel et al., 2022; Rentzsch & Gross, 2015). Consequently, a domain-specific perspective is being adopted for more and more psychological constructs, including self-esteem (Rentzsch et al., 2016; Shavelson et al., 1976), perfectionism (Haase et al., 2013), risk-taking (Liu et al., 2021), and narcissism (Grosz et al., 2022).

As envy is based on social comparisons that take place in specific life domains, the importance of a domain-specific approach was recognized early on in envy research. According to research by Salovey and Rodin (1984, 1991), upward comparisons are more likely to elicit state envy in life domains that are judged to be important and that are relevant for a person's self-esteem (Salovey & Rodin, 1984, 1991). Moreover, several measures of dispositional envy include domain-specific subscales for assessing experiences of envy in specific life domains (Belk, 1985; Rentzsch & Gross, 2015). For instance, in addition to assessing global dispositional envy, the Domain-Specific Envy Scale (DSES; Rentzsch & Gross, 2015) includes three subscales measuring dispositional envy in broad domains of social comparison (i.e., attraction, competence, and wealth), the selection of which was adapted from the three forms of capital postulated by Bourdieu (1986). Underpinning the importance of a domain-specific approach in envy research, a previous study showed that envy following an upward comparison with a person who seems competent was predicted by dispositional envy in the competence domain over and above global dispositional envy (Rentzsch & Gross, 2015).

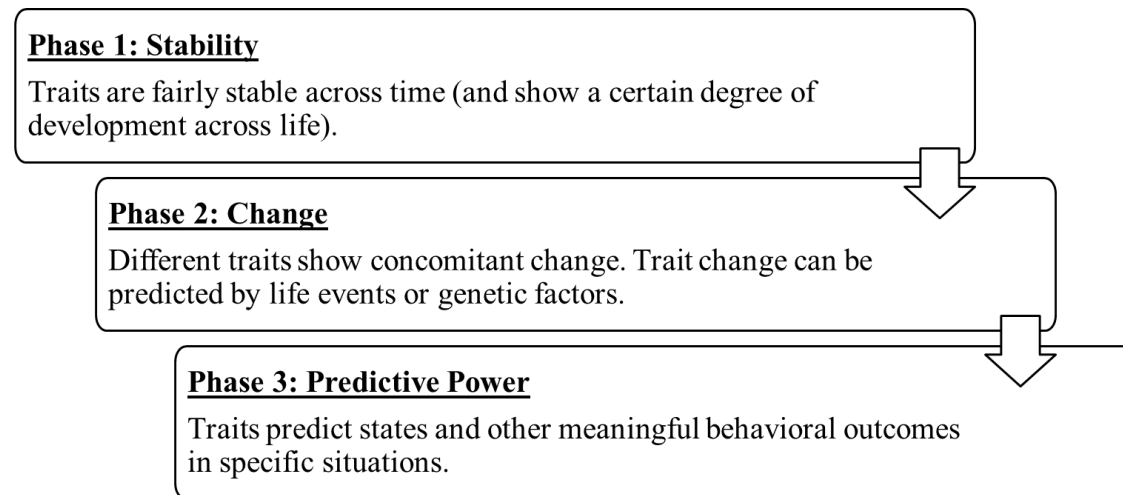
1.3 Gaps in the Field of Dispositional Envy Research From a Personality Perspective

Conceptualizing envy as a stable trait has moved envy research into the realms of personality psychology, which examines fairly stable patterns of behaviors, thoughts, and feelings that vary between individuals (Allport, 1961). In personality psychology, established traits, such as the Big Five and self-esteem, have undergone an intricate research process that can be classified into three different phases (see Figure 1 for an overview). In the following, I describe these phases and relate them to research on

dispositional envy. From there, I derive the three superordinate research questions of the present dissertation.

Figure 1

Phases of the Prototypical Research Process on Traits in Personality Psychology



Note. The phases are based on ideas by Wrzus (2021).

First, a defining feature of (personality) traits is their temporal stability. This means that traits are stable with regard to individuals' relative ranking (e.g., people who are among the most extraverted at a given point in time will remain above average on extraversion) as well as with regard to their mean level (e.g., the average extraversion level in a certain population will not change dramatically over time). Traits, such as the Big Five, have been shown to remain fairly stable across time spans of several years (e.g., Bleidorn et al., 2021; Seifert et al., 2022; Specht et al., 2011). The empirical investigation of a construct's temporal stability therefore constitutes an important first step in the prototypical research process in the field of personality psychology. However, it is important to note that, despite their stability, personality traits are expected to show a certain degree of change across longer periods of time (Roberts et al., 2008; Roberts & Mroczek, 2008). This is why research on the stability of personality traits pertaining to Phase 1 often also provides insights into how these traits develop across the life span (Rentzsch & Schröder-Abé, 2018; Specht et al., 2011). Stability and change can be viewed as two sides of the same coin, as imperfect stability implies change.

Second, once the stability of a trait is established, research moves on to a further phase that focuses on explaining individual differences in trait change (e.g., explaining why some individuals experience increases in extraversion across life, whereas others become

less extraverted). For this purpose, a growing body of research is investigating how personality development is associated with changes in other (trait) characteristics. For instance, a previous study found that personality development was closely intertwined with changes in life goals (Atherton et al., 2021). Similarly, previous research has investigated associations between the change patterns in different personality traits (e.g., extraversion and neuroticism; Borghuis et al., 2017; Olaru & Allemand, 2022) as well as associations between personality change and other characteristics, such as perceived social support (Pfund & Allemand, 2022), relationship satisfaction (O'Meara & South, 2019), and well-being (Fetvadjiev & He, 2019). Additionally, research has investigated whether trait change can be predicted by life events (see Bleidorn et al., 2018, for a review) or genetic factors (Bleidorn et al., 2014; Kandler et al., 2014). For instance, it has been shown that becoming a parent (Hutteman et al., 2014) and entering the labor market (Specht et al., 2011) is associated with changes in the Big Five personality traits. Last, in order to complete the picture, researchers have begun to form and test theories about the processes and mechanisms underlying personality change (e.g., Geukes et al., 2017; Wrzus & Roberts, 2017).

Third, the investigation of stable individual differences is not an end in and of itself, but it is aimed at predicting experiences and behavior in specific situations. Following the person-situation debate on whether individual differences in personality are meaningful enough to have an impact on actual behavior in specific situations (Fleeson & Nofhle, 2008), it has been widely agreed upon that both personality and situational variables contribute to the prediction of behavior, including emotions, motivations, and cognitions (Funder, 2006; Rauthmann, 2020). In line with this notion, states can be seen as manifestations of traits in specific situations (Fleeson & Jayawickreme, 2015). Research in personality psychology is therefore increasingly investigating how behaviors and personality states emerge from a dynamic interplay of person and situational variables (e.g., Bleidorn, 2009; Church et al., 2008; Horstmann et al., 2021). For instance, it has been shown that the Big Five traits predict personality states and trait-specific behaviors in different situational contexts (e.g., at work and at home; Church et al., 2008).

Compared with research on established trait constructs, such as the Big Five, personality psychology research on dispositional envy is still in its infancy. Whereas many interesting approaches have been introduced and many new developments have taken place in the field in recent years, there is still a gap when it comes to longitudinal data. Among

the few longitudinal studies on envy that have been conducted so far (Chae, 2018; Mujcic & Oswald, 2018; Ng et al., 2021), none have assessed dispositional envy with an established measure across multiple measurement occasions. As a consequence of this lack of longitudinal data, the stability of dispositional envy as well as determinants of change have not yet been empirically investigated. This means that the in-depth investigation of dispositional envy from the perspective of the prototypical process of personality psychology trait research is still just beginning, as is the case for many emotional traits (see Reisenzein et al., 2020). This has led me to the research questions that the present dissertation aims to answer.

1.3.1 Research Question 1: Is Dispositional Envy Stable Across Time?

Following state-trait theories of emotions (Endler & Hunt, 1966; Rosenberg, 1998; Spielberger, 1972), previous research has conceptualized dispositional envy as a trait-like individual difference variable, thereby implicitly assuming that dispositional envy is stable across time. However, this assumption has never been empirically investigated. In addition to these theoretical considerations, the stability of dispositional envy has important practical implications, as it is an indication of how difficult it might be to change a person's tendency to experience envy (e.g., via interventions; see Wagner et al., 2019). As a first step in the personality psychological research process on dispositional envy (see Phase 1 in Figure 1), I therefore aimed to examine whether dispositional envy is indeed stable across time spans of several years.

The longitudinal stability of trait characteristics can be investigated with the use of different indicators. Among the most prominent are rank-order stability, mean-level change, and the proportion of variance that can be accounted for by a stable trait factor. While *rank-order stability* describes the consistency of individuals' relative ranking on a certain attribute across time, *mean-level change* refers to increases or decreases in the mean level of a variable at the population level (Roberts et al., 2008). When repeatedly measuring dispositional envy in the same group of participants, a high rank-order stability would thus imply that the individuals with the highest (or lowest) levels of dispositional envy at one point in time are likely to still be among the most (or least) envious at later time points. Moreover, mean-level change would be represented by increases or decreases in the group-level mean scores of dispositional envy between measurement occasions. Additionally, the *latent state-trait modeling* framework can be used to disentangle stable ("trait-like") and

variable (“state-like”) components of psychological constructs (Geiser, 2020). With regard to the first research question, the model allows researchers to investigate the extent to which variance in dispositional envy can be attributed to a stable trait factor as opposed to occasion-specific fluctuations. Traits can be expected to remain fairly stable across time with regard to all indicators of stability (i.e., high rank-order stability, low mean-level change, and a substantial proportion of trait-specific variance).

Whereas a large body of research has used all three indicators to investigate the stability of established trait characteristics, such as the Big Five and self-esteem (e.g., Anusic & Schimmack, 2016; Rentzsch & Schröder-Abé, 2018; Seifert et al., 2022; Wagner et al., 2019), the longitudinal stability of dispositional envy has yet to be empirically investigated. The first aim of the present dissertation was therefore to examine whether dispositional envy is stable across several years as postulated by state-trait theories of emotions (*Research Question 1*). Moreover, a domain-specific perspective adds an additional layer to this research question, as it raises the question of whether domain-specific dispositional envy is less stable or equally as stable as global dispositional envy.

1.3.2 Research Question 2: In What Way is Change in Dispositional Envy Intertwined With Self-Esteem Development?

After establishing that dispositional envy indeed remains fairly stable across time and can therefore be rightfully considered an emotional trait, the focus of research may shift from the enduring (i.e., stability) to the more malleable (i.e., change) components of dispositional envy (see Phase 2 of the prototypical research process depicted in Figure 1). An imperfect stability implies individual differences in intraindividual change, meaning that not all individuals follow the same normative developmental trend regarding change in dispositional envy across time but that some individuals might experience decreases in dispositional envy, whereas others’ levels of dispositional envy might stagnate or decrease. The second aim of the present dissertation was therefore to explain why individuals differ in their change trajectories (i.e., individual differences in intraindividual change across time). As illustrated before, individual differences in intraindividual change may be explained by concomitant change in related traits, among other things.

From a theoretical perspective as well as according to previous research, a construct that is closely linked with envy is *self-esteem*. Self-esteem can be defined as the positivity of a person’s global evaluation of the self (Baumeister, 1998; Coopersmith, 1967;

Rosenberg, 1965). In addition to having important implications for many life domains, including mental health (Orth et al., 2012; Sowislo & Orth, 2013) and social relationships (Harris & Orth, 2020; Leary et al., 1995), self-esteem has been shown to be associated with emotional traits, such as anxiety and guilt/shame proneness (Benetti & Kambouropoulos, 2006; Cohen et al., 2011). Moreover, from the early beginnings of envy research, theoretical accounts have highlighted the close connection between envy and low self-esteem (Foster, 1972; Heider, 1958; Salovey & Rodin, 1984; Silver & Sabini, 1978). In line with these theoretical accounts, it has been shown empirically that people who are prone to experiencing envy typically have low self-esteem, with moderate to large effects (Rentzsch & Gross, 2015; Smith et al., 1999; Vrabel et al., 2018). Considering the close relationship between dispositional envy and self-esteem, it seems likely that changes in a person's dispositional envy are connected to changes in self-esteem. This notion has been further underpinned by early theoretical accounts suggesting that envy and self-esteem are mutually dependent, with envy having been conceptualized as both an antecedent and a consequence of low self-esteem (e.g., Foster, 1972; Silver & Sabini, 1978).

When investigating the longitudinal interplay of dispositional envy and self-esteem, it is important to differentiate two ways in which change in the two constructs might be intertwined. First, dispositional envy and self-esteem might show *correlated change*, meaning that they change in unison (albeit in different directions): When a person's self-esteem decreases, their tendency to experience envy increases within the same time frame and vice versa. Second, there might be *prospective effects*, meaning that change in one construct predicts later change in the respective other construct. For instance, decreases in a person's self-esteem might predict later increases in their dispositional envy. Whereas prospective effects might hint at a causal flow between the two constructs, correlated change might occur when change in both constructs results from the same causal factors or developmental principles (e.g., specific life events or personality maturation).

As a first step toward understanding why individuals differ in how their dispositional envy changes across time, I therefore aimed to examine how change in dispositional envy is related to self-esteem development (*Research Question 2*). The previous literature on dispositional envy and self-esteem is limited in that the association between the two constructs has been investigated only at the cross-sectional level so far (Rentzsch & Gross, 2015; Smith et al., 1999; Vrabel et al., 2018). Because self-esteem, similar to dispositional envy, has been conceptualized as a domain-specific construct that

varies across comparison domains (e.g., self-esteem in the social or academic domain; see Shavelson et al., 1976), the longitudinal interplay between dispositional envy and self-esteem can be examined in specific comparison domains in addition to the global constructs. For instance, it is important to investigate how change in domain-specific dispositional envy in the competence domain is related to change in a person's performance self-esteem.

1.3.3 Research Question 3: How Does Dispositional Envy Translate Into Experiences of Vaccine Envy During the COVID-19 Pandemic?

Whereas state-trait theories of emotions propose that some people have a more pronounced tendency to experience specific emotions than others, they do not explain how emotional states are evoked in specific situations. Even people with a pronounced disposition to experience envy will not experience state envy in all situations involving an upward comparison with another person; and conversely, even people low on dispositional envy might experience envy from time to time, depending on the characteristics of the situation. In order to predict experiences and behavior in specific situations (see Phase 3 of the prototypical research process depicted in Figure 1), a holistic perspective on envy was needed in order to take a close look at how experiences of state envy in daily life are determined not only by a person's level of dispositional envy but also by characteristics of the situation and cognitive components of envy, such as appraisals of injustice and undeservingness (see Moors et al., 2013, for an overview of appraisal theories of emotions). For instance, a previous study investigated participants' experiences of state envy after being outperformed by fellow participants in two competitive situations involving a loss of money (Neufeld & Johnson, 2016). It was shown that the highest levels of state envy were reported by participants who scored high on dispositional envy and a measure of relative deprivation, a construct that includes appraisals of deservingness. However, studies simultaneously assessing dispositional envy, appraisal processes, and state envy in specific situations remain scarce (but see Rentzsch et al., 2023, for an exception).

The present dissertation was written during the COVID-19 pandemic, a major health crisis that affected almost everyone in one way or another. In Germany and many other countries, the pandemic was characterized by large-scale lockdowns, social distancing, and other major challenges to mental well-being (Müller et al., 2023). Reports of envy started to emerge after the beginning of the vaccination campaign in 2021 when

COVID-19 vaccines were in short supply, and many people had to endure long waiting times before they could get vaccinated. At the same time, people waiting for the vaccine were regularly confronted with others who had already received the desired vaccine. This situation can be considered a prototypical envy-eliciting event, as it involves an upward comparison with another person who enjoys a desired possession (see Smith & Kim, 2007). However, not everyone in this situation reported experiencing envy, pointing to the relevance of appraisal processes and individual differences in dispositional envy and other traits. Affecting large parts of the German population, the vaccination campaign could therefore be considered a unique opportunity to investigate the process of envy generation.

Through the example of the COVID-19 pandemic, I aimed to illustrate how a person's dispositional envy translates into experiences of state envy depending on characteristics of the situation and envy-specific appraisals. Specifically, I investigated the situation involving the shortage of COVID-19 vaccines that affected a substantial proportion of the German population during the early stages of the vaccination campaign and that, following media reports as well as personal anecdotes, led many people to experience *vaccine envy*. In the present research, vaccine envy was defined as envy that is experienced when one becomes aware that another person is vaccinated while one is still waiting for the vaccination. In order to demonstrate how state envy emerges from an interplay between person variables and appraisals in specific situations, the present research investigated how the shortage of vaccines during the pandemic led some people to experience vaccine envy depending on certain trait characteristics (e.g., dispositional envy and self-esteem) and envy-specific appraisals of injustice and undeservingness (*Research Question 3*).

1.4 Outline of the Dissertation

It has been argued that emotional traits, such as dispositional envy, are central subsystems of personality and should therefore be integrated into general personality taxonomies (Reisenzein et al., 2020). Building on this idea, the aim of the present dissertation was to deepen the understanding of dispositional envy as a stable and domain-specific emotional trait with the help of classical personality psychological methods (e.g., longitudinal analyses of stability and change). Moreover, I aimed to investigate how dispositional envy translates into experiences of vaccine envy during the COVID-19 pandemic. The present dissertation consists of three empirical articles that represent

different steps in the research process on dispositional envy from a personality psychology perspective (see also Figure 1 in Section 1.3). All articles rely on large samples that provided data on multiple measurement occasions. The articles are presented in Chapter 2 (Empirical Work).

Article 1 (“Stability and Change in Dispositional Envy: Longitudinal Evidence on Envy as a Stable Trait”) aimed to lay the foundation for the further investigation of dispositional envy by providing initial empirical evidence that, as conceptualized by state-trait theories of emotions, dispositional envy can indeed be considered a stable emotional trait. This research was the first to systematically examine the longitudinal stability of dispositional envy across multiple measurement occasions. In order to get a comprehensive picture, my coauthor and I investigated three indicators of stability (rank-order stability, mean-level change, and the proportion of trait-specific variance) with the help of complex modeling approaches including latent change models and latent state-trait models. For these analyses, we drew on 6-year longitudinal data from the Self-Evaluations Across Life (SELF) study (Rentzsch, 2021), including three measurement occasions and $N = 1,229$ adult participants. All methods, hypotheses, and analyses were preregistered before the end of data collection. In line with state-trait theories of emotions and previous conceptualizations of dispositional envy as a stable emotional trait, we hypothesized that global dispositional envy would remain stable across time spans of several years (i.e., high rank-order stability, minimal mean-level change, and a substantial proportion of trait-specific variance). Moreover, in addition to examining global dispositional envy, we adopted a domain-specific perspective by investigating the stability of dispositional envy in the domains of attraction, competence, and wealth.

In Article 2 (“Does Insecurity Lead to Envy? The Longitudinal Interplay Between Dispositional Envy and Self-Esteem”), we proceeded to the next phase of the exploration of dispositional envy from a personality psychology perspective by investigating its longitudinal interplay with self-esteem. As emphasized by a considerable number of theoretical and empirical accounts, a person’s disposition to experience envy is closely and reciprocally linked to their self-esteem, with individuals with a strong tendency to experience envy typically suffering from low self-esteem. However, the longitudinal interplay between these two constructs has never been systematically investigated. Article 2 is a two-study paper: For the first study, we again used three waves of longitudinal data from the SELF study with $N = 1,254$ participants; for the second study, we obtained data

from the GESIS panel (Bosnjak et al., 2018), a representative sample of the German population ($N = 6,134$), after having submitted a peer-reviewed research proposal. Both studies were preregistered before the end of data collection and used bivariate latent change models in order to examine the longitudinal interplay between dispositional envy and self-esteem. We hypothesized that the two constructs should show inverse correlated change, meaning that people who increase in dispositional envy experience simultaneous decreases in self-esteem and vice versa. Moreover, we exploratively investigated prospective effects, referring to effects of (change in) dispositional envy on later change in self-esteem or vice versa. As in Article 1, we additionally adopted a domain-specific perspective by investigating the longitudinal interplay between dispositional envy and self-esteem in specific life domains (e.g., the domain of competence/performance).

Building on the first two articles, Article 3 (“Vaccine Envy During the COVID-19 Pandemic”) is an exploration of how dispositional envy shapes experiences of envy in a specific situation. Examining a particular case of envy (i.e., vaccine envy during the COVID-19 pandemic), the third article can be considered an illustration of how state envy emerges from a complex interplay between the envy-eliciting situation (in this case, becoming aware that another person has received a COVID-19 vaccine), person variables, such as dispositional envy and self-esteem, and characteristic appraisals of injustice and undeservingness. Article 3 has to be understood in the context of the COVID-19 pandemic, with data having been collected during the peak of the vaccination campaign, when vaccine envy was a much-discussed topic in German media. In the present research, we defined *vaccine envy* as an unpleasant emotion that is experienced when one becomes aware that another person is vaccinated against COVID-19 while one is still waiting for the vaccination. Article 3 had several objectives: (a) to examine whether vaccine envy was actually a common phenomenon in the German society during the vaccination campaign, (b) to determine whether vaccine envy can actually be considered envy in the strict sense (i.e., a painful emotion) by comparing its nomological network to that of generic envy, and (c) to investigate the correlates and life outcomes of vaccine envy, including its association with well-being and vaccination willingness. In order to collect data on vaccine envy, I implemented an online survey with two measurement occasions, one in May 2021 ($N = 1,174$) and one in October/November 2021 ($N = 535$). All methods, hypotheses, and analyses were preregistered before the beginning of data collection. In line with previous envy research, it was hypothesized that vaccine envy would be positively related to

dispositional envy and appraisals of injustice and undeservingness and negatively related to self-esteem. Moreover, we hypothesized that vaccine envy would be associated with an increased willingness to get vaccinated.

Article 3 is different from the first two articles in several important ways: First, whereas Articles 1 and 2 aimed to broaden the understanding of dispositional envy from a basic research perspective by applying classical personality psychological methods, Article 3 aimed to illustrate the relevance of envy research in an applied case. Second, Article 3 used envy measures located at different points on the state-trait continuum instead of only focusing on dispositional envy. Third, Article 3 went beyond the traditional envy domains (i.e., attraction, competence, and wealth) by exploring health-related envy.

2

EMPIRICAL WORK

ARTICLE 1:
STABILITY AND CHANGE IN DISPOSITIONAL ENVY:
LONGITUDINAL EVIDENCE ON ENVY AS A STABLE TRAIT

Erz, E., & Rentzsch, K. (2022). Stability and change in dispositional envy: Longitudinal evidence on envy as a stable trait. *European Journal of Personality*, 38(1), 67-84.
<https://doi.org/10.1177/08902070221128137>

This is the authors' accepted manuscript of an article published as the version of record in the *European Journal of Personality*.

ABSTRACT

Dispositional envy has been conceptualized as an emotional trait that varies across comparison domains (e.g., attraction, competence, wealth). Despite its prevalence and potentially detrimental effects, little is known about stability and change in dispositional envy across time due to a lack of longitudinal data. The goal of the present research was to close this gap by investigating stability and developmental change in dispositional envy over time. In a preregistered longitudinal study across 6 years, we analyzed data from $N = 1,229$ German participants ($n = 510\text{--}634$ per wave) with a mean age of 47.0 years at intake ($SD = 12.4$, range 18 to 88). Results from latent factor models revealed that both global and domain-specific dispositional envy were stable across 6 years in terms of their rank order and mean levels, with stability coefficients similar to those of other trait measures reported in literature. Moreover, a substantial amount of variance in global and domain-specific dispositional envy was accounted for by a stable trait factor. Results thus provide evidence for a stable disposition toward the experience of envy both at the global level and within specific envy domains. The present findings have important theoretical and practical implications for the stability and development of dispositional envy in adulthood and advance the understanding of emotional traits in general.

Keywords: dispositional envy, stability, latent state-trait, adulthood, development

INTRODUCTION

People differ in their disposition toward envy, with some being more prone to the experience of envy than others (Smith et al., 1999). The increasing interest in dispositional envy mirrors the uptick of interest in dispositional social emotions in general (e.g., dispositional gratitude, dispositional contempt, and dispositional greed; see McCullough et al., 2002; Schriber et al., 2017; Seuntjens et al., 2015). With dispositional envy being increasingly in the focus of research over the last decades (Crusius et al., 2020; Smith & Kim, 2007), it is quite surprising that no study has yet systematically investigated whether it is appropriate to conceptualize dispositional envy as a trait that remains stable over time. One reason for this gap might be the lack of longitudinal data in research on social emotional traits.

The goal of the present study is to enhance the understanding of envy as a trait by systematically investigating long-term stability and change in dispositional envy across several years. We believe that a more detailed knowledge about stability and change in dispositional envy will allow us to derive implications for the conceptualization of dispositional envy as a stable trait and thereby advance research on emotional traits in general.

Conceptualizations of Envy as an Emotional Trait

Envy is an unpleasant, comparison-based emotion that arises when a person realizes that someone else has something that the person longs for, strives for, or desires (Parrott & Smith, 1993; Smith & Kim, 2007). As shown by previous research, envy includes cognitive, physiological, motivational, and behavioral aspects in addition to the subjective experience of an unpleasant or even painful emotional state (for a review on component approaches in emotion research, see Scherer & Moors, 2019). For instance, envy is connected to a vast range of positive and negative behavioral outcomes, such as antisocial behavior (Behler et al., 2020), hostility (Rentzsch et al., 2015), and social undermining (Duffy et al., 2012), but also increased persistence and performance (see Lange & Crusius, 2015; van de Ven et al., 2011). Moreover, envy includes upward social comparisons (Alicke & Zell, 2008; Smith & Kim, 2007) and the cognitive appraisal of the other person's advantage as unjust or undeserved (Smith et al., 1994; van de Ven et al., 2012). The subjective experience of envy is often described as painful (Cohen-Charash & Mueller,

2007; Tai et al., 2012), which is reflected in neural activation in brain areas responsible for the processing of social pain (Takahashi et al., 2009).

Envy has been studied as a state and as a trait (e.g., Belk, 1985; Gold, 1996; Rentzsch & Gross, 2015; Smith et al., 1999). The theoretical differentiation between states and traits has a long tradition in psychological research. According to classical state-trait theories of emotions (Endler & Hunt, 1966; Spielberger, 1972), affective states are defined as complex emotional reactions that vary in intensity and fluctuate over time as a function of situational influences, while affective traits are defined as an individual's proneness toward a certain emotion, which determines how often and intensely this emotion is experienced (Spielberger & Reheiser, 2009). The hierarchical model of affective organization (Rosenberg, 1998) draws on Spielberger's ideas and provides a useful framework for the organization of affect in different levels of analysis. According to this model, an affective trait can be understood as a person's threshold for the experience of a certain emotion. For instance, people high in dispositional envy should have a low threshold for the experience of state envy and thus experience envy in situations where people with low dispositional envy remain indifferent. This means that while distinct emotional experiences might be futile and highly susceptible to situational changes, they also have a dispositional core that remains stable over time (Izard et al., 1993).

State-trait theories of emotions have stimulated the development of various instruments designed to empirically investigate temporarily stable components of emotions. Among the first questionnaires that were specifically developed to measure emotional traits are the Spielberger scales that assess trait (and state) aspects of anxiety and anger (Spielberger, 1972, 1983, 1988). Similarly, several questionnaires have been developed in order to assess dispositional social emotions such as dispositional gratitude (McCullough et al., 2002), dispositional greed (Seuntjens et al., 2015), and dispositional envy (Rentzsch & Gross, 2015). The growing body of research investigating emotions from a personality perspective has met with approval amongst those arguing that the emotion system is a central subsystem of personality (Reisenzein et al., 2020).

Dispositional Envy as a Domain-Specific Construct

Envy has been conceptualized as a domain-specific construct that varies within individuals and across comparison domains (e.g., attraction, competence, and wealth; DelPriore et al., 2012; Salovey & Rodin, 1991). Research on state envy has shown that

people tend to experience envy when they fail to meet their own expectations in a domain, provided that the specific domain of comparison is important to them (Salovey & Rodin, 1984, 1991). Comparison domains that are particularly likely to elicit envy have been identified from an evolutionary psychological point of view, with the domains of status/prestige, attraction, and romantic success being most prominent (DePriore et al., 2012).

Based on this, it has been shown that a person's disposition toward envy varies across comparison domains (e.g., Rentzsch & Gross, 2015). For instance, a person that tends to feel envious when others are more competent might nevertheless be indifferent to others having more financial success. Some of the instruments measuring dispositional envy refer to specific comparison domains, such as the Materialism Scale (Belk, 1985), which assesses dispositional envy with regard to wealth and romantic attraction. Moreover, the Domain-Specific Envy Scale (DSES; Rentzsch & Gross, 2015) has been developed to measure global dispositional envy and domain-specific dispositional envy in three broad domains of social comparison: attraction, competence, and wealth.

The idea that psychological traits can vary across life domains has a long research tradition. Other examples of domain-specific constructs include self-esteem (Gentile et al., 2009; Shavelson et al., 1976), perfectionism (Haase et al., 2013), risk-taking (Liu et al., 2021), and narcissism (Grosz et al., 2021). A domain-specific perspective entails specific advantages when compared to a purely global perspective, as underpinned by several theoretical accounts that stress the importance of symmetry between predictor and criterion (i.e., the symmetry principle, see Wittmann, 1988; specificity-matching, see McWilliams et al., 2013; Swann Jr et al., 2007; the frame-of-reference approach, Lievens et al., 2008). All of these theoretical principles would agree that in situations where a specific domain is especially salient, domain-specific dispositional envy is more useful for the prediction of state envy than global dispositional envy. This was demonstrated by a previous study which showed that competence envy triggered by an upward comparison with a competent-seeming person was predicted by domain-specific dispositional envy regarding competence, over and above global dispositional envy (Rentzsch & Gross, 2015). The same study found unique associations between the domains of dispositional envy and other domain-specific constructs, such as domain-specific self-esteem and contingencies of self-worth, further underpinning the importance of a domain-specific approach.

Theoretical and Empirical Perspectives on the Stability of Dispositional Envy

When investigating the stability of trait characteristics, it is important to differentiate between different indicators of longitudinal stability, such as rank-order stability, mean-level change, and the proportion of variance that can be accounted for by a stable trait factor. *Rank-order stability* describes the consistency of individuals' relative ordering on a certain variable over time, while *mean-level change* refers to increases or decreases of the mean level of an attribute at the population level over time (Roberts et al., 2008). Trait-like constructs can be expected to be stable across time with regard to rank-order stability and mean-level change (i.e., high rank-order stability and low mean-level change), even though most dispositions including personality traits such as the Big Five show a certain degree of change across life (Roberts et al., 2008; Roberts & Mroczek, 2008). In the case of well-established trait characteristics such as self-esteem and the Big Five, there is extensive research on both indicators of stability (e.g., Anusic & Schimmack, 2016; Rentzsch & Schröder-Abé, 2018; Specht et al., 2011).

With regard to dispositional envy and other dispositional social emotions, research on rank-order stability and mean-level change remains scarce. The only conclusions about the *rank-order stability* of dispositional envy can be drawn from test-retest reliability coefficients reported in the context of questionnaire validation studies. For dispositional envy, a 2-week retest reliability of $r = .80$ (Smith et al., 1999) and a 3-month retest reliability of $r = .77$ (Rentzsch & Gross, 2015) were reported. However, because time intervals were short, these findings only allow very limited conclusions on the long-term stability of dispositional envy. Research on *mean-level change* in dispositional envy is equally insufficient. To our knowledge, a study assessing mean-level change in dispositional envy does not yet exist.

In recent years, researchers have increasingly used the statistical framework of *latent state-trait modeling* in order to disentangle stable and variable components of different constructs, with “trait-like” constructs such as intelligence containing large proportions of trait-specific variance and “state-like” constructs such as mood containing rather small proportions of trait-specific variance (Geiser et al., 2017; see also Hertzog & Nesselroade, 1987). Latent state-trait theories thus closely resemble state-trait theories of emotions, where affective states are defined as fluctuating, while emotional traits are defined as remaining relatively stable across time (i.e., containing high amounts of trait

variance). Latent state-trait models such as the Trait-State-Occasion (TSO) model (Cole et al., 2005) can be used to decompose measures into a stable *trait* component and an *occasion-specific* component that accounts for variance that is specific for measurement occasions (see also Steyer et al., 1999, 2015). For instance, in an application of TSO modeling, Lance and colleagues (2021) found that, in a three-wave study across 2 years with 1-year intervals between waves, 84% of interindividual differences in trait anxiety and 81% of interindividual differences in trait anger could be explained by a stable trait factor (for similar investigations with regard to disgust proneness and positive emotionality, see Olatunji et al., 2020; Kendall et al., 2015). However, no previous study has used latent state-trait modeling in research on dispositional envy and other social emotional traits.

A domain-specific perspective raises additional research questions concerning the stability of global versus domain-specific constructs. So far, there are no specific theoretical or empirical accounts on the stability of domain-specific dispositional envy. As a comparison-based emotion (Alicke & Zell, 2008; Smith & Kim, 2007; White et al., 2006), domain-specific dispositional envy may be less stable than global dispositional envy, because it may be more sensitive to recent outcomes of social comparisons in that domain. Another perspective suggests that domain-specific constructs are equally stable as their corresponding global constructs (e.g., Fleming & Courtney, 1984; Rentzsch & Schröder-Abé, 2018; regarding domain-specific self-esteem). According to this perspective, domain-specific dispositional envy can be expected to reflect a person's stable disposition toward envy in a specific domain, which would not be influenced by recent social comparison outcomes.

The Present Study

The question of trait stability and change has been the subject of a major debate in personality psychology for several decades. Stability and change in the Big Five has been extensively researched (Bleidorn et al., 2021; Borghuis et al., 2017; Specht et al., 2011), and there has been a recent surge of interest in the stability of other trait characteristics such as loneliness (Mund et al., 2020) and materialism (Jiang et al., 2021). Research on the stability and change of dispositional envy and other social emotional traits, however, is still lagging behind due to a lack of longitudinal data. The present work aims to investigate whether the conceptualization of dispositional envy as a stable trait as proposed by state-

trait theories of emotions is justified and to thereby place research on dispositional envy and social emotions in general on a more solid, empirically underpinned ground.

The present study is the first to systematically examine three indicators of stability in dispositional envy (i.e., rank-order stability, mean-level change, and the proportion of variance accounted for by a stable trait factor). All hypotheses were preregistered on the Open Science Framework (<https://osf.io/8aewb/>). In line with previous conceptualizations of dispositional envy as a trait-like construct (e.g., Rentzsch & Gross, 2015; Smith et al., 1999), we hypothesized that global dispositional envy would be stable across a time span of 2 to 6 years (Hypothesis 1), which should be reflected by high rank-order stability, minimal mean-level change, and a substantial proportion of trait-specific variance. Moreover, we aimed to investigate possible differences regarding the stability of global and domain-specific dispositional envy. Following the idea that domain-specific dispositional envy may be more sensitive to recent outcomes of social comparisons in that domain, domain-specific envy should be less stable than global envy (Hypothesis 2), as indicated by a greater stability in terms of rank-order stability and mean-level change as well as a greater proportion of trait-specific variance of global dispositional envy when compared with domain-specific dispositional envy. Note, however, that other perspectives suggested that domain-specific constructs should be as stable as the corresponding global construct.

In the present study, we used a longitudinal design, where dispositional envy was measured on three occasions over the course of 6 years. At intake, participants' age ranged between 18 and 88 with a mean age of 47 years ($SD = 12.4$). In total, $N = 1,229$ participants completed the 15-item Domain-Specific Envy Scale (DSES; Rentzsch & Gross, 2015), which is a valid instrument measuring global and domain-specific dispositional envy. We then carried out longitudinal analyses using a latent variable approach in order to investigate rank-order stability and mean-level change and to disentangle stable and variable variance components of dispositional envy. Moreover, we exploratively tested for gender and age effects on the initial level, rank-order stability, and mean-level change of global and domain-specific dispositional envy.

METHODS

Preregistration

All methods, hypotheses, and analyses in the present study were preregistered on the OSF (see <https://osf.io/8aewb/>).¹ The preregistration document also includes a detailed overview of all measures at each time point. Analyses that deviate from the preregistered protocol are identified as such in the following.

Participants and Procedure

Participants were recruited from the German population using a pool of volunteers for participation in lab research. The link for signing up was announced in regional and national media outlets. As an incentive, participants received personal feedback on their self-esteem profile after participating in the study. Assessments were conducted as part of the SELF (Self-Evaluations Across Life) study (Rentzsch, 2021), which was approved by the ethics committee of the University of Bamberg.

The participant pool was contacted in 2-year intervals beginning in 2013 and followed across 6 years. In this paper, we report data from three waves of data collection: 2013 (Time 1), 2017 (Time 2), and 2019 (Time 3). One further wave of data collection in 2015 was omitted due to preregistered criteria (covariance coverage between measures of dispositional envy at each wave $< .10$). At each wave, participants who had completed former waves and new participants were included in the study. Planned sample size was 500 participants per wave based on constraints regarding the size of the participant pool.² All participants who provided data on dispositional envy on at least one measurement occasion were included in the analysis, resulting in an overall sample size of 1,229 participants. The number of participants per measurement occasion ranged from 510 (in 2017) to 634 (in 2013³). Of those participating at Time 1, $n = 206$ individuals also provided data at Time 2, and $n = 205$ participants attended Time 3. Of those individuals who attended Time 2, $n = 251$ also provided data on dispositional envy at Time 3; $n = 139$ participants took part in all three waves of data collection. Detailed information on sample size and demographics is presented in Table 1.

Measure

Global and domain-specific dispositional envy was assessed with the Domain-Specific Envy Scale (DSES; Rentzsch & Gross, 2015). The DSES exhibits good reliability

Table 1*Sample Size and Demographics Across Waves*

Wave	2013 (Time 1)	2017 (Time 2)	2019 (Time 3)
Sample size <i>n</i>	634	510	611
<i>Age</i>			
Mean (SD)	47.0 (12.4)	48.8 (13.7)	48.8 (14.5)
Range	18-88	19-78	18-81
<i>Gender^a</i>			
Male (%)	190 (30.6%)	177 (34.7%)	190 (31.4%)
Female (%)	431 (69.4%)	333 (65.3%)	415 (68.6%)
<i>Education^a</i>			
Main school (Hauptschule)	22 (3.5%)	13 (2.5%)	20 (3.3%)
Middle school (Mittlere Reife)	142 (22.5%)	100 (19.6%)	106 (17.5%)
Entrance qualification college of applied science (Fachhochschulreife)	71 (11.2%)	56 (11.0%)	61 (10.1%)
High school degree (Abitur)	120 (19.0%)	95 (18.6%)	123 (20.3%)
College/university degree	277 (43.8%)	244 (47.8%)	294 (48.6%)
No degree	0	2 (0.4%)	1 (0.2%)

Note. Data from a fourth wave (2015) were omitted in line with the preregistered criterion of insufficient covariance coverage between waves.

^a Sample sizes differ due to missing data.

and validity in adolescents and adults (Crusius et al., 2021; Rentzsch et al., 2015; Rentzsch & Gross, 2015). Highlighting the validity of its emotional content, previous research showed that the DSES predicted actual experiences of (state) envy in upward-comparison situations (Rentzsch & Gross, 2015). The 15-item scale can be divided into three 5-item subscales measuring dispositional envy with regard to attraction, competence, and wealth as broad domains of social comparison. The items were formulated in a way that they emphasize the subjective experience of an unpleasant feeling as a reaction to an upward comparison with another person.

- Attraction envy (e.g., “It annoys me when others are more popular than I am”) refers to interpersonal and romantic attraction (being popular as a friend and relation partner) as well as physical attraction (being good-looking).

- Competence envy (e.g., “It is hard to take when other people are more intelligent than I am”) refers to envy elicited by the perception of others as being more intelligent or creative.
- Wealth envy (e.g., “It bothers me when others own things that I cannot have”) refers to envy that is triggered by the financial well-being of others (being able to buy better products or living in better neighborhoods).

Responses were rated on 7-point rating scales ranging from 1 (*not at all*) to 7 (*very much*). Reliability coefficients for the subscales as measured with Cronbach’s alpha (α) ranged from .80 to .90 across time points, and the global scale exhibited an $\alpha = .93$ at every time point.

Analytic Strategy

The stability of dispositional envy was investigated with the help of latent longitudinal analyses based on confirmatory factor models. In order to investigate global dispositional envy, a first-order measurement model representing the latent factor of dispositional envy and three manifest parcels as indicators (Little et al., 2002) was used. As preregistered, the internal-consistency approach was applied to create parcels (for a concise description of that approach, see Little et al., 2002, p. 167). In order to investigate specific domains of dispositional envy, first-order measurement models for each of the domain-specific subscales of the DSES (i.e., attraction, competence, wealth) were established. Each factor model included three item parcels based on the balancing technique as recommended by Little et al. (2002, p. 166). The use of item parcels has been controversial (e.g., Marsh et al., 2013; Meade & Kroustalis, 2006), and we adopted the parceling strategy due to the widely acknowledged advantages that parcels have compared to item-level indicators, such as an increased reliability, a lower likelihood of distributional violations, and less sampling error (Little et al., 2002, 2013).

All models were estimated with Mplus Version 8.5 (Muthén & Muthén, 1998-2019) based on full information maximum likelihood estimation (Enders, 2010). According to our preregistration, model fit was assessed with the χ^2 -test statistic, Comparative Fit Index (CFI), Root Mean Square Error of Approximation (RMSEA), and Standardized Root-Mean-Square Residual (SRMR), a CFI > .90, RMSEA < .08, and SRMR < .11 reflecting an acceptable fit to the data. The Bayesian Information Criterion (BIC) and Tucker-Lewis Index (TLI) are also reported. In accordance with the preregistration, we used $p < .05$ and

95% confidence intervals for non-directional hypotheses. Additionally, we corrected p values for the exploratory analyses of gender and age effects with the Benjamini-Hochberg procedure (Benjamini & Hochberg, 1995) in order to adjust for multiple comparisons (see Table S-2 in the Supplement).

The anonymized data and all scripts used for the analyses are available on the OSF (<https://osf.io/5fvhc/>).

Measurement Invariance

First of all, we tested for measurement invariance across time. Establishing invariance is important to ensure that the relationship between the indicators and the latent factors did not change across time, which is a prerequisite for a meaningful comparison of latent factors at different times of measurement.

Every measurement model for each of the measures of global and domain-specific dispositional envy was tested for invariance across the three time points. For each model, the three latent factors representing envy at the different measurement waves (2013, 2017, and 2019) were allowed to correlate. All models were tested in terms of configural, metric, scalar, and strict factorial invariance by comparing a series of increasingly restrictive models against each other (Meredith, 1993). As preregistered and in accordance with Cheung and Rensvold (2002), a value of ΔCFI smaller than or equal to .01 between nested models was regarded as indicating a nonsignificant decrement in fit between the models. The measurement models of the following analyses regarding rank-order stability, mean-level change, and latent state-trait modeling were based on the level of invariance found in these tests.

In the metric invariance model, all factor loadings were constrained to be equal across time. In addition to that, the intercepts of all indicators were constrained to be equal in the scalar invariance model. In the strict invariance model, the residual variances were constrained to be equal in addition to factor loadings and intercepts. In all models, we allowed the residuals of identical indicators to be correlated in order to account for the use of the same indicators across time (Bollen & Curran, 2006).

Rank-Order Stability

In order to investigate rank-order stability, we examined the intercorrelations between the latent envy factors at different times of measurement (i.e., Time 1 – Time 2,

Time 2 – Time 3, and Time 1 – Time 3).⁴ Each analysis was based on the respective measurement model. In order to facilitate the interpretation of the stability of global dispositional envy (Hypothesis 1), rank-order stability coefficients were then compared to stability coefficients of other trait measures reported in previous literature. As preregistered, differences in rank-order stability between measures of dispositional envy were considered relevant, when the confidence intervals of the respective rank-order stability parameters did not overlap (Hypothesis 2).

To exploratively analyze gender and age effects on the rank-order stability of global and domain-specific dispositional envy, we used latent moderated structural equation modelling (Klein & Moosbrugger, 2000). Specifically, gender and age were used as moderators in latent regression analyses, in which the latent factor of dispositional envy at Time 1 predicted the latent envy factor at Time 3. Each model was estimated using a maximum-likelihood estimator with robust standard errors. In addition to regressing the envy factors at Time 3 on the respective initial factor at Time 1, the moderator and an interaction term between the moderator and the initial factor at Time 1 were included as predictors. A significant interaction effect indicates that individual differences in the moderator correspond with individual differences in rank-order stability across time.

Prior to analyses, age was recoded in 10-year units (i.e., divided by 10) and mean-centered in order to avoid very small values, using participants' age at Time 3. If information on age was missing, we used age data from other times of measurement in order to extrapolate participants' age at Time 3. Positive effects of age thus reflect an increase in the dependent variable when age increases by 10 years. Sex was coded as -1 for men and 1 for women. With respect to age, linear, quadratic, and cubic effects between age and rank-order stability were investigated.

Mean-Level Change

In order to examine mean-level change, True Intraindividual Change Models (TICM; Steyer et al., 1997) were run for each measure of dispositional envy separately. In these models, change is measured directly via latent difference variables. Latent difference variables represent individual differences in true intraindividual change over time corrected for random measurement error (Steyer et al., 1997). All TICM were based on the respective measurement model of each measure of dispositional envy. One set of analyses included latent difference variables between the latent envy factors and the first time point (Time 2

– Time 1, Time 3 – Time 1; i.e., baseline change models). Another set of analyses included latent difference variables between the latent envy factors of neighboring time points (Time 2 – Time 1, Time 3 – Time 2; i.e., neighbor change models). Baseline change models were used to analyze mean-level change during the 6-year (Time 1 – Time 3) and the 4-year (Time 1 – Time 2) interval. Neighbor change models were used to analyze mean-level change during the 2-year interval (Time 2 – Time 3).

All latent envy factors loaded on an initial latent factor at Time 1. Every envy factor at later time points loaded on a latent difference factor indicating latent change between Time 1 and that measurement occasion (or in the case of neighbor change models: several latent difference factors indicating latent change between consecutive measurement occasions). All loadings were fixed to one. The intercepts of the reference indicators were set to zero to identify the latent means. The latent difference factors were allowed to correlate. The intercepts and variances of the latent envy factors were set to zero for purposes of identification. Latent mean-level change was assessed as the mean of the latent difference factor. A significant latent difference factor mean indicates that the mean change between time points is significantly different from zero; a positive sign on the latent difference factor mean indicates that the latent scores of dispositional envy have increased between the respective time points. The variance of the latent difference factor reflects individual differences in the latent change scores, indicating interindividual differences in intraindividual change.

In order to evaluate the size of the mean-level change in global dispositional envy (Hypothesis 1), we used the recommendations by Cohen (1992), with a latent Cohen's d of 0.20 representing a small effect.⁵ Again, differences in mean-level change between measures of dispositional envy were considered relevant, when the confidence intervals of the respective mean-level change parameters did not overlap (Hypothesis 2).

In a set of exploratory analyses, we investigated whether age and gender as time-invariant covariates predicted the initial levels and mean-level change of the respective measures of global and domain-specific dispositional envy. With respect to age, we again investigated linear, quadratic, and cubic effects on change in dispositional envy.

Latent State-Trait Modeling

To analyze trait and occasion-specific variance in the respective measures of dispositional envy, we used latent Trait-State-Occasion (TSO) models (Cole et al., 2005).

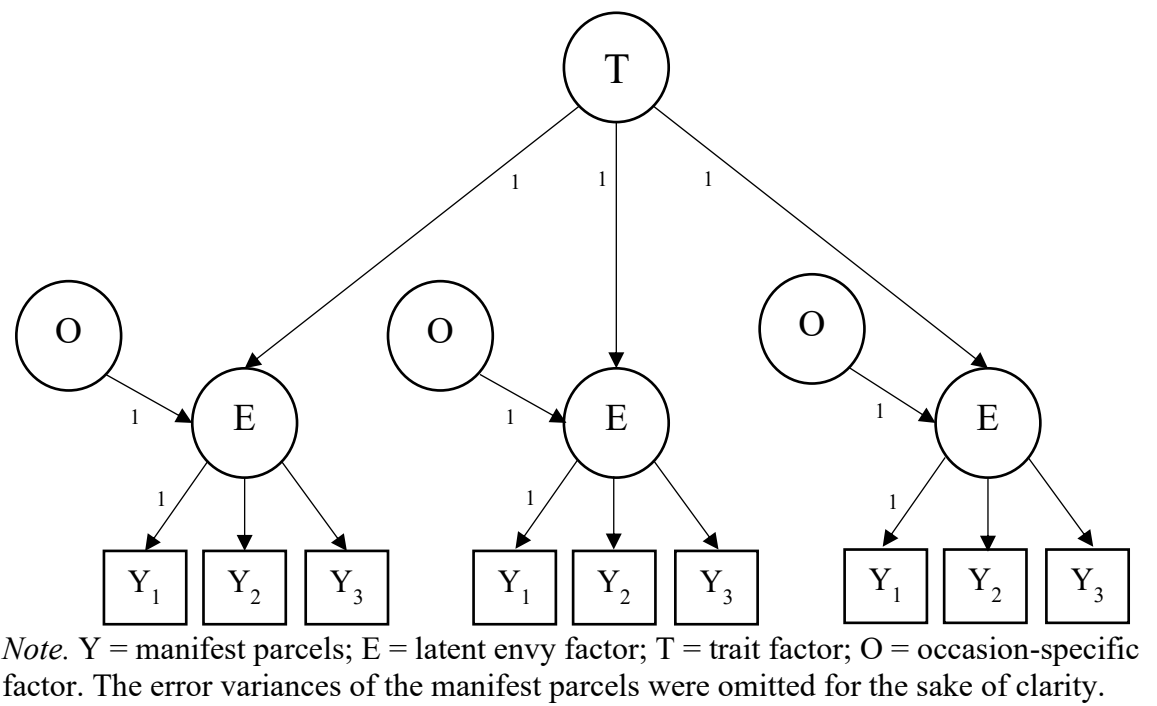
The TSO model decomposes latent variables into a trait factor representing stable individual differences across time and an occasion factor representing effects of changing occasion-specific circumstances such as specific events or momentary interpersonal and intrapersonal conditions (Cole, 2006). TSO models have successfully been used for longitudinal data with three measurement occasions (Lance et al., 2021; Wagner et al., 2019).

The same measurement models as in the analyses described above were used. TSO models for each measure of global and domain-specific dispositional envy were run separately (see Figure 1 for the structural model). The intercepts of the reference indicators were set to zero to identify the latent means. All latent envy factors loaded on a trait factor indicating stable trait variance. Additionally, every envy factor loaded on an occasion-specific factor indicating the proportion of state variance in envy at a specific measurement occasion that cannot be explained by the trait factor. All loadings were fixed to one. The intercepts of the latent envy factors were set to zero. Since the latent envy factors were defined to be completely determined by the trait factor and the respective occasion-specific factor, the residual variances of the latent envy factors were set to zero. The occasion-specific factor at Time 1 was not allowed to correlate with the trait factor. Following suggestions by Prenoveau (2016), the factor variances of the occasion-specific factors were constrained to be equal, since constraining did not lead to a significant decrement of model fit (global envy: $\Delta\chi^2(2) = 0.39, p = .821$; attraction envy: $\Delta\chi^2(2) = 0.10, p = .951$; competence envy: $\Delta\chi^2(2) = 1.01, p = .604$; wealth envy: $\Delta\chi^2(2) = 5.29, p = .071$). As preregistered, the TSO model originally included autoregressive effects between the occasion-specific factors of neighboring time points. Following suggestions by Prenoveau (2016), we tested whether these autoregressive effects were necessary in order to explain the stability of dispositional envy across time. Since constraining the autoregressive pathways to zero did not lead to a significant decrement in model fit (global envy: $\Delta\chi^2(2) = 1.56, p = .458$; attraction envy: $\Delta\chi^2(2) = 0.84, p = .658$; competence envy: $\Delta\chi^2(2) = 4.34, p = .114$; wealth envy: $\Delta\chi^2(2) = 0.79, p = .673$), we used the more parsimonious model without autoregressive effects in the present study. In this special case, the TSO model is equivalent to a *single-trait/multistate model* (Prenoveau, 2016; Steyer et al., 2012).

As preregistered, we hypothesized that a substantial proportion of variance in global dispositional envy would be accounted for by a stable trait factor, which again was underpinned by comparisons with previous literature (Hypothesis 1). Extending the

preregistered protocol, differences in trait-specific variance between global and domain-specific dispositional envy were considered relevant if the confidence intervals of the proportion of variance accounted for by a stable trait factor did not overlap (Hypothesis 2).

Figure 1
Latent TSO Model Without Autoregressive Effects for Three Measurement Occasions (Time 1, Time 2, and Time 3)



RESULTS

Estimated means, standard deviations, and intercorrelations of all measures of dispositional envy across time are displayed in Table 2 (for the intercorrelations of the manifest indicators, see Table S-1 in the Supplement; <https://osf.io/5fvhc/>).

Measurement Invariance

Rank-order stability estimates for global and domain-specific dispositional envy are displayed in Table 3. Results can be interpreted in terms of stability of the respective envy measures over the years corrected for measurement error. Global dispositional envy exhibited a rank-order stability of $r = .78$ across 6 years, supporting the hypothesis of dispositional envy being stable across time (Hypothesis 1). Rank-order stability coefficients of domain-specific dispositional envy ranged from $r = .75$ for competence envy to $r = .80$ for wealth envy, all $ps < .001$. Overlapping confidence intervals suggested that

the stability of domain-specific dispositional envy was comparable to the stability of global dispositional envy. This provides support for the theoretical perspective suggesting that domain-specific constructs are as stable as global constructs, while the perspective of domain-specific dispositional envy being less stable than global dispositional envy was rejected (Hypothesis 2).

Rank-Order Stability

Rank-order stability estimates for global and domain-specific dispositional envy are displayed in Table 4. Results can be interpreted in terms of stability of the respective envy measures over the years corrected for measurement error. Global dispositional envy exhibited a rank-order stability of $r = .78$ across six years, supporting the hypothesis of dispositional envy being stable across time (Hypothesis 1). Rank-order stability coefficients of domain-specific dispositional envy ranged from $r = .75$ for competence envy to $r = .80$ for wealth envy, all $ps < .001$. Overlapping confidence intervals suggested that the stability of domain-specific dispositional envy was comparable to the stability of global dispositional envy. This provides support for the theoretical perspective suggesting that domain-specific constructs are as stable as global constructs, while the perspective of domain-specific dispositional envy being less stable than global dispositional envy was rejected (Hypothesis 2).

Mean-Level Change

The True Intraindividual Change Models (TICM) revealed an excellent model fit for global (CFI = .996, RMSEA = .019) and domain-specific dispositional envy (attraction: CFI = .995, RMSEA = .021; competence: CFI = 1.000, RMSEA = 0.000; wealth: CFI = .984, RMSEA = .038). Results from the TICM as displayed in Table 4 revealed that both global and domain-specific dispositional envy were stable with respect to mean levels. All measures of dispositional envy showed a non-significant mean-level change across the 6 years of assessment. Effect sizes across all envy measures and time intervals were close to zero with latent Cohen's d ranging from -0.07 to 0.03, providing further support for Hypothesis 1. Moreover, we found overlapping confidence intervals for mean-level change in global and domain-specific dispositional envy, which again supports the perspective of domain-specific envy being equally stable as global dispositional envy (see Hypothesis 2).

Table 2*Estimated Means, Standard Deviations, and Intercorrelations Between Latent Envy Factors*

	<i>M</i>	<i>SD</i>	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
1. Global Envy T1	2.68	1.26	-											
2. Global Envy T2	2.64	1.29	.83	-										
3. Global Envy T3	2.63	1.31	.83	.86	-									
4. Attraction Envy T1	2.60	1.22	.95	.80	.79	-								
5. Attraction Envy T2	2.53	1.27	.79	.95	.82	.75	-							
6. Attraction Envy T3	2.51	1.26	.80	.83	.97	.76	.79	-						
7. Competence Envy T1	2.91	1.34	.86	.71	.71	.82	.68	.69	-					
8. Competence Envy T2	2.93	1.40	.73	.87	.75	.69	.83	.73	.62	-				
9. Competence Envy T3	2.95	1.38	.73	.76	.88	.69	.72	.85	.62	.66	-			
10. Wealth Envy T1	1.96	1.06	.77	.64	.64	.74	.61	.62	.66	.56	.56	-		
11. Wealth Envy T2	1.91	0.95	.69	.83	.71	.66	.78	.69	.59	.72	.62	.53	-	
12. Wealth Envy T3	1.94	1.07	.65	.68	.79	.62	.65	.76	.56	.59	.69	.51	.56	-

Note. Responses were made on 7-point Likert-type scales ranging from 1 (*not at all*) to 7 (*very much*). $N = 1229$ ($n = 510$ -634 per wave). All $ps < .001$.

Table 3*Model Fit Indices From Invariance Testing Across Time*

Measures of Envy	χ^2	df	p	BIC	TLI	CFI	RMSEA	SRMR
Global Envy								
(Configural invariance)	19.10	15	.209	14546.44	0.997	0.999	0.015	0.020
(Metric invariance)	30.73	19	.043	14529.61	0.993	0.996	0.022	0.028
(Scalar invariance)	39.68	25	.031	14495.88	0.993	0.995	0.022	0.028
(Strict invariance)	43.14	31	.072	14456.65	0.996	0.996	0.018	0.035
Attraction Envy								
(Configural invariance)	22.08	15	.106	16466.39	0.995	0.998	0.020	0.020
(Metric invariance)	26.08	19	.128	16441.94	0.996	0.998	0.017	0.024
(Scalar invariance)	37.84	25	.048	16411.01	0.995	0.996	0.020	0.026
(Strict invariance)	47.98	31	.026	16378.47	0.994	0.995	0.021	0.027
Competence Envy								
(Configural invariance)	7.44	15	.944	17147.74	1.005	1.000	0.000	0.014
(Metric invariance)	14.23	19	.770	17126.07	1.002	1.000	0.000	0.020
(Scalar invariance)	17.79	25	.851	17086.95	1.003	1.000	0.000	0.020
(Strict invariance)	20.31	31	.929	17046.79	1.003	1.000	0.000	0.021
Wealth Envy								
(Configural invariance)	32.99	15	.005	13308.11	0.986	0.994	0.031	0.023
(Metric invariance)	41.63	19	.002	13288.30	0.986	0.993	0.031	0.024
(Scalar invariance)	48.67	25	.003	13252.65	0.989	0.992	0.028	0.024
(Partial strict invariance) ^a	78.63	30	<.001	13247.04	0.981	0.984	0.036	0.036

Note. BIC = Bayesian Information Criterion, TLI = Tucker-Lewis Index, CFI = Comparative Fit Index, RMSEA = Root Mean Square Error of Approximation, SRMR = Standardized Root-Mean-Square Residual. $N = 1229$ ($n = 510$ -634 per wave).

^a In the case of wealth envy, one residual variance was freed in order to achieve partial strict invariance.

Table 4*Rank-Order Stability, Mean-Level Change, and Variance of Change Across Time*

		Global Envy	Attraction Envy	Competence Envy	Wealth Envy
T1-T3 (6 years)	Rank-order stability	.78 [.72, .84], <.001	.78 [0.72, 0.86], <.001	.75 [.69, .82], <.001	.80 [.75, .86], <.001
	Mean-level change ^a	-0.05 [-0.15, 0.06], .355	-0.09 [-0.19, 0.02], .104	0.05 [-0.07, 0.16], .434	-0.01 [-0.10, 0.08], .814
	Latent Cohen's <i>d</i>	-0.04	-0.07	0.03	-0.01
	Variance of change	0.71 [0.53, 0.90], <.001	0.63 [0.44, 0.82], <.001	0.92 [0.69, 1.15], <.001	0.44 [0.32, 0.57], <.001
	Corr _(Time1, Diff)	-.28 [-.39, -.17], <.001	-.27 [-.39, -.16], <.001	-.32 [-.42, -.22], <.001	-.29 [-.41, -.18], <.001
T1-T2 (4 years)	Rank-order stability	.79 [.73, .85], <.001	.78 [.72, .84], <.001	.73 [.66, .79], <.001	.81 [.76, .87], <.001
	Mean-level change ^a	-0.05 [-0.15, 0.06], .397	-0.07 [-0.17, 0.04], .220	0.02 [-0.10, 0.14], .708	-0.05 [-0.13, 0.04], .289
	Latent Cohen's <i>d</i>	-0.04	-0.05	0.02	-0.05
	Variance of change	0.67 [0.49, 0.85], <.001	0.68 [0.51, 0.86], <.001	1.04 [0.79, 1.29], <.001	0.39 [0.27, 0.50], <.001
	Corr _(Time1, Diff)	-.29 [-.41, -.17], <.001	-.28 [-.41, -.16], <.001	-.32 [-.43, -.22], <.001	-.46 [-.57, -.34], <.001
T2-T3 (2 years)	Rank-order stability	.82 [.77, .86], <.001	.81 [.76, .86], <.001	.80 [.75, .85], <.001	.78 [.73, .84], <.001
	Mean-level change ^b	0.00 [-0.10, 0.09], .940	-0.02 [-0.12, 0.08], .696	0.02 [-0.09, 0.13], .685	0.04 [-0.05, 0.12], .400
	Latent Cohen's <i>d</i>	0.00	-0.02	0.02	0.03
	Variance of change	0.61 [0.46, 0.76], <.001	0.62 [0.46, 0.78], <.001	0.77 [0.59, 0.96], <.001	0.47 [0.35, 0.59], <.001
	Corr _(Time1, Diff)	.00, [-.16, .16], .979	.02 [-.14, .19], .801	.02 [-.13, .18], .758	.13 [-.02, .28], .090

Note. Values represent stability/variance/correlation coefficients [95% confidence interval], *p* value. Bolded values are statistically significant ($\alpha = .05$). Rank-order stability = intercorrelations between the latent envy factors; mean-level change = mean of the latent difference factor based on latent change models (^a baseline change models, ^b neighbor change models); latent Cohen's *d* = (mean difference/pooled standard deviation); variance of change = individual differences in intraindividual latent change; Corr_(Time1, Diff) = correlation between initial envy and latent change.

N = 1229 (*n* = 510-634 per wave).

As indicated by the variance of the change scores (Table 4), participants differed significantly from each other in how much their global and domain-specific envy scores changed across the 6 years of assessment (with variances ranging from 0.44 to 0.92). Correlations between the initial level of dispositional envy and the 6-year change score ranged from $r = -.27$ to $r = -.32$ across the envy measures.

Trait and Occasion-Specific Components of Dispositional Envy

Latent TSO models showed an excellent model fit for global (CFI = .997, RMSEA = .016) and domain-specific dispositional envy (attraction: CFI = .996, RMSEA = .019; competence: CFI = 1.000, RMSEA = 0.000; wealth: CFI = .982, RMSEA = .036). The analyses revealed that for all measures of dispositional envy, the proportion of variance explained by a stable trait factor was larger than the proportion of variance explained by an occasion-specific factor (see Table 5). With regard to global dispositional envy, 80% of variance across waves was accounted for by a trait factor, whereas only 20% could be explained by occasion-specific influences. Similarly, the proportion of trait variance in domain-specific dispositional envy ranged from 76 to 80%. Our results thus indicated that global dispositional envy had a strong trait component (Hypothesis 1). Moreover, overlapping confidence intervals regarding the proportion of trait-specific variance supported the perspective of domain-specific dispositional envy being equally stable as global dispositional envy (Hypothesis 2).

For both global and domain-specific dispositional envy, the trait and occasion-specific variances were significantly different from zero, highlighting the utility of the TSO model for the present data. For global dispositional envy, the variance of the latent trait factor was $\sigma^2_T = 1.32$ and the variance of the occasion-specific factor at T1 was $\sigma^2_O = 0.33$. The trait-specific variance of domain-specific dispositional envy ranged between 0.87 for wealth envy and 1.43 for competence envy. For all measures of dispositional envy, the trait variance was significantly larger than the occasion-specific variance.

Gender and Age Effects

We exploratively investigated gender and age effects on rank-order stability as well as on latent change and on initial levels of global and domain-specific dispositional envy. Results of the analyses investigating gender and age effects on rank-order stability and mean-level change across 6 years (Time 1 – Time 3) are displayed in Table 6.

Moderation of Rank-Order Stability

Gender did not influence the rank-order stability of global or domain-specific dispositional envy. Age revealed a significant quadratic effect on the rank-order stability of global dispositional envy ($b = -0.03$, $p = .031$), indicating that the stability of global dispositional envy was particularly large in middle adulthood, whereas global dispositional envy was less stable in younger and older adults. Moreover, age revealed a significant linear effect on the rank-order stability of dispositional envy with regard to attraction ($b = -0.07$, $p = .003$), indicating that attraction envy was more stable in younger participants than in older participants. In the case of wealth envy, we found a significant cubic effect ($b = 0.04$, $p = .004$) of age on rank-order stability. This means that the rank-order stability of wealth envy showed an overall decrease over the course of life, with largest coefficients in middle adulthood. Significant effects of age on rank-order stability are shown in Figure S-1 in the Supplement.

Predicting Initial Levels and Mean-Level Change

Overall, only few effects of covariates were found. Women revealed higher initial levels of global dispositional envy ($b = 0.35$, $p = .001$) as well as attraction ($b = 0.38$, $p < .001$) and competence envy ($b = 0.40$, $p < .001$). We found no evidence for gender differences in wealth envy ($b = 0.08$, $p = .325$). With respect to gender effects on change, there was no significant effect of gender on change in any measure of dispositional envy ($ps > .05$).

With regard to age, results revealed evidence for a significant linear relationship between age and initial levels of global and domain-specific dispositional envy (bs ranging from -0.20 for wealth envy to -0.33 for global dispositional envy, all $ps < .001$). Older participants thus exhibited lower initial dispositional envy than younger participants. However, there was no evidence for linear, quadratic, or cubic effects of age on change in dispositional envy ($ps > .05$), with the exception of dispositional envy with regard to competence, where we found a quadratic relationship with age ($b = 0.06$, $p = .038$). The predicted decline in competence envy across 6 years was strongest in middle adulthood around the age of 50 years, whereas a smaller decline or even a slight increase in competence envy was predicted for younger and older adults.

Table 5
Trait Variance and Occasion-Specific Variance From Latent Trait-State Occasion Models

	Trait factor variance	Occasion-specific variance	Consistency	Occasion specificity
Global Envy	1.315 [1.150, 1.479], <.001	0.333 [0.275, 0.390], <.001	79.8% [76.2%, 83.4%]	20.2% [16.6%, 23.8%]
Attraction Envy	1.226 [1.062, 1.389], <.001	0.329 [0.270, 0.388], <.001	78.8% [75.0%, 82.7%]	21.2% [17.3%, 25.0%]
Competence Envy	1.431 [1.251, 1.611], <.001	0.446 [0.372, 0.521], <.001	76.2% [72.2%, 80.3%]	23.8% [19.7%, 27.8%]
Wealth Envy	0.872 [0.762, 0.981], <.001	0.217 [0.177, 0.257], <.001	80.1% [76.2%, 83.9%]	19.9% [16.1%, 23.8%]

Note. Values represent trait/occasion-specific factor variance [95% confidence interval], *p* value. Consistency = proportion of variance explained by trait factor; occasion-specificity = proportion of variance explained by occasion-specific factor. *N* = 1229 (*n* = 510-634 per wave).

Table 6*Gender and Age Effects on Rank-Order Stability, Initial Levels, and Latent Change*

		Global Envy	Attraction Envy	Competence Envy	Wealth Envy
Rank-order stability ^a (Time 1 – Time 3)	Gender	0.00 [-0.14, 0.15], .963	0.03 [-0.12, 0.17], .731	0.05 [-0.08, 0.18], .452	0.12 [-0.07, 0.31], .220
	Age	-0.03 [-0.08, 0.01], .145	-0.07 [-0.13, -0.02], .003	0.02 [-0.03, 0.07], .463	-0.08 [-0.15, -0.01], .027
	Age ²	-0.03 [-0.06, -0.003], .031	-0.03 [-0.06, 0.01], .098	-0.01 [-0.04, 0.03], .667	-0.05 [-0.08, -0.02], .004
	Age ³	-0.01 [-0.03, 0.01], .280	-0.01 [-0.03, 0.02], .224	-0.01 [-0.03, 0.01], .302	0.04 [0.01, 0.07], .004
Initial level ^b (Time 1)	Gender	0.35 [0.15, 0.55], .001	0.38 [0.19, 0.57], <.001	0.40 [0.19, 0.62], <.001	0.08 [-0.08, 0.25], .325
	Age	-0.33 [-0.40, -0.26], <.001	-0.33 [-0.40, -0.26], <.001	-0.27 [-0.35, -0.20], <.001	-0.20 [-0.26, -0.14], <.001
	Age ²	-0.02 [-0.06, 0.03], .504	0.00 [-0.05, 0.04], .883	-0.04 [-0.09, 0.01], .110	-0.01 [-0.04, 0.03], .777
	Age ³	0.02 [0, 0.05], .067	0.02 [0, 0.05], .072	0.02 [-0.01, 0.05], .178	0.02 [0, 0.04], .072
Mean-level change ^b (Time 1 – Time 3)	Gender	0.01 [-0.21, 0.23], .912	0.00 [-0.21, 0.22], .983	0.01 [-0.23, 0.25], .939	0.09 [-0.09, 0.27], .334
	Age	0.01 [-0.07, 0.09], .794	0.02 [-0.06, 0.09], .688	-0.01 [-0.10, 0.08], .816	0.00 [-0.06, 0.07], .950
	Age ²	0.03 [-0.02, 0.08], .259	0.02 [-0.03, 0.07], .507	0.06 [0.003, 0.12], .040	0.00 [-0.04, 0.04], .927
	Age ³	-0.01 [-0.04, 0.02], .467	-0.01 [-0.04, 0.02], .422	-0.02 [-0.05, 0.02], .372	-0.01 [-0.03, 0.02], .473

Note. Values represent unstandardized interaction/regression coefficients, [95% confidence interval], *p* value. Bolded values are statistically significant ($\alpha = .05$).

^a Based on latent regression analyses. Cells present unstandardized interaction coefficients between the moderator and the latent envy factor at Time 1. ^b Based on True Intraindividual Change Models. Cells present unstandardized regression coefficients. Initial level = latent initial level of envy at Time 1; mean-level change = latent difference variable.

Gender was coded as -1 = male, 1 = female. Age was mean-centered and is given in 10-year units. *N* = 1219-1223 due to missing data on age and gender (*n* = 509-631 per wave).

DISCUSSION

The goal of the present research was to investigate the long-term stability of global and domain-specific dispositional envy. In a preregistered longitudinal study of adults, dispositional envy was examined across three waves and a period of 6 years. We used three different indicators of stability, i.e., rank-order stability, mean-level change, and latent state-trait modeling, in order to examine if dispositional envy remains stable across time and thereby underpin its conceptualization as a stable trait.

Global and Domain-Specific Dispositional Envy are Stable and Trait-Like

In line with Hypothesis 1, the rank-order stabilities of global and domain-specific dispositional envy were relatively high, with global dispositional envy exhibiting a 6-year stability of $r = .78$ and stability coefficients of domain-specific dispositional envy ranging between $r = .75$ for competence envy and $r = .80$ for wealth envy. Stability coefficients were comparable to those of other trait measures that have been reported in the literature, such as trait anger ($r = .70/.81$ for women/men across 6 years; Hakulinen et al., 2014), multidimensional self-esteem ($r = .76-.87$ across 2 years; Rentzsch & Schröder-Abé, 2018), and the Big Five personality traits ($r = .64-.73$ across 4 years; Specht et al., 2011). Mean-level change across 6 years in all measures of dispositional envy was small and non-significant, which again supports the notion of dispositional envy as a stable trait.

Results from Trait-State-Occasion (TSO) models (Cole et al., 2005) indicated that, in accordance with Hypothesis 1, 80% of variance in global dispositional envy was accounted for by a stable trait factor. This is in line with previous research on trait components of emotional traits, which found that 84% of variance in trait anxiety and 81% of variance in trait anger as well as 75% of variance in disgust proneness were accounted for by a stable trait factor (Lance et al., 2021; Olatunji et al., 2020). Taken together, our findings clearly support the conceptualization of dispositional envy as a trait which remains stable across time.

Beside a large trait component, we found significant occasion-specific variance in global and domain-specific dispositional envy, highlighting the usefulness of the TSO model. Factors that cause deviations from a person's habitual level of domain-specific envy might include specific events or momentary intrapersonal conditions. For instance, a salient upward comparison around the time of testing might lead to deviations from the average

level of dispositional envy in a person. Similarly, intrapersonal conditions such as mood might cause intraindividual variability in dispositional envy.

When comparing global and domain-specific dispositional envy with respect to the different indicators of stability, a clear pattern emerged: We found that domain-specific dispositional envy was equally stable as global dispositional envy. Rank-order stability coefficients were comparable for global and domain-specific dispositional envy; and both forms of dispositional envy exhibited no significant mean-level change across time. Moreover, domain-specific dispositional envy exhibited a proportion of trait-specific variance which was comparable to that of global dispositional envy. We did not find any evidence supporting the perspective of domain-specific constructs being less stable than global constructs (Hypothesis 2). If domain-specific dispositional envy were more dependent on recent events or social comparison outcomes than global dispositional envy, as some might expect, this should be reflected in a greater proportion of occasion-specific variance in domain-specific dispositional envy. However, our data showed that the proportion of occasion-specific variance did not vary significantly between measures of dispositional envy and was generally quite small compared to the proportion of trait-specific variance. Our findings thus support the notion of domain-specific dispositional envy as a stable trait, which mirrors results from related research on domain-specific constructs (e.g., on self-esteem; Rentzsch & Schröder-Abé, 2022). We believe that this highlights the importance of a domain-specific perspective in personality psychology.

Age and Gender Effects on Levels, Stability, and Change of Dispositional Envy

In our study, we found that participants differed from each other in their initial levels of dispositional envy as well as in change in dispositional envy across time. In order to explain these individual differences, we exploratively investigated the influence of age and gender on levels, stability, and change of dispositional envy. Taken together, our results suggest that interindividual differences in rank-order stability and mean-level change in dispositional envy cannot, for the most part, be explained by age and gender. We found only few and rather weak effects of age on rank-order stability and mean-level change and no evidence for any gender effects. However, there were age and gender effects on the initial levels of dispositional envy, with younger participants and women reporting more dispositional envy.

Our finding of age effects on the initial envy levels is in line with several cross-sectional studies that found a negative relationship between dispositional envy and age (Henniger & Harris, 2015; Lange & Crusius, 2015; Rentzsch & Gross, 2015) as well as previous research demonstrating that general negative affect decreases with age (Carstensen et al., 2000; Charles et al., 2001; Gross et al., 1997; Windsor & Anstey, 2010). Specific mechanisms that account for these positive aspects of aging might include the fact that growing old is often associated with a decrease in social comparison orientation (Callan et al., 2015) and an enhanced emotion regulation (Urry & Gross, 2010). The age effect found in the present study is thus in line with a growing body of research highlighting positive aspects of aging. This provides support for the idea that aging does not have to be a painful process filled with sadness and resentment due to the loss of attraction, skills, and assets, and should be investigated more closely by future research.

Women on average reported significantly higher initial levels of dispositional envy (except for domain-specific dispositional envy with regard to wealth). However, this result should be interpreted with caution, as the effects were quite small and previous studies generally only found small or nonsignificant gender effects on dispositional envy (Briki, 2019; Henniger & Harris, 2015). If the finding that women report more dispositional envy than men can be replicated, future research should investigate the mechanisms underlying this gender effect. For instance, gender differences in global dispositional envy might, at least in part, be accounted for by the fact that women tend to experience more negative affect (Fujita et al., 1991) and lower self-esteem (Bleidorn et al., 2016; Kling et al., 1999), variables that are closely intertwined with envy (Rentzsch & Gross, 2015). Similarly, gender differences in domain-specific dispositional envy might be explained by gender differences in domain-specific self-esteem. For instance, women report lower physical appearance self-esteem (Gentile et al., 2009) and tend to base their self-esteem more strongly on academics and appearance than men do (Crocker et al., 2003), which is in line with our finding of women reporting more attraction and competence envy than men. Future research should take a closer look at gender differences regarding domain-specific dispositional envy.

With regard to rank-order stability, we did not find any gender effects, indicating that global and domain-specific dispositional envy are equally stable in women as in men. However, we found some evidence for age effects on rank-order stability. For example, global dispositional envy was particularly stable in middle adulthood with a significant

quadratic effect of age, mirroring previous research on rank-order stability that found similar inverted U-shaped patterns (Lucas & Donnellan, 2011; Seifert et al., 2022). This peak of rank-order stabilities of dispositional envy in middle adulthood might be due to the relative stability of social roles and biological and cognitive factors during midlife when compared to young or older adulthood (see Wortman et al., 2012).

The investigation of age and gender effects on mean-level change yielded no significant effects, except for a quadratic relationship between age and dispositional envy with regard to competence, indicating that the predicted decline in competence envy across 6 years was strongest in middle adulthood. An explanation might be that social comparison in the competence domain plays a bigger role in young and old adult life when compared to midlife, with young adults facing many challenges in the field of academics (for instance during college and in the early stages of their career), and old adults increasingly having to cope with cognitive impairments (Deary et al., 2009).

Implications for Research on Emotional Traits

With our study, we wanted to contribute to the growing body of research on emotional traits. As postulated by classical state-trait models of emotions (Endler & Hunt, 1966; Rosenberg, 1998; Spielberger, 1972), emotional experiences have a dispositional core that remains stable across time and determines how often and intensely a certain emotion is experienced. Building on these models, a growing number of empirical studies have investigated antecedents, correlates, and consequences of dispositional envy (e.g., Rentzsch & Gross, 2015; Vrabel et al., 2018). The emotional core of dispositional envy has been demonstrated in previous research (Rentzsch & Gross, 2015; Smith et al., 1999). However, as is the case for many other dispositional social emotions, there has been no empirical evidence regarding its dispositional core, showing that dispositional envy actually meets the postulated criterium of temporal stability. Our results fill this gap in research by showing that the disposition toward the experience of envy is temporarily stable and thus complete the picture of dispositional envy as an emotional trait.

Recently, there have been calls for the integration of emotional traits into general models of personality structure, emphasizing the centrality of the emotion system and arguing that differences in emotional traits are important for describing individuals (Reisenzein et al., 2020). We believe that our research underpins this idea by providing evidence that individual differences in dispositional envy remain fairly stable across longer

time intervals. Importantly, while some might expect dispositional emotions to be less “trait-like” than core personality traits, we found no evidence that dispositional envy is less stable than traditional personality traits such as the Big Five.

However, it is not self-evident that the existing research on stability and change in emotional traits can be replicated for other emotional traits, as they may have distinct properties depending, for example, on the valence of the emotion (positive and negative). For instance, according to the broaden-and-build theory (Fredrickson, 2001), positive emotions such as gratitude and admiration can initiate an upward spiral by building personal resources and promoting well-being, which in turn increases the likelihood for positive emotional experiences, suggesting that individuals high in dispositional positive emotions should be likely to experience an increase in their mean levels across life. Such mutually reinforcing processes might not play a role for dispositional envy. Another characteristic of envy is that its expression is often suppressed (see Lange et al., 2020), because it violates social norms (Foster, 1972) and is painful to the person experiencing it (Takahashi et al., 2009). Emotions that are expressed more openly than envy such as anger and pride might be more likely to elicit positive or negative feedback from others, which might lead to changes in a person’s emotional disposition in the long term. On the other hand, even though some differences with regard to stability and change might emerge, state-trait theories of emotions suggest that all emotions have a strong dispositional core that remains stable across time (Rosenberg, 1998; Spielberger, 1972). Future research should thus investigate the generalizability of our findings on other (social) emotional traits. Possible discrepancies might prove informative in order to understand the mechanisms underlying stability and change in emotional dispositions.

Another important question concerns the mechanisms behind the stability of global and domain-specific dispositional envy and emotional traits in general. Explanations might include genetic, environmental, and psychological factors (Allemand et al., 2013). For instance, stable genetic factors may contribute to the stability of dispositional envy, either by directly influencing a person’s trait level of envy, or by having an impact on trait characteristics related to dispositional envy (e.g., social comparison orientation). At the same time, stable environmental influences as well as transactions between genetic and environmental factors might play an important role. For instance, a person with a pronounced disposition toward wealth envy might decide to pursue a career in the finance sector, where their tendency for social comparison with regard to wealth is consistently

encouraged, further consolidating their trait envy at a high level. Psychological explanations that have been put forward include set-point theory and stable appraisal biases. According to classical set-point models (see Ormel et al., 2017), a person's trait level fluctuates around an individual set-point. While temporary changes as a reaction to experiences and life events are possible, the trait level will eventually return to this characteristic set-point. Even though newer approaches to set-point theory emphasize that set-points can change under certain conditions, set-point models might thus explain why mean-levels of dispositional envy do not change across time, while at the same time allowing temporary changes (i.e., occasion-specific deviations from an individual's dispositional envy). Moreover, recent research emphasized the importance of appraisal biases underlying emotional traits (Scherer, 2020). Stable biases in the appraisal of situations and events (e.g., a tendency to interpret upward comparisons as threatening) might thus contribute to the stability of dispositional envy across time. Future research should investigate the mechanisms behind the stability of dispositional envy and other emotional traits, e.g., by examining the appraisal biases underlying them.

Strengths, Limitations, and Directions for Future Research

The present study has several strengths worth noticing. Most importantly, the longitudinal design is novel in the field of research on dispositional envy. To our knowledge, no previous study has systematically examined stability and change in dispositional envy, nor is there any previous research attempting to disentangle trait and state variance in envy. We approached the question of stability and change in dispositional envy with different methods, encompassing the more traditional analyses of rank-order stability and mean-level change as well as the more modern approach of latent state-trait modeling. Moreover, we used an established instrument measuring global and domain-specific dispositional envy with five items per subscale, which demonstrated excellent psychometric properties with regard to reliability and validity. We thus believe that our data and methodology make an important contribution to research on dispositional envy and emotional traits in general. Moreover, we would like to highlight that the study was preregistered before data of Time 2 were analyzed and before data of Time 3 were collected. Even though the need for preregistration is frequently emphasized in psychological research, it remains far from being self-evident.

We would also like to draw attention to the sample of the current study, which had a large age range from young to old adulthood, with a mean age closely resembling that of the German general population (44.5 years; DESTATIS, 2020). Future research should nonetheless use larger, age-balanced samples that allow for comparisons between age groups and for conclusions on the development of global and domain-specific dispositional envy across life. Moreover, women were overrepresented in our sample, and participants had relatively high levels of education. Future studies should replicate our findings in representative samples to test the generalizability of the results, especially our findings on gender and age effects on stability and change. Research on the early development of dispositional envy in childhood and adolescence could also provide important insights into when in life a person's disposition toward the experience on envy becomes manifest.

Our data suggested large individual differences in change in dispositional envy, which could only in part be explained by gender or age. Future research should identify further predictors of change in dispositional envy. For instance, dispositional envy might change as a reaction to life events connected to social comparison. As envy is a consequence of upward comparisons (Alicke & Zell, 2008), positive events which increase an individual's status (e.g., a promotion) might lead to a decrease in envy, while events connected to a decrease of a person's status (e.g., losing one's job) might lead to an increase in dispositional envy. In this regard, it is also important to determine the reasons for change in domain-specific dispositional envy when compared to global dispositional envy. For instance, as people are particularly prone to envy in life domains that are important to them (Salovey & Rodin, 1991), changes in the subjective importance of a specific domain might lead to changes in dispositional envy with regard to that domain, but not in other domains or at the global level. Moreover, life events that influence social status in a specific comparison domain might lead to changes in domain-specific envy: For example, a promotion that involves a pay raise might lead to a decrease in dispositional envy with regard to wealth, but not in other domains of dispositional envy. Future research should also examine if individual differences in the direction or magnitude of change in domain-specific dispositional envy across time are connected to changes in related psychological constructs such as domain-specific self-esteem (Rentzsch et al., 2022; Rentzsch & Gross, 2015), social comparison orientation (Alicke & Zell, 2008), and domain-specific narcissism (Grosz et al., 2021; Krizan & Johar, 2012), or changes in more objective indicators and life events (e.g., income, unemployment).

Moreover, even though variance in dispositional envy was largely accounted for by a stable trait factor, we found significant occasion-specific variance in all measures of dispositional envy. Future research might not only want to investigate predictors and correlates of the trait component of dispositional envy, but also look into factors associated with occasion-specific variation in dispositional envy, such as specific life events or psychological variables.

In the present study, we covered a time span of 6 years, which can be considered quite broad with regard to the investigation of rank-order stabilities, since previous studies investigating retest reliabilities at best used time intervals of several months. However, longer time intervals seem to be especially important for the investigation of mean-level change. In the present study, we found a negative relationship of dispositional envy with age at the cross-sectional level, but only small mean-level change over 6 years. Thus, future researchers may be able to detect some mean-level change in dispositional envy when investigating longer time intervals.

The present study assessed global dispositional envy by aggregating the domain-specific subscales. Even though previous research showed that the global factor of the Domain-Specific Envy Scale (DSES) is a reliable and valid measure that shows convergent validity with other measures of global dispositional envy (Rentzsch & Gross, 2015; Crusius et al., 2021), the comparison between global and domain-specific dispositional envy may be improved by using a separate measure for the assessment of global dispositional envy. Future research might thus want to use a measure specifically designed for the assessment of global dispositional envy in addition to the DSES.

The present study focused on the trait-based assessment of dispositional envy. In future studies, researchers may want to simultaneously use trait and state measures of envy, in order to investigate how the stable trait translates into state envy experienced in everyday life as suggested by classical state-trait theories (e.g., Rosenberg, 1998; Spielberger, 1972) and modern trait approaches (e.g., Fleenon & Jayawickreme, 2015).

By providing empirical evidence for the conceptualization of envy as stable trait, the present study makes an important contribution to research on dispositional envy and emotional traits in general. We hope that the present study stimulates research on emotional traits by emphasizing the importance of longitudinal data and the investigation of different indicators of stability.

FOOTNOTES

¹ The preregistration was uploaded to the Open Science Framework on July 17th 2019 before the beginning of data collection for Time 3. Data on dispositional envy from Time 1 were analyzed and reported in Rentzsch and Gross (2015). Data from Time 2 had been collected but not analyzed prior to the preregistration. As the preregistration belongs to the overarching project, only some of the hypotheses and analyses specified in the preregistration were used in the present paper.

² Planned sample size was 500 participants per wave based on considerations regarding the size and previous response rates of the participant pool. At the time of the preregistration, the participant pool contained about 2,000 e-mail addresses from volunteers. The response rate in the first waves of data collection was around 25%.

³ At Time 1, 636 participants completed the questionnaire. We excluded two participants from the present analyses because they reported to be underaged.

⁴ In the preregistration, standardized regression coefficients based on latent regression analyses were registered in order to investigate rank-order stability. We decided to use correlation coefficients in order to stay in line with previous literature, where rank-order stability was typically measured via correlation coefficients. Analyses based on latent regression analyses revealed identical coefficients except for slightly stronger coefficients for the last interval (i.e., Time 2 – Time 3; β s between 0.82 and 0.84).

⁵ In order to determine the power of our study for finding a small effect with regard to mean-level change in the True Intraindividual Change Model (TICM), we performed a post-hoc power analysis using a Monte Carlo simulation study (see Muthén & Muthén, 1998-2019, 2002). For the simulation, we used the data (parameter estimates and patterns of missing data) from the TICM (baseline model) of global dispositional envy. Results revealed a power of 1.0 to detect a small mean-level change (latent Cohen's $d = 0.20$) across the 6 years of assessment.

DATA ACCESSIBILITY STATEMENT

Open science material including study materials, data, and analysis scripts used for this article can be accessed at <https://osf.io/5fvhc/>.

REFERENCES

- Alicke, M. D., & Zell, E. (2008). Social comparison and envy. In R. H. Smith (Ed.), *Envy: Theory and research* (pp. 73–93). Oxford University Press. <https://doi.org/10.1093/acprof:oso/9780195327953.003.0005>
- Allemand, M., Gruenenfelder-Steiger, A. E., & Hill, P. L. (2013). Stability of personality traits in adulthood. *GeroPsych*, 26(1), 5–13. <https://doi.org/10.1024/1662-9647/a000080>
- Anusic, I., & Schimmack, U. (2016). Stability and change of personality traits, self-esteem, and well-being: Introducing the meta-analytic stability and change model of retest correlations. *Journal of Personality and Social Psychology*, 110(5), 766–781. <https://doi.org/10.1037/pspp0000066>
- Behler, A. M. C., Wall, C. S., Bos, A., & Green, J. D. (2020). To help or to harm? Assessing the impact of envy on prosocial and antisocial behaviors. *Personality and Social Psychology Bulletin*, 46(7), 1156–1168. <https://doi.org/10.1177/0146167219897660>
- Belk, R. W. (1985). Materialism: Trait aspects of living in the material world. *Journal of Consumer Research*, 12(3), 265–280. <https://doi.org/10.1086/208515>
- Benjamini, Y., & Hochberg, Y. (1995). Controlling the false discovery rate: A practical and powerful approach to multiple testing. *Journal of the Royal Statistical Society: Series B (Methodological)*, 57(1), 289–300. <https://doi.org/10.1111/j.2517-6161.1995.tb02031.x>
- Bleidorn, W., Arslan, R. C., Denissen, J. J., Rentfrow, P. J., Gebauer, J. E., Potter, J., & Gosling, S. D. (2016). Age and gender differences in self-esteem—A cross-cultural window. *Journal of Personality and Social Psychology*, 111(3), 396–410. <https://doi.org/10.1037/pspp0000078>
- Bleidorn, W., Hopwood, C. J., Back, M. D., Denissen, J. J. A., Hennecke, M., Hill, P. L., Jokela, M., Kandler, C., Lucas, R. E., Luhmann, M., Orth, U., Roberts, B. W., Wagner, J., Wrzus, C., & Zimmermann, J. (2021). Personality trait stability and change. *Personality Science*, 2, 1–20. <https://doi.org/10.5964/ps.6009>

- Bollen, K. A., & Curran, P. J. (2006). *Latent curve models: A structural equation perspective*. John Wiley & Sons.
- Borghuis, J., Denissen, J. J., Oberski, D., Sijtsma, K., Meeus, W. H., Branje, S., Koot, H. M., & Bleidorn, W. (2017). Big Five personality stability, change, and codevelopment across adolescence and early adulthood. *Journal of Personality and Social Psychology*, 113(4), 641–657. <https://doi.org/10.1037/pspp0000138>
- Briki, W. (2019). Harmed trait self-control: Why do people with a higher dispositional malicious envy experience lower subjective wellbeing? A cross-sectional study. *Journal of Happiness Studies*, 20(2), 523–540. <https://doi.org/10.1007/s10902-017-9955-x>
- Callan, M. J., Kim, H., & Matthews, W. J. (2015). Age differences in social comparison tendency and personal relative deprivation. *Personality and Individual Differences*, 87, 196–199. <https://doi.org/10.1016/j.paid.2015.08.003>
- Carstensen, L. L., Pasupathi, M., Mayr, U., & Nesselroade, J. R. (2000). Emotional experience in everyday life across the adult life span. *Journal of Personality and Social Psychology*, 79(4), 644–655. <https://doi.org/10.1037/0022-3514.79.4.644>
- Charles, S. T., Reynolds, C. A., & Gatz, M. (2001). Age-related differences and change in positive and negative affect over 23 years. *Journal of Personality and Social Psychology*, 80(1), 136–151. <https://doi.org/10.1037/0022-3514.80.1.136>
- Cheung, G. W., & Rensvold, R. B. (2002). Evaluating goodness-of-fit indexes for testing measurement invariance. *Structural Equation Modeling*, 9(2), 233–255. https://doi.org/10.1207/S15328007SEM0902_5
- Cohen, J. (1992). A power primer. *Psychological Bulletin*, 112(1), 155–159. <https://doi.org/10.1037/0033-2909.112.1.155>
- Cohen-Charash, Y., & Mueller, J. S. (2007). Does perceived unfairness exacerbate or mitigate interpersonal counterproductive work behaviors related to envy? *Journal of Applied Psychology*, 92(3), 666–680. <https://doi.org/10.1037/0021-9010.92.3.666>

- Cole, D. A. (2006). Coping with longitudinal data in research on developmental psychopathology. *International Journal of Behavioral Development*, 30(1), 20–25. <https://doi.org/10.1177/0165025406059969>
- Cole, D. A., Martin, N. C., & Steiger, J. H. (2005). Empirical and conceptual problems with longitudinal trait-state models: Introducing a trait-state-occasion model. *Psychological Methods*, 10(1), 3–20. <https://doi.org/10.1037/1082-989X.10.1.3>
- Crocker, J., Luhtanen, R. K., Cooper, M. L., & Bouvrette, A. (2003). Contingencies of self-worth in college students: Theory and measurement. *Journal of Personality and Social Psychology*, 85(5), 894–908. <https://doi.org/10.1037/0022-3514.85.5.894>
- Crusius, J., Gonzalez, M. F., Lange, J., & Cohen-Charash, Y. (2020). Envy: An adversarial review and comparison of two competing views. *Emotion Review*, 12(1), 3–21. <https://doi.org/10.1177/1754073919873131>
- Crusius, J., Thierhoff, J., & Lange, J. (2021). Dispositional greed predicts benign and malicious envy. *Personality and Individual Differences*, 168, 110361. <https://doi.org/10.1016/j.paid.2020.110361>
- Deary, I. J., Corley, J., Gow, A. J., Harris, S. E., Houlihan, L. M., Marioni, R. E., Penke, L., Rafnsson, S. B., & Starr, J. M. (2009). Age-associated cognitive decline. *British Medical Bulletin*, 92(1), 135–152. <https://doi.org/10.1093/bmb/ldp033>
- DelPriore, D. J., Hill, S. E., & Buss, D. M. (2012). Envy: Functional specificity and sex-differentiated design features. *Personality and Individual Differences*, 53(3), 317–322. <https://doi.org/10.1016/j.paid.2012.03.029>
- Duffy, M. K., Scott, K. L., Shaw, J. D., Tepper, B. J., & Aquino, K. (2012). A social context model of envy and social undermining. *Academy of Management Journal*, 55(3), 643–666. <https://doi.org/10.5465/amj.2009.0804>
- Enders, C. K. (2010). *Applied missing data analysis*. Guilford.
- Endler, N. S., & Hunt, J. M. (1966). Sources of behavioral variance as measured by the SR Inventory of Anxiousness. *Psychological Bulletin*, 65(6), 336–346. <https://doi.org/10.1037/h0023309>
- Fleeson, W., & Jayawickreme, E. (2015). Whole Trait Theory. *Journal of Research in Personality*, 56, 82–92. <https://doi.org/10.1016/j.jrp.2014.10.009>

- Fleming, J. S., & Courtney, B. E. (1984). The dimensionality of self-esteem: II. Hierarchical facet model for revised measurement scales. *Journal of Personality and Social Psychology*, 46(2), 404–421. <https://doi.org/10.1037/0022-3514.46.2.404>
- Foster, G. M. (1972). The anatomy of envy: A study in symbolic behavior. *Current Anthropology*, 13(2), 165–202. <https://doi.org/10.1086/201267>
- Fredrickson, B. L. (2001). The role of positive emotions in positive psychology: The broaden-and-build theory of positive emotions. *American Psychologist*, 56(3), 218–226. <https://doi.org/10.1037/0003-066X.56.3.218>
- Fujita, F., Diener, E., & Sandvik, E. (1991). Gender differences in negative affect and well-being: The case for emotional intensity. *Journal of Personality and Social Psychology*, 61(3), 427–434. <https://doi.org/10.1037/0022-3514.61.3.427>
- Geiser, C., Götz, T., Preckel, F., & Freund, P. A. (2017). States and traits. *European Journal of Psychological Assessment*, 33(4), 219–223. <https://doi.org/10.1027/1015-5759/a000413>
- Gentile, B., Grabe, S., Dolan-Pascoe, B., Twenge, J. M., Wells, B. E., & Maitino, A. (2009). Gender differences in domain-specific self-esteem: A meta-analysis. *Review of General Psychology*, 13(1), 34–45. <https://doi.org/10.1037/a0013689>
- Gold, B. T. (1996). Enviousness and its relationship to maladjustment and psychopathology. *Personality and Individual Differences*, 21(3), 311–321. [https://doi.org/10.1016/0191-8869\(96\)00081-5](https://doi.org/10.1016/0191-8869(96)00081-5)
- Gross, J. J., Carstensen, L. L., Pasupathi, M., Tsai, J., Götestam Skorpen, C., & Hsu, A. Y. (1997). Emotion and aging: Experience, expression, and control. *Psychology and Aging*, 12(4), 590–599. <https://doi.org/10.1037/0882-7974.12.4.590>
- Grosz, M. P., Hartmann, I., Dufner, M., Leckelt, M., Gerlach, T. M., Rauthmann, J. F., Denissen, J. J., Küfner, A. C., & Back, M. D. (2021). A process × domain assessment of narcissism: The Domain-Specific Narcissistic Admiration and Rivalry Questionnaire. *Assessment*, 10731911211020075. <https://doi.org/10.1177/10731911211020075>

- Haase, A. M., Prapavessis, H., & Owens, R. G. (2013). Domain-specificity in perfectionism: Variations across domains of life. *Personality and Individual Differences*, 55(6), 711–715. <https://doi.org/10.1016/j.paid.2013.05.025>
- Hakulinen, C., Jokela, M., Keltikangas-Järvinen, L., Merjonen, P., Raitakari, O. T., & Hintsanen, M. (2014). Longitudinal measurement invariance, stability and change of anger and cynicism. *Journal of Behavioral Medicine*, 37(3), 434–444. <https://doi.org/10.1007/s10865-013-9501-1>
- Hareli, S., & Parkinson, B. (2008). What's social about social emotions? *Journal for the Theory of Social Behaviour*, 38(2), 131–156. <https://doi.org/10.1111/j.1468-5914.2008.00363.x>
- Henniger, N. E., & Harris, C. R. (2015). Envy across adulthood: The what and the who. *Basic and Applied Social Psychology*, 37(6), 303–318. <https://doi.org/10.1080/01973533.2015.1088440>
- Hertzog, C., & Nesselroade, J. R. (1987). Beyond autoregressive models: Some implications of the trait-state distinction for the structural modeling of developmental change. *Child Development*, 58(1), 93–109. <https://doi.org/10.2307/1130294>
- Izard, C. E., Libero, D. Z., Putnam, P., & Haynes, O. M. (1993). Stability of emotion experiences and their relations to traits of personality. *Journal of Personality and Social Psychology*, 64(5), 847–860. <https://doi.org/10.1037/0022-3514.64.5.847>
- Jiang, W., Liu, H., & Jiang, J. (2021). The Development of Materialism in Emerging Adulthood: Stability, Change, and Antecedents. *Personality and Social Psychology Bulletin*, 47(2), 293–306. <https://doi.org/10.1177/0146167220925234>
- Kendall, A. D., Zinbarg, R. E., Mineka, S., Bobova, L., Prenoveau, J. M., Revelle, W., & Craske, M. G. (2015). Prospective associations of low positive emotionality with first onsets of depressive and anxiety disorders: Results from a 10-wave latent trait-state modeling study. *Journal of Abnormal Psychology*, 124(4), 933–943. <https://doi.org/10.1037/abn0000105>

- Klein, A., & Moosbrugger, H. (2000). Maximum likelihood estimation of latent interaction effects with the LMS method. *Psychometrika*, 65(4), 457–474. <https://doi.org/10.1007/BF02296338>
- Kling, K. C., Hyde, J. S., Showers, C. J., & Buswell, B. N. (1999). Gender differences in self-esteem: A meta-analysis. *Psychological Bulletin*, 125(4), 470–500. <https://doi.org/10.1037/0033-2909.125.4.470>
- Krizan, Z., & Johar, O. (2012). Envy divides the two faces of narcissism. *Journal of Personality*, 80(5), 1415–1451. <https://doi.org/10.1111/j.1467-6494.2012.00767.x>
- Lance, C. E., Christie, J., & Williamson, G. M. (2021). Do state and trait measures measure states and traits? The case of community-dwelling caregivers of older adults. *Assessment*, 28(3), 829–844. <https://doi.org/10.1177/1073191119888582>
- Lange, J., & Crusius, J. (2015). Dispositional envy revisited: Unraveling the motivational dynamics of benign and malicious envy. *Personality and Social Psychology Bulletin*, 41(2), 284–294. <https://doi.org/10.1177/0146167214564959>
- Lange, J., Hagemeyer, B., Lösch, T., & Rentzsch, K. (2020). Accuracy and bias in the social perception of envy. *Emotion*, 20(8), 1399–1410. <https://doi.org/10.1037/emo0000652>
- Lievens, F., De Corte, W., & Schollaert, E. (2008). A closer look at the frame-of-reference effect in personality scale scores and validity. *Journal of Applied Psychology*, 93(2), 268–279. <https://doi.org/10.1037/0021-9010.93.2.268>
- Little, T. D., Cunningham, W. A., Shahar, G., & Widaman, K. F. (2002). To parcel or not to parcel: Exploring the question, weighing the merits. *Structural Equation Modeling*, 9(2), 151–173. https://doi.org/10.1207/S15328007SEM0902_1
- Little, T. D., Rhemtulla, M., Gibson, K., & Schoemann, A. M. (2013). Why the items versus parcels controversy needn't be one. *Psychological Methods*, 18(3), 285–300. <https://doi.org/10.1037/a0033266>
- Liu, Z., Elliot, A. J., & Li, Y. (2021). Social comparison orientation and trait competitiveness: Their interrelation and utility in predicting overall and domain-specific risk-taking. *Personality and Individual Differences*, 171, 110451. <https://doi.org/10.1016/j.paid.2020.110451>

- Lucas, R. E., & Donnellan, M. B. (2011). Personality development across the life span: Longitudinal analyses with a national sample from Germany. *Journal of Personality and Social Psychology*, 101(4), 847–861. <https://doi.org/10.1037/a0024298>
- Marsh, H. W., Lüdtke, O., Nagengast, B., Morin, A. J., & Von Davier, M. (2013). Why item parcels are (almost) never appropriate: Two wrongs do not make a right—Camouflaging misspecification with item parcels in CFA models. *Psychological Methods*, 18(3), 257–284. <https://doi.org/10.1037/a0032773>
- McCullough, M. E., Emmons, R. A., & Tsang, J.-A. (2002). The grateful disposition: A conceptual and empirical topography. *Journal of Personality and Social Psychology*, 82(1), 112–127. <https://doi.org/10.1037/0022-3514.82.1.112>
- McWilliams, M. A., Nier, J. A., & Singer, J. A. (2013). The implicit self and the specificity-matching principle: Implicit self-concept predicts domain-specific outcomes. *Personality and Individual Differences*, 54(4), 474–478. <https://doi.org/10.1016/j.paid.2012.09.014>
- Meade, A. W., & Kroustalis, C. M. (2006). Problems with item parceling for confirmatory factor analytic tests of measurement invariance. *Organizational Research Methods*, 9(3), 369–403. <https://doi.org/10.1177/1094428105283384>
- Meredith, W. (1993). Measurement invariance, factor analysis and factorial invariance. *Psychometrika*, 58(4), 525–543. <https://doi.org/10.1007/bf02294825>
- Mund, M., Lüdtke, O., & Neyer, F. J. (2020). Owner of a lonely heart: The stability of loneliness across the life span. *Journal of Personality and Social Psychology*, 119(2), 497–516. <https://doi.org/10.1037/pspp0000262>
- Muthén, L. K., & Muthén, B. O. (1998-2019). *Mplus user's guide* (8th ed.). Muthén & Muthén.
- Muthén, L. K., & Muthén, B. O. (2002). How to use a Monte Carlo study to decide on sample size and determine power. *Structural Equation Modeling*, 9(4), 599–620. https://doi.org/10.1207/S15328007SEM0904_8
- Olatunji, B. O., Cox, R. C., & Cole, D. A. (2020). The longitudinal structure of disgust proneness: Testing a latent trait-state model in relation to obsessive-compulsive

- symptoms. *Behaviour Research and Therapy*, 135, 103749. <https://doi.org/10.1016/j.brat.2020.103749>
- Ormel, J., VonKorff, M., Jeronimus, B. F., & Riese, H. (2017). Set-Point Theory and personality development: Reconciliation of a paradox. In J. Specht (Ed.), *Personality development across the lifespan* (pp. 117–137). Academic Press. <https://doi.org/10.1016/B978-0-12-804674-6.00009-0>
- Parrott, W. G., & Smith, R. H. (1993). Distinguishing the experiences of envy and jealousy. *Journal of Personality and Social Psychology*, 64(6), 906–920. <https://doi.org/10.1037/0022-3514.64.6.906>
- Prenoveau, J. M. (2016). Specifying and interpreting latent state–trait models with autoregression: An illustration. *Structural Equation Modeling: A Multidisciplinary Journal*, 23(5), 731–749. <https://doi.org/10.1080/10705511.2016.1186550>
- Reisenzein, R., Hildebrandt, V., & Weber, H. (2020). Personality and emotion. In P. J. Corr & G. Matthews (Eds.), *Cambridge handbook of personality psychology* (2nd ed., pp. 81–99). Cambridge University Press.
- Rentzsch, K. (2021). *Self-Evaluations Across Life (SELF) study*. <https://osf.io/je924>
- Rentzsch, K., Erz, E., & Schütz, A. (2022). Development of short and ultra-short forms of the Multidimensional Self-Esteem Scale: Relations to the Big Five, narcissism, and academic achievement in adults and adolescents. *European Journal of Psychological Assessment*, 38(4), 270–281. <https://doi.org/10.1027/1015-5759/a000660>
- Rentzsch, K., & Gross, J. J. (2015). Who turns green with envy? Conceptual and empirical perspectives on dispositional envy. *European Journal of Personality*, 29(5), 530–547. <https://doi.org/10.1002/per.2012>
- Rentzsch, K., & Schröder-Abé. (2022). Top down or bottom up? Evidence from the longitudinal development of global and domain-specific self-esteem in adulthood. *Journal of Personality and Social Psychology*, 122(4), 714–730. <https://doi.org/10.1037/pspp0000393>

- Rentzsch, K., & Schröder-Abé, M. (2018). Stability and change in domain-specific self-esteem and global self-esteem. *European Journal of Personality*, 32(4), 353–370. <https://doi.org/10.1002/per.2167>
- Rentzsch, K., Schröder-Abé, M., & Schütz, A. (2015). Envy mediates the relation between low academic self-esteem and hostile tendencies. *Journal of Research in Personality*, 58, 143–153. <https://doi.org/10.1016/j.jrp.2015.08.001>
- Roberts, B. W., & Mroczek, D. (2008). Personality trait change in adulthood. *Current Directions in Psychological Science*, 17(1), 31–35. <https://doi.org/10.1111/j.1467-8721.2008.00543.x>
- Roberts, B. W., Wood, D., & Caspi, A. (2008). The development of personality traits in adulthood. In O. P. John, R. W. Robins, & L. A. Pervin (Eds.), *Handbook of personality: Theory and research* (pp. 375–398). The Guilford Press.
- Rosenberg, E. L. (1998). Levels of analysis and the organization of affect. *Review of General Psychology*, 2(3), 247–270. <https://doi.org/10.1037/1089-2680.2.3.247>
- Salovey, P., & Rodin, J. (1984). Some antecedents and consequences of social-comparison jealousy. *Journal of Personality and Social Psychology*, 47(4), 780–792. <https://doi.org/10.1037/0022-3514.47.4.780>
- Salovey, P., & Rodin, J. (1991). Provoking jealousy and envy: Domain relevance and self-esteem threat. *Journal of Social and Clinical Psychology*, 10(4), 395–413. <https://doi.org/10.1521/jscp.1991.10.4.395>
- Scherer, K. R. (2021). Evidence for the existence of emotion dispositions and the effects of appraisal bias. *Emotion*, 21(6), 1224–1238. <https://doi.org/10.1037/emo0000861>
- Scherer, K. R., & Moors, A. (2019). The emotion process: Event appraisal and component differentiation. *Annual Review of Psychology*, 70, 719–745. <https://doi.org/10.1146/annurev-psych-122216-011854>
- Schriber, R. A., Chung, J. M., Sorensen, K. S., & Robins, R. W. (2017). Dispositional contempt: A first look at the contemptuous person. *Journal of Personality and Social Psychology*, 113(2), 280–309. <https://doi.org/10.1037/pspp0000101>

- Seifert, I. S., Rohrer, J. M., Egloff, B., & Schmukle, S. C. (2022). The development of the rank-order stability of the Big Five across the life span. *Journal of Personality and Social Psychology*, 122(5), 920–941. <https://doi.org/10.1037/pspp0000398>
- Seuntjens, T. G., Zeelenberg, M., Van de Ven, N., & Breugelmans, S. M. (2015). Dispositional greed. *Journal of Personality and Social Psychology*, 108(6), 917–933. <https://doi.org/10.1037/pspp0000031>
- Shavelson, R. J., Hubner, J. J., & Stanton, G. C. (1976). Self-concept: Validation of construct interpretations. *Review of Educational Research*, 46(3), 407–441. <https://doi.org/10.3102/00346543046003407>
- Smith, R. H., & Kim, S. H. (2007). Comprehending envy. *Psychological Bulletin*, 133(1), 46–64. <https://doi.org/10.1037/0033-2909.133.1.46>
- Smith, R. H., Parrott, W. G., Diener, E. F., Hoyle, R. H., & Kim, S. H. (1999). Dispositional envy. *Personality and Social Psychology Bulletin*, 25(8), 1007–1020. <https://doi.org/10.1177/01461672992511008>
- Smith, R. H., Parrott, W. G., Ozer, D., & Moniz, A. (1994). Subjective injustice and inferiority as predictors of hostile and depressive feelings in envy. *Personality and Social Psychology Bulletin*, 20(6), 705–711. <https://doi.org/10.1177/0146167294206008>
- Specht, J., Egloff, B., & Schmukle, S. C. (2011). Stability and change of personality across the life course: The impact of age and major life events on mean-level and rank-order stability of the Big Five. *Journal of Personality and Social Psychology*, 101(4), 862–882. <https://doi.org/10.1037/a0024950>
- Spielberger, C. D. (1972). *Anxiety: Current trends in theory and research*. Academic Press.
- Spielberger, C. D. (1983). *Manual for the State-Trait-Anxiety Inventory*. Consulting Psychologist Press.
- Spielberger, C. D. (1988). *State-Trait-Anger-Expression-Inventory (STAXI)* (Research ed.). Psychological Assessment Resources.
- Spielberger, C. D., & Reheiser, E. C. (2009). Assessment of emotions: Anxiety, anger, depression, and curiosity. *Applied Psychology: Health and Well-Being*, 1(3), 271–302. <https://doi.org/10.1111/j.1758-0854.2009.01017.x>

- Steyer, R., Eid, M., & Schwenkmezger, P. (1997). Modeling true intraindividual change: True change as a latent variable. *Methods of Psychological Research Online*, 2(1), 21–33.
- Steyer, R., Geiser, C., & Fiege, C. (2012). Latent state-trait models. In H. Cooper, P. M. Camic, D. L. Long, A. T. Panter, D. Rindskopf, & K. J. Sher (Eds.), *APA handbook of research methods in psychology (Vol. 3). Data analysis and research publication* (pp. 291–308). American Psychological Association. <https://doi.org/10.1037/13621-014>
- Steyer, R., Mayer, A., Geiser, C., & Cole, D. A. (2015). A theory of states and traits—Revised. *Annual Review of Clinical Psychology*, 11, 71–98. <https://doi.org/10.1146/annurev-clinpsy-032813-153719>
- Steyer, R., Schmitt, M., & Eid, M. (1999). Latent state–trait theory and research in personality and individual differences. *European Journal of Personality*, 13(5), 389–408. [https://doi.org/10.1002/\(SICI\)1099-0984\(199909/10\)13:5%3C389::AID-PER361%3E3.0.CO;2-A](https://doi.org/10.1002/(SICI)1099-0984(199909/10)13:5%3C389::AID-PER361%3E3.0.CO;2-A)
- Swann Jr, W. B., Chang-Schneider, C., & Larsen McClarty, K. (2007). Do people’s self-views matter? Self-concept and self-esteem in everyday life. *American Psychologist*, 62(2), 84–94. <https://doi.org/10.1037/0003-066X.62.2.84>
- Tai, K., Narayanan, J., & McAllister, D. J. (2012). Envy as pain: Rethinking the nature of envy and its implications for employees and organizations. *Academy of Management Review*, 37(1), 107–129. <https://doi.org/10.5465/amr.2009.0484>
- Takahashi, H., Kato, M., Matsuura, M., Mobbs, D., Suhara, T., & Okubo, Y. (2009). When your gain is my pain and your pain is my gain: Neural correlates of envy and schadenfreude. *Science*, 323(5916), 937–939. <https://doi.org/10.1126/science.1165604>
- Urry, H. L., & Gross, J. J. (2010). Emotion regulation in older age. *Current Directions in Psychological Science*, 19(6), 352–357. <https://doi.org/10.1177/0963721410388395>

- van de Ven, N., Zeelenberg, M., & Pieters, R. (2011). Why envy outperforms admiration. *Personality and Social Psychology Bulletin*, 37(6), 784–795. <https://doi.org/10.1177/0146167211400421>
- van de Ven, N., Zeelenberg, M., & Pieters, R. (2012). Appraisal patterns of envy and related emotions. *Motivation and Emotion*, 36(2), 195–204. <https://doi.org/10.1007/s11031-011-9235-8>
- Vrabel, J. K., Zeigler-Hill, V., & Southard, A. C. (2018). Self-esteem and envy: Is state self-esteem instability associated with the benign and malicious forms of envy? *Personality and Individual Differences*, 123, 100–104. <https://doi.org/10.1016/j.paid.2017.11.001>
- Wagner, J., Lüdtke, O., & Robitzsch, A. (2019). Does personality become more stable with age? Disentangling state and trait effects for the big five across the life span using local structural equation modeling. *Journal of Personality and Social Psychology*, 116(4), 666–680. <https://doi.org/10.1037/pspp0000203>
- White, J. B., Langer, E. J., Yariv, L., & Welch, J. C. (2006). Frequent social comparisons and destructive emotions and behaviors: The dark side of social comparisons. *Journal of Adult Development*, 13(1), 36–44. <https://doi.org/10.1007/s10804-006-9005-0>
- Windsor, T. D., & Anstey, K. J. (2010). Age differences in psychosocial predictors of positive and negative affect: A longitudinal investigation of young, midlife, and older adults. *Psychology and Aging*, 25(3), 641–652. <https://doi.org/10.1037/a0019431>
- Wittmann, W. W. (1988). Multivariate reliability theory. In J. R. Nesselroade & R. B. Cattell (Eds.), *Handbook of multivariate experimental psychology* (pp. 505–560). Plenum. https://doi.org/10.1007/978-1-4613-0893-5_16
- Wortman, J., Lucas, R. E., & Donnellan, M. B. (2012). Stability and change in the Big Five personality domains: Evidence from a longitudinal study of Australians. *Psychology and Aging*, 27(4), 867–874. <https://doi.org/10.1037/a0029322>

SUPPLEMENT

Table S-1

Estimated Correlations of the Manifest Indicators of Global and Domain-Specific Dispositional Envy Across Time

Indicator	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.
1. Global ₁₁	-																	
2. Global ₂₁	.70	-																
3. Global ₃₁	.65	.56	-															
4. Attr ₁₁	.92	.59	.60	-														
5. Attr ₂₁	.93	.69	.64	.76	-													
6. Attr ₃₁	.84	.61	.49	.66	.72	-												
7. Comp ₁₁	.65	.92	.51	.55	.64	.58	-											
8. Comp ₂₁	.66	.94	.53	.56	.66	.57	.79	-										
9. Comp ₃₁	.57	.83	.46	.48	.56	.49	.67	.70	-									
10. Wealth ₁₁	.62	.52	.94	.58	.60	.47	.49	.48	.43	-								
11. Wealth ₂₁	.63	.52	.94	.57	.62	.47	.46	.50	.44	.82	-							
12. Wealth ₃₁	.47	.46	.79	.43	.48	.34	.44	.43	.36	.63	.66	-						
13. Global ₁₃	.75	.54	.51	.71	.71	.58	.51	.52	.41	.50	.47	.37	-					
14. Global ₂₃	.58	.69	.46	.52	.56	.48	.63	.68	.52	.45	.43	.33	.33	-				
15. Global ₃₃	.57	.37	.73	.54	.52	.46	.34	.36	.30	.73	.68	.53	.63	.57	-			
16. Attr ₁₃	.71	.44	.44	.73	.64	.50	.40	.43	.32	.43	.41	.33	.93	.62	.58	-		
17. Attr ₂₃	.70	.55	.51	.62	.71	.52	.53	.52	.42	.50	.48	.36	.95	.72	.61	.80	-	
18. Attr ₃₃	.63	.50	.42	.54	.58	.60	.48	.48	.37	.42	.38	.31	.84	.69	.52	.66	.75	-
19. Comp ₁₃	.54	.65	.41	.48	.52	.43	.63	.62	.46	.39	.38	.32	.69	.93	.52	.57	.67	.65
20. Comp ₂₃	.54	.63	.46	.48	.51	.47	.56	.66	.43	.47	.42	.31	.68	.94	.54	.58	.66	.64
21. Comp ₃₃	.51	.60	.36	.44	.51	.42	.51	.57	.57	.36	.34	.26	.63	.84	.48	.53	.62	.57
22. Wealth ₁₃	.49	.31	.68	.47	.46	.37	.29	.31	.23	.70	.62	.47	.55	.51	.93	.50	.53	.46
23. Wealth ₂₃	.56	.37	.71	.52	.52	.48	.36	.34	.30	.71	.70	.44	.59	.50	.91	.54	.59	.48
24. Wealth ₃₃	.43	.29	.48	.42	.37	.35	.25	.28	.27	.43	.39	.51	.51	.47	.74	.49	.48	.42
25. Global ₁₄	.74	.55	.54	.68	.68	.61	.49	.54	.46	.53	.51	.40	.76	.60	.59	.71	.72	.64
26. Global ₂₄	.55	.73	.49	.49	.53	.48	.65	.70	.59	.46	.45	.41	.59	.77	.49	.50	.57	.54
27. Global ₃₄	.49	.42	.75	.48	.45	.37	.37	.40	.36	.73	.69	.57	.51	.46	.73	.44	.53	.40
28. Attr ₁₄	.67	.46	.49	.67	.59	.52	.40	.44	.40	.48	.46	.37	.67	.51	.57	.68	.59	.51
29. Attr ₂₄	.70	.59	.54	.62	.69	.57	.51	.57	.50	.53	.52	.37	.72	.59	.53	.65	.71	.59
30. Attr ₃₄	.60	.42	.40	.53	.53	.58	.40	.42	.28	.40	.36	.32	.67	.53	.50	.57	.63	.67
31. Comp ₁₄	.51	.69	.46	.45	.48	.46	.67	.63	.54	.45	.41	.40	.54	.71	.46	.45	.52	.52
32. Comp ₂₄	.51	.67	.46	.45	.49	.45	.56	.70	.50	.43	.45	.36	.53	.72	.45	.47	.52	.48
33. Comp ₃₄	.48	.62	.40	.43	.47	.40	.54	.57	.60	.38	.36	.35	.54	.64	.44	.46	.54	.46
34. Wealth ₁₄	.40	.33	.70	.39	.36	.30	.29	.32	.28	.74	.61	.49	.44	.40	.67	.38	.46	.35
35. Wealth ₂₄	.49	.43	.72	.46	.48	.38	.37	.40	.39	.67	.72	.51	.49	.42	.69	.42	.53	.38
36. Wealth ₃₄	.42	.36	.51	.44	.34	.32	.33	.35	.28	.44	.46	.53	.39	.40	.52	.36	.39	.30

Indicator	19.	20.	21.	22.	23.	24.	25.	26.	27.	28.	29.	30.	31.	32.	33.	34.	35.	36.
19. Comp ₁₃	-																	
20. Comp ₂₃	.80	-																
21. Comp ₃₃	.69	.70	-															
22. Wealth ₁₃	.47	.49	.43	-														
23. Wealth ₂₃	.47	.48	.40	.78	-													
24. Wealth ₃₃	.44	.42	.43	.55	.54	-												
25. Global ₁₄	.54	.58	.51	.51	.56	.50	-											
26. Global ₂₄	.70	.73	.64	.45	.44	.40	.72	-										
27. Global ₃₄	.41	.47	.36	.65	.71	.53	.69	.59	-									
28. Attr ₁₄	.47	.50	.40	.48	.51	.52	.91	.62	.63	-								
29. Attr ₂₄	.54	.55	.52	.46	.51	.43	.93	.70	.66	.75	-							
30. Attr ₃₄	.46	.53	.44	.43	.48	.39	.85	.62	.54	.66	.73	-						
31. Comp ₁₄	.70	.66	.55	.43	.42	.36	.67	.93	.57	.57	.65	.57	-					
32. Comp ₂₄	.63	.72	.58	.41	.40	.36	.67	.93	.53	.57	.65	.59	.78	-				
33. Comp ₃₄	.57	.58	.64	.40	.38	.38	.62	.85	.49	.55	.59	.52	.72	.71	-			
34. Wealth ₁₄	.35	.42	.31	.65	.62	.45	.61	.53	.93	.57	.58	.48	.52	.47	.44	-		
35. Wealth ₂₄	.39	.42	.32	.59	.72	.46	.65	.54	.91	.58	.65	.50	.50	.51	.46	.78	-	
36. Wealth ₃₄	.37	.39	.33	.39	.49	.54	.53	.47	.75	.51	.48	.42	.47	.40	.38	.58	.56	-

Note. Responses were made on 7-point Likert-type scales ranging from 1 (not at all) to 7 (very much). $N = 1229$ ($n = 510$ -634 per wave). Manifest indicators are based on item parcels of global, attraction (attr), competence (comp), and wealth envy.

Table S-2

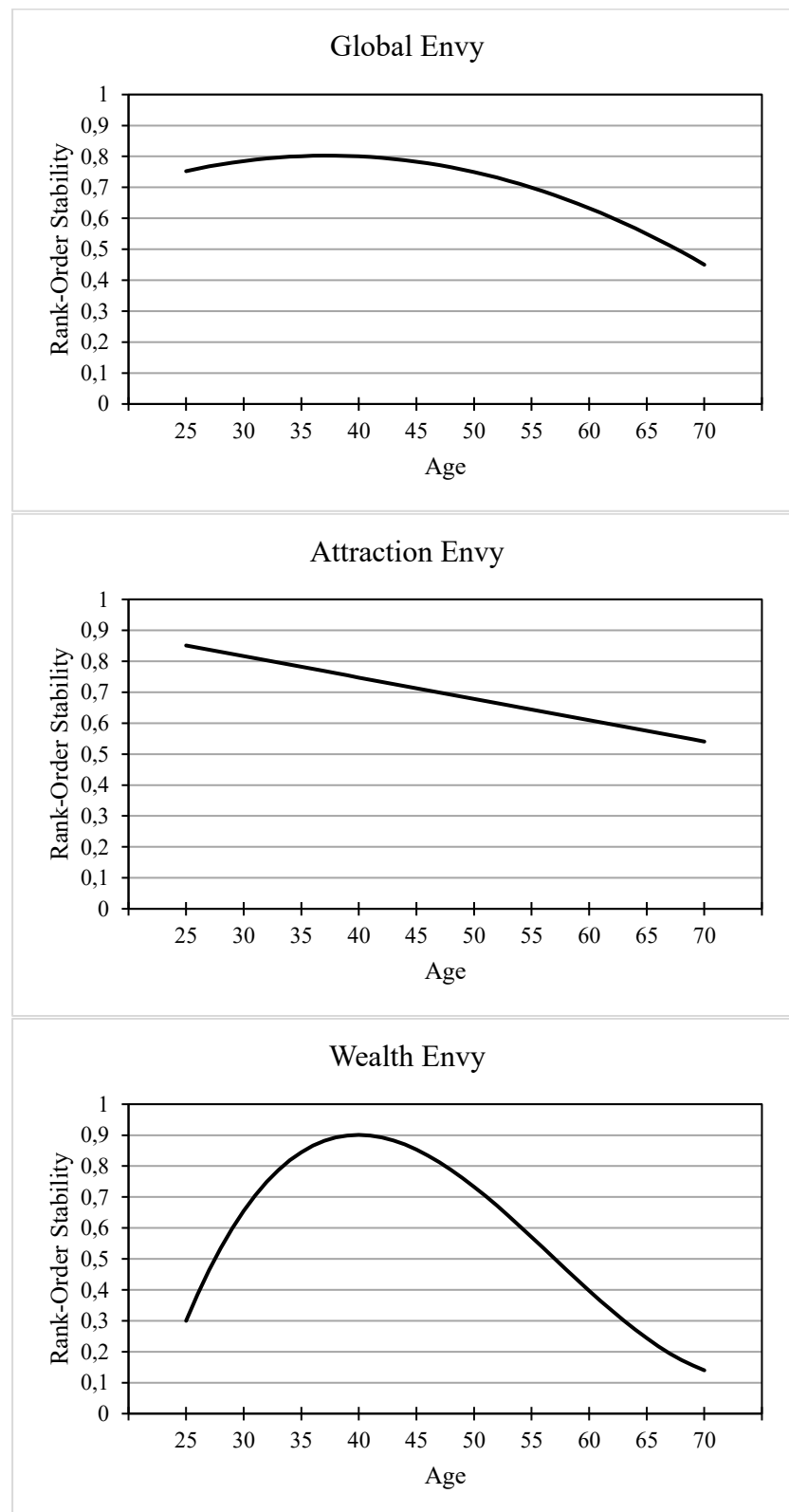
Gender and Age Effects on Rank-Order Stability, Initial Levels, and Latent Change Corrected for Multiple Testing

		Global Envy	Attraction Envy	Competence Envy	Wealth Envy
Rank-order stability ^a (Time 1 – Time 3)	Gender	0.00 [-0.14, 0.15], .983	0.03 [-0.12, 0.17], .923	0.05 [-0.08, 0.18], .723	0.12 [-0.07, 0.31], .503
	Age	-0.03 [-0.08, 0.01], .366	-0.07 [-0.13, -0.02], .018	0.02 [-0.03, 0.07], .717	-0.08 [-0.15, -0.01], .118
	Age ²	-0.03 [-0.06, -0.003], .124	-0.03 [-0.06, 0.01], .277	-0.01 [-0.04, 0.03], .889	-0.05 [-0.08, -0.02], .020
Initial level ^b (Time 1)	Age ³	-0.01 [-0.03, 0.01], .560	-0.01 [-0.03, 0.02], .489	-0.01 [-0.03, 0.01], .580	0.04 [0.01, 0.07], .020
	Gender	0.35 [0.15, 0.55], .007	0.38 [0.19, 0.57], <.001	0.40 [0.19, 0.62], <.001	0.08 [-0.08, 0.25], .600
	Age	-0.33 [-0.40, -0.26], <.001	-0.33 [-0.40, -0.26], <.001	-0.27 [-0.35, -0.20], <.001	-0.20 [-0.26, -0.14], <.001
Mean-level change ^b (Time 1 – Time 3)	Age ²	-0.02 [-0.06, 0.03], .712	0.00 [-0.05, 0.04], 1.000	-0.04 [-0.09, 0.01], .293	-0.01 [-0.04, 0.03], .956
	Age ³	0.02 [0, 0.05], .230	0.02 [0, 0.05], .223	0.02 [-0.01, 0.05], .427	0.02 [0, 0.04], .223
	Gender	0.01 [-0.21, 0.23], 1.000	0.00 [-0.21, 0.22], .983	0.01 [-0.23, 0.25], 1.000	0.09 [-0.09, 0.27], .594
	Age	0.01 [-0.07, 0.09], .953	0.02 [-0.06, 0.09], .893	-0.01 [-0.10, 0.08], .955	0.00 [-0.06, 0.07], .991
	Age ²	0.03 [-0.02, 0.08], .541	0.02 [-0.03, 0.07], .695	0.06 [0.003, 0.12], .148	0.00 [-0.04, 0.04], 1.000
	Age ³	-0.01 [-0.04, 0.02], .701	-0.01 [-0.04, 0.02], .698	-0.02 [-0.05, 0.02], .638	-0.01 [-0.03, 0.02], .688

Note. Values represent unstandardized interaction/regression coefficients, [95% confidence interval], adjusted *p* value (corrected with the Benjamini-Hochberg procedure). Bolded values are statistically significant ($\alpha = .05$).

^a Based on latent regression analyses. Cells present unstandardized interaction coefficients between the moderator and the latent envy factor at Time 1. ^b Based on True Intraindividual Change Models. Cells present unstandardized regression coefficients. Initial level = latent initial level of envy at Time 1; mean-level change = latent difference variable.

Gender was coded as -1 = male, 1 = female. Age was mean-centered and is given in 10-year units. N = 1219-1223 due to missing data on age and gender (n = 509-631 per wave).

Figure S-1*Age Effects on Rank-Order Stability*

Note. Estimated effects of age at Time 1 on the latent rank-order stabilities across 6 years for three measures of dispositional envy. Values represent unstandardized coefficients.

ARTICLE 2:
DOES INSECURITY LEAD TO ENVY?
THE LONGITUDINAL INTERPLAY BETWEEN
DISPOSITIONAL ENVY AND SELF-ESTEEM

Erz, E., & Rentzsch, K. (2024). Does insecurity lead to envy? The longitudinal interplay between dispositional envy and self-esteem. *Journal of Research in Personality*, 113, 104543. <https://doi.org/10.1016/j.jrp.2024.104543>

The present manuscript represents a previous version of the article published as the version of record in the *Journal of Research in Personality*. When referencing this article, please refer to the published version.

ABSTRACT

Despite the widespread assumption that insecurity leads to envy and some evidence of a cross-sectional association between dispositional envy and low self-esteem, there is no research on the mutual development of these two constructs across time. The aim of the present research was to systematically investigate correlated change and prospective effects between dispositional envy and self-esteem at the global level and within specific social comparison domains (e.g., with regard to academic competence or attraction). In two preregistered longitudinal studies, we used data from more than 7,000 adult participants whom we followed for 6 years. Results from latent change models showed that change in dispositional envy was negatively correlated with concurrent change in self-esteem at the global level and within comparison domains. Moreover, we found preliminary evidence of prospective effects of self-esteem on dispositional envy, suggesting that self-esteem has an impact on later change in dispositional envy but not vice versa. Our findings illustrate that the development of dispositional envy is closely intertwined with self-esteem development. Moreover, our research provides initial longitudinal evidence that low self-esteem might indeed lead to envy.

Keywords: dispositional envy, self-esteem, correlated change, longitudinal, domain-specific

INTRODUCTION

Imagine Alex, who has just finished drama school and is now pursuing a career in acting. Whenever one of his peers manages to obtain a prestigious part in a theater play, he is tormented by feelings of envy. When you picture Alex, is he confident or insecure about his acting skills? And how do you imagine his tendency to feel envy might change if he works with a famous director who further undermines his self-esteem with continuous criticism?

From the early beginnings of envy research, the nature of the relationship between envy and self-esteem has been the subject of lively debates (Foster, 1972; Heider, 1958; Salovey & Rodin, 1991; Silver & Sabini, 1978). Today, it is well-established that dispositional envy (i.e., a person's trait-like tendency to experience envy) is related to low self-esteem (e.g., Rentzsch & Gross, 2015; Smith et al., 1999; Vrabel et al., 2018). However, the theoretical assumption of a reciprocal interplay between these two trait constructs has never been empirically investigated. With the present studies, we sought to extend the existing literature by examining how the development of dispositional envy is intertwined with self-esteem development across a time span of 6 years in two large multiwave samples. Specifically, we aimed to investigate whether change in dispositional envy is related to change in self-esteem within the same time interval (i.e., *correlated change*) and whether change in self-esteem predicts later change in dispositional envy or vice versa (i.e., *prospective effects*).

Previous Cross-Sectional Evidence of a Link Between Dispositional Envy and Self-Esteem

Envy is a comparison-based emotion that arises when a person realizes that someone else has something that the person longs for, strives for, or desires (Parrott & Smith, 1993; Smith & Kim, 2007). The experience of envy is unpleasant and can even be painful (Smith et al., 1996; Takahashi et al., 2009), and its expression is stigmatized (Miceli & Castelfranchi, 2007). Some people are more prone to envy than others, marking stable individual differences in a person's disposition toward envy (Erz & Rentzsch, 2022; Rentzsch & Gross, 2015; Smith et al., 1999). Although envy can result in a vast range of negative outcomes, including antisocial behavior (Behler et al., 2020), hostility (Rentzsch et al., 2015), and social undermining (Duffy et al., 2012), envy has also been shown to have positive effects, such as motivating people to improve themselves or increasing their

performance (see Lange & Crusius, 2015; Van de Ven, 2017). Self-esteem, on the other hand, can be defined as the positivity of a person's self-evaluation (Baumeister, 1998; Coopersmith, 1967; Rosenberg, 1965). It has been associated with a myriad of different outcomes, including social interaction and relationships (Harris & Orth, 2020; Leary et al., 1995) as well as well-being and mental health (Orth et al., 2012; Sowislo & Orth, 2013; Stinson et al., 2008).

Both dispositional envy and self-esteem have been conceptualized as domain-specific trait constructs that vary within individuals and across comparison domains. Multidimensional models of self-esteem (Shavelson et al., 1976; see also Rentzsch et al., 2016, for an overview) assume that, in addition to the general positivity of a person's self-concept (i.e., global self-esteem), individuals hold domain-specific self-evaluations, such as feelings of self-worth in the social or physical domain. Despite a positive correlation between these domains (Rentzsch et al., 2022), individuals may experience domain-specific variations in their self-esteem levels. For example, a person might have high self-esteem in the performance domain ("I am satisfied with my performance at work") but may simultaneously feel insecure about their physical appearance ("I am ashamed of my body"). The same is true for a person's disposition toward envy, which can also vary between life domains (e.g., attraction and wealth; see Rentzsch & Gross, 2015). The importance of a domain-specific perspective is underpinned by theoretical accounts, such as the symmetry principle (Wittmann, 1988) and specificity-matching (McWilliams et al., 2013; Swann Jr et al., 2007), which stress the importance of symmetry between predictor and criterion. According to these accounts, a domain-specific outcome (e.g., a person's job performance) can be predicted more accurately by constructs belonging to the same domain (the person's performance self-esteem) compared with global constructs (the person's global self-esteem level; see also Marsh et al., 2006; Michel et al., 2022; Rentzsch & Gross, 2015).

Lay psychologists often assume that envy is a sign of low self-esteem. Indeed, from the early beginnings of envy research, it has been argued that envy can be seen as an attempt to protect one's self-esteem (Salovey & Rodin, 1984; Silver & Sabini, 1978; Sullivan, 1953). A similar argument has been made by psychoanalytical theorists who view envy as a *narcissistic injury* (Barth, 1988). Others have proposed that experiences of envy are destructive for a person's self-concept and are accompanied by feelings of inferiority (Foster, 1972; Heider, 1958). Moreover, emphasizing the importance of a domain-specific perspective, it has been argued that people are more likely to experience envy in

comparison domains that are relevant for their self-concept (Salovey & Rodin, 1991). In line with these early accounts, the idea of a close relationship between envy and self-esteem has been incorporated into a conceptualization of dispositional envy by Smith et al. (1999), according to which dispositional envy is accompanied by a chronic sense of inferiority (see also Cohen-Charash & Mueller, 2007; Lange et al., 2018; Rentzsch & Gross, 2015).

These theoretical accounts are underpinned by robust cross-sectional evidence that people who are prone to envy tend to have low self-esteem, a finding that has held across different measures of dispositional envy and self-esteem (Rentzsch & Gross, 2015; Smith et al., 1999; Vrabel et al., 2018). Effect sizes were typically moderate to large. Importantly, evidence that dispositional envy is connected to low self-esteem can be found not only at the global level (i.e., for global dispositional envy and self-esteem) but also at the level of specific comparison domains (Rentzsch & Gross, 2015; see also Salovey & Rodin, 1991). For instance, people who are particularly insecure about their academic performance tend to envy others who are perceived as more intelligent. However, despite the convincing finding of a negative cross-sectional relationship between dispositional envy and self-esteem, open questions remain about how these two constructs influence each other across time.

The Longitudinal Interplay Between Dispositional Envy and Self-Esteem

Not only have most early theoretical accounts assumed that envy is related low self-esteem at a given point in time, but they have also postulated that the two constructs are mutually dependent (e.g., Foster, 1972; Silver & Sabini, 1978). Such a reciprocal association should be reflected in the longitudinal interplay between dispositional envy and self-esteem, resulting in two ways in which the development of the two constructs might be intertwined.

First, it is possible that the two constructs change in unison (i.e., *correlated change*): When a person's self-esteem increases, their proclivity to experience envy goes down within the same time interval and vice versa. This may occur on the basis of ongoing bidirectional influences between the two constructs or when changes in dispositional envy and self-esteem are the result of the same causal factors or overarching developmental principles. For instance, there is longitudinal evidence that self-esteem decreases as a reaction to life events that are associated with loss of status (e.g., unemployment; Reitz et al., 2022; see also Mahadevan et al., 2019). As evolutionary psychology postulates that

dispositional envy evolved as an indicator that one is being outperformed by others (DelPriore et al., 2012; Hill & Buss, 2008), it can be expected that such life events lead to increases in a person's tendency to experience envy in addition to decreases in their self-esteem, thereby causing negative correlated change. Moreover, previous research has shown that, whereas dispositional envy is negatively correlated with age (Henniger & Harris, 2015; Rentzsch & Gross, 2015), self-esteem increases from adolescence to middle adulthood (Orth & Robins, 2014). Provided that there are processes of personality maturation at work affecting both constructs (see maturity principle of personality development; Roberts et al., 2001, 2008), we can expect that correlated change will occur between dispositional envy and self-esteem.

Second, rather than nondirectional concordant development, there might be *prospective effects* between dispositional envy and self-esteem, implying that change in one construct has an impact on change in the other construct. For instance, often experiencing envy might decrease a person's self-esteem, or, by contrast, decreases in self-esteem might result in frequent experiences of envy. However, previous theoretical and empirical accounts have disagreed about the direction of influence between dispositional envy and self-esteem. On the one hand, self-esteem has been conceptualized as an antecedent of dispositional envy, as low self-esteem might increase a person's vulnerability to experiencing envy (Salovey & Rodin, 1984; Silver & Sabini, 1978). This notion is underpinned by previous research that has shown that people with low self-esteem are particularly prone to engaging in (upward) social comparisons (Gibbons & Buunk, 1999; Wayment & Taylor, 1995), which are a precondition for the experience of envy (Fiske, 2010; Smith et al., 1999; van de Ven & Zeelenberg, 2020; White et al., 2006). Further supporting this notion, a study with a South Korean sample found that low self-esteem prospectively predicted young women's envy of social media influencers, a relationship that was partially mediated by the frequency of social comparisons with influencers (Chae, 2018; see also Appel et al., 2015; Rentzsch et al., 2015). On the other hand, low self-esteem might be a consequence of dispositional envy, as frequently experiencing envy, a painful emotion that draws one's attention toward unfavorable upward comparisons, might pose a threat to a person's self-esteem (Barth, 1988; Foster, 1972). In line with this idea, a previous study viewed low self-esteem as a consequence of envy in the workplace, arguing that the experience of envy might lead employees to focus on their shortcomings, thereby causing

distress and reducing the person's sense of self-worth (Thompson et al., 2016; see also Ng et al., 2021).

To sum up, previous conceptualizations of the association between dispositional envy and self-esteem lead to different predictions regarding their longitudinal interplay. However, given that almost all studies that have investigated the relationship between the two constructs have relied primarily on cross-sectional data, the existing research does not allow us to disentangle correlated change and prospective effects; that is, it is not yet clear whether changes in dispositional envy come along with concurrent changes in self-esteem within the same time interval or whether one construct prospectively predicts change in the other construct. Similarly, the directionality of the association between dispositional envy and self-esteem remains unclear, as dispositional envy has been conceptualized as both an antecedent and a consequence of low self-esteem, meaning that (change in) self-esteem might prospectively predict change in dispositional envy or vice versa. Moreover, the longitudinal interplay has never been systematically examined within specific comparison domains. In order to close these gaps, the present research used longitudinal data assessing global and domain-specific dispositional envy and self-esteem across multiple measurement occasions.

Modeling the Longitudinal Interplay Between Dispositional Envy and Self-Esteem via Latent Change Models

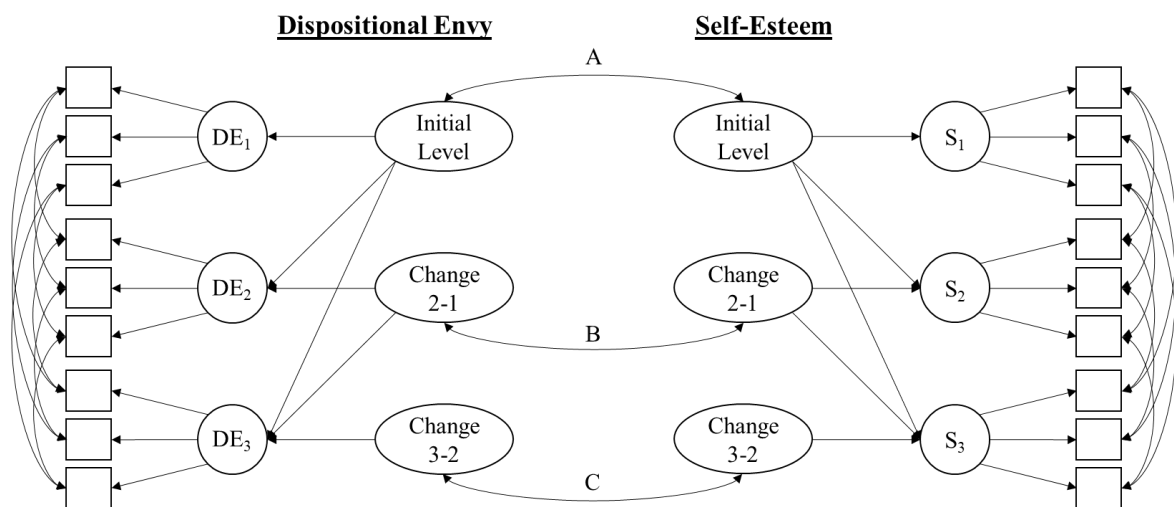
Previous research has shown that, despite the relatively high temporal stability of dispositional envy and self-esteem, individuals exhibit significant differences in how these constructs change across time, with some people experiencing no change in their dispositional envy/self-esteem across time spans of several years and others experiencing increases or decreases (Erz & Rentzsch, 2022; Orth et al., 2010; Rentzsch & Schröder-Abé, 2022). In order to examine such individual differences in change in the two constructs in the present study, we drew on latent change models (*True Intraindividual Change Models* in Study 1 and *Latent Change Score models* in Study 2). In these models, change is measured directly via latent difference variables, which represent individual differences in true intraindividual change over time corrected for random measurement error (Steyer et al., 1997). Compared with other approaches to modeling individual differences in change across time (e.g., latent growth curve models), latent change models are more flexible in the sense that they can be used even when change patterns do not follow a specific form

(e.g., linear or quadratic change; Geiser, 2020). For the present research, we used bivariate models that combine the latent change models of dispositional envy and self-esteem into one parallel process model (McArdle, 2009; Steyer et al., 1997; see Figure 1 for a schematic diagram of a bivariate True Intraindividual Change Model).

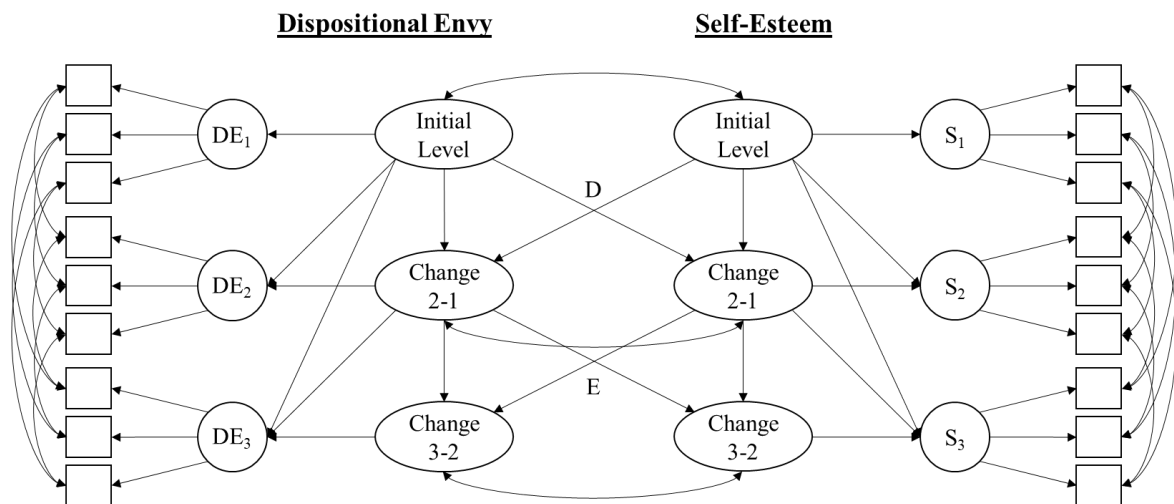
Figure 1

Bivariate True Intraindividual Change Model (Study 1)

1a. Correlational model



1b. Cross-lagged model



Note. DE = latent dispositional envy factors, S = latent self-esteem factors. A = initial level correlations (cross-sectional), B = correlated change between Time 1 and Time 2, C = correlated change between Time 2 and Time 3, D = *level on change* effects, E = *change on change* effects. A first set of models (1a) was purely correlational; in a second step, we added autoregressions and cross-lagged effects (1b).

In order to investigate *correlated change*, we first specified purely correlational models (see Figure 1a). In these models, correlated change (i.e., the correlation between the change factors; Paths B and C in Figure 1a) represents the degree to which change in one construct is associated with change in the other construct within the same time interval (“When individuals decrease in dispositional envy, their self-esteem increases” and vice versa). For the investigation of *prospective effects* of dispositional envy on self-esteem or of self-esteem on dispositional envy, we then used models that included *cross-lagged effects* between variables across time points (see Figure 1b). In the present research, we modeled two kinds of cross-lagged effects: *Level on change* effects (see the D paths in Figure 1b) represent the effect of the initial level of one construct on prospective change in the other construct (“When individuals have low self-esteem, they will experience a subsequent increase in dispositional envy”). *Change on change* effects (see the E paths in Figure 1b) represent the effect of change in one construct on later change in the other construct (“When individuals experience a decrease in dispositional envy, they will experience a subsequent increase in self-esteem”).

Latent change models thus provide an excellent way of disentangling whether dispositional envy and self-esteem change in unison (i.e., *correlated change*) or whether self-esteem has an impact on later change in dispositional envy or vice versa (i.e., *prospective effects*). Moreover, they allow us to compare the prospective effect of self-esteem on dispositional envy with the effect of dispositional envy on self-esteem, thereby providing further evidence of whether change in self-esteem can be considered an antecedent or a consequence of change in dispositional envy.

The Present Research

Previous research on the association between dispositional envy and self-esteem has pointed to a longitudinal interplay between the two constructs. However, previous theoretical and empirical accounts have been inconsistent with regard to the exact nature of the longitudinal interplay, with some accounts indicating nondirected concordant development (i.e., *correlated change*) and others pointing to prospective effects. Similarly, whereas some studies have assumed that a person’s self-esteem influences (dispositional) envy, others have suggested the opposite direction of effect (e.g., Chae, 2018; Foster, 1972; Silver & Sabini, 1978; Thompson et al., 2016). However, a major limitation of previous studies is that nearly all of them relied on cross-sectional data, with the exception of Chae

(2018), who used a design with two measurement occasions but included only directional effects of self-esteem on envy and not the other way around. In order to systematically investigate the longitudinal flow between dispositional envy and self-esteem, we therefore used a longitudinal design that included concurrent effects and both directions of prospective effects.

The present research used two data sets in which dispositional envy and self-esteem were assessed at two or more measurement occasions, thereby allowing the systematic examination of correlated change and prospective effects. We had two research questions: First, we wanted to investigate whether changes in dispositional envy across time are accompanied by simultaneous self-esteem changes within the same time interval (i.e., *correlated change*). In light of the consistently large negative correlation between dispositional envy and self-esteem on the cross-sectional level as well as preliminary evidence of inverse developmental trends, we expected significant negative correlated change, meaning that intraindividual increases in self-esteem should be associated with intraindividual decreases in a person's level of dispositional envy within the same time interval and vice versa. Second, we aimed to investigate whether change in dispositional envy is an antecedent or a consequence of change in self-esteem. To our knowledge, no previous study has systematically investigated *prospective effects* between dispositional envy and self-esteem. As the existing literature provides arguments for both directions of effects, we aimed to conduct an exploratory investigation of whether a person's initial level or change in dispositional envy predicts later self-esteem change, vice versa, or both.

Furthermore, previous research has pointed to the importance of a domain-specific approach when investigating the association between dispositional envy and self-esteem (Michel et al., 2022; Rentzsch & Gross, 2015). In addition to the longitudinal interplay of global dispositional envy and self-esteem, we therefore aimed to investigate correlated change and prospective effects within specific social comparison domains (e.g., attraction and competence).

In the present research, we used data from two large-scale longitudinal studies. In Study 1, participants were followed across three measurement occasions with intervals between waves ranging from 2 to 4 years. Both dispositional envy and self-esteem were assessed with domain-specific measures, allowing us to investigate domain-specific associations between dispositional envy and self-esteem. In Study 2, we aimed to replicate

our findings regarding correlated change and prospective effects of global dispositional envy and self-esteem by using data from a sample that was representative of the German population. Participants provided data on two measurement occasions with an overall time span of 6 years.

STUDY 1

The purpose of the first study was to examine correlated change and prospective effects between dispositional envy and self-esteem. In addition to examining global dispositional envy and self-esteem, we wanted to investigate longitudinal associations between specific domains of envy and self-esteem.

Method

The present study's methods and analyses were preregistered on the OSF (see https://osf.io/8aewb/?view_only=6341e5e030ac464eafd1b9f1a25e7c38).¹ The preregistration document also includes a detailed overview of all measures at each time point. Analyses that deviate from the preregistered protocol are identified as such in the following.

Participants and Procedure

Assessments were conducted as part of the SELF (Self-Evaluations Across Life) study (Rentzsch, 2021), which was approved by the ethics committee of the University of Bamberg.² Participants were recruited from the German population using a pool of volunteers for participation in lab research. The link for signing up was announced in regional and national media outlets. As an incentive, participants were offered personalized feedback on their self-esteem profile after participating in the study.

The participant pool was contacted in 2-year intervals beginning in 2013 and followed across 6 years. In this paper, we report results from three waves of data: 2013 (Time 1), 2017 (Time 2), and 2019 (Time 3). One further wave of data collected in 2015 was omitted due to preregistered criteria (covariance coverage between waves $< .10$ for dispositional envy). In each wave, participants who had completed previous waves and new participants were included in the study. All participants who provided data on dispositional envy or self-esteem on at least one measurement occasion were included in the analysis, resulting in an overall sample size of 1,254 participants.³ The number of participants per measurement occasion ranged from 523 (in 2017) to 634 (in 2013). Of those participating

at Time 1, $n = 208$ individuals also provided data at Time 2, and $n = 209$ participated at Time 3. Of the individuals who participated at Time 2, $n = 258$ also provided data on dispositional envy at Time 3. Table 1 presents detailed information on sample sizes and demographics.

Table 1

Sample Size and Demographics Across Waves (Study 1)

Wave	2013 (Time 1)	2017 (Time 2)	2019 (Time 3)
Sample size n	634	523	633
<i>Age</i>			
Mean (SD)	47.0 (12.4)	48.8 (13.7)	48.8 (14.5)
Range	18-88	19-78	18-81
<i>Gender</i> ^a			
Male (%)	190 (30.6%)	177 (34.7%)	190 (31.4%)
Female (%)	431 (69.4%)	333 (65.3%)	415 (68.6%)
<i>Education</i> ^a			
Main school (Hauptschule)	22 (3.5%)	13 (2.5%)	20 (3.3%)
Middle school (Mittlere Reife)	142 (22.5%)	100 (19.6%)	106 (17.5%)
Entrance qualification college of applied science (Fachhochschulreife)	71 (11.2%)	56 (11.0%)	61 (10.1%)
High school degree (Abitur)	120 (19.0%)	95 (18.6%)	123 (20.3%)
College/university degree	277 (43.8%)	244 (47.8%)	294 (48.6%)
No degree	0	2 (0.4%)	1 (0.2%)

Note. Data from a fourth wave (2015) were omitted in line with the preregistered criterion of insufficient covariance coverage between waves.

^a Sample sizes differ due to missing data.

Measures

We investigated correlated change and prospective effects between dispositional envy and self-esteem both at the global level and within specific social comparison domains. We therefore used domain-specific instruments to assess dispositional envy and self-esteem.

Domain-Specific Dispositional Envy. Global and domain-specific dispositional envy were assessed with the Domain-Specific Envy Scale (DSES; Rentzsch & Gross, 2015). The DSES has exhibited good reliability and validity in adults (Crusius et al., 2021; Rentzsch et al., 2015; Rentzsch & Gross, 2015). The 15-item scale measuring global dispositional envy can be divided into three five-item subscales measuring dispositional envy with regard to attraction, competence, and wealth as broad social comparison domains. The items were formulated in such a way that they emphasize the subjective experience of an unpleasant feeling as a reaction to an upward comparison with another person.

- Global envy refers to an individual's general dispositional envy across different social comparison domains.
- Attraction envy refers to interpersonal and romantic attraction (being popular as a friend and relationship partner) as well as physical attraction (being good-looking).
- Competence envy refers to envy elicited by perceiving that others are more intelligent or creative.
- Wealth envy refers to envy that is triggered by the financial well-being of others (when others are able to buy better products or live in better neighborhoods).

Responses were rated on 7-point rating scales ranging from 1 (*not at all*) to 7 (*very much*). Reliability coefficients for the three envy domains as measured with Cronbach's alpha (α) ranged from .80 to .90 across time points, and the global scale had high reliability ($\alpha = .93$) at every time point.

Multidimensional Self-Esteem. To measure self-esteem, we used the Multidimensional Self-Esteem Scale (MSES; Schütz et al., 2016), an instrument that exhibits good reliability and validity in adult samples (Rentzsch et al., 2016). The MSES is the German adaptation of a scale created by Fleming and Courtney (1984) and includes six subscales: global self-esteem, social contact, social criticism, performance, physical appearance, and physical ability.

- Global self-esteem describes a person's global perceptions of self-worth, independent of any particular domain. High scorers have high general self-acceptance, high self-confidence, and positive self-evaluations.

- Social contact self-esteem refers to a person's social skills in the presence of others. High scorers are comfortable being in contact with others and are confident in their social skills.
- Social criticism self-esteem describes a person's confidence that others approve of them. High scorers are confident that they are accepted and positively evaluated by others.
- Performance self-esteem describes a person's confidence that their performances are good and that they exhibit competence in their occupation, job, or school.
- Physical appearance self-esteem refers to the evaluation of the appearance of one's body. High scorers evaluate themselves as physically attractive and are satisfied with their bodies.
- Physical ability self-esteem refers to the evaluation of one's abilities with respect to sports and physical coordination.

Each subscale consists of five to seven items. Responses on the 32 items were given on 7-point rating scales ranging from 1 (*not at all*) to 7 (*very much*) for items measuring intensity and from 1 (*never*) to 7 (*very much*) for items measuring frequency. Internal consistencies for the five self-esteem domains measured with Cronbach's alpha (α) ranged from .77 to .90, and global self-esteem had α values that ranged from .89 (Times 1 and 2) to .90 (Time 3).

Matching of Envy and Self-Esteem Domains. For the bivariate analyses within specific social comparison domains, we grouped the domains of dispositional envy and self-esteem according to their content (see also Rentzsch & Gross, 2015). Dispositional envy with regard to competence was grouped into the same domain as performance self-esteem because both refer to a person's intellectual abilities. As attraction envy includes aspects of popularity as well as physical attraction, this envy domain was matched with physical appearance self-esteem as well as the two social domains: social contact self-esteem and social criticism self-esteem. Domains of dispositional envy and self-esteem that did not have an equivalent in the respective other construct (e.g., wealth envy and physical ability self-esteem) were not included in the bivariate domain-specific analyses.

Analytic Strategy

For all analyses, we used latent longitudinal analyses based on confirmatory factor models. In order to investigate global dispositional envy, a first-order measurement model

representing the latent factor of dispositional envy and three manifest parcels as indicators (Little et al., 2002) was used. As preregistered, the internal-consistency approach was applied to create parcels (for a concise description of this approach, see Little et al., 2002, p. 167). In order to investigate global self-esteem as well as specific domains of self-esteem and dispositional envy, first-order measurement models for each of the six (i.e., one global and five domain-specific) subscales of the MSES (e.g., global self-esteem, performance self-esteem) and for the three domain-specific subscales of the DSES (i.e., attraction, competence, wealth) were established. Each factor model included three item parcels based on the balancing technique as recommended by Little et al. (2002, p. 166).

All models were estimated with Mplus Version 8.5 (Muthén & Muthén, 1998-2019) using full information maximum likelihood estimation (Enders, 2010). In accordance with our preregistration, model fit was assessed with the χ^2 -test statistic, Comparative Fit Index (CFI), Root Mean Square Error of Approximation (RMSEA), and Standardized Root-Mean-Square Residual (SRMR), with CFI > .90, RMSEA < .08, and SRMR < .11 reflecting an acceptable fit to the data. The Bayesian Information Criterion (BIC) and Tucker-Lewis Index (TLI) are also reported. In accordance with the preregistration, we used $p < .05$ and 95% confidence intervals.

The anonymized data and all scripts used for the analyses are available on the OSF (https://osf.io/5jvcx/?view_only=c8356273953f47e7bb0277cf8d7e16d1).

Measurement Invariance. First, we tested for measurement invariance in dispositional envy and self-esteem across time. Establishing invariance is important to ensure that the relationship between the indicators and the latent factors did not change across time, which is a prerequisite for a meaningful comparison of latent factors at different measurement points.

Every measurement model of each of the measures of global and domain-specific dispositional envy and self-esteem was tested for invariance across the three measurement occasions. For each model, the three latent factors representing envy/self-esteem in the different waves of measurement (2013, 2017, and 2019) were allowed to correlate. All models were tested for configural, weak, strong, and strict factorial invariance by comparing a series of increasingly restrictive models against each other (Meredith, 1993). As preregistered and in accordance with Cheung and Rensvold (2002), a value of ΔCFI smaller than or equal to .01 between nested models was regarded as indicating a

nonsignificant decrement in fit between the models. The measurement models used in the following analyses (i.e., the latent change models) were based on the level of invariance found in these tests.

In the weak invariance model, all factor loadings were constrained to be equal across time. In addition to this constraint, the intercepts of all indicators were constrained to be equal in the strong invariance model. In the strict invariance model, the residual variances were constrained to be equal in addition to the factor loadings and intercepts. In all models, we allowed the residuals of identical indicators to be correlated in order to account for the use of the same indicators across time (Bollen & Curran, 2006).

True Intraindividual Change Models. In order to investigate the longitudinal interplay of dispositional envy and self-esteem, we used bivariate True Intraindividual Change Models (TICMs; Steyer et al., 1997).⁴ As a first step, we modeled change in dispositional envy and self-esteem separately. In these univariate TICMs, all latent envy/self-esteem factors loaded on an initial latent factor at Time 1. The latent difference factors were each measured by the latent factor of the respective time point and of all subsequent time points. All loadings were fixed to one. The intercepts of the reference indicators were set to zero to identify the latent means. The latent difference factors were allowed to correlate. The intercepts and variances of the latent envy factors were set to zero for purposes of identification. The means and variances of the latent difference factors were freely estimated. A significant latent difference factor mean indicates that the mean change between time points was significantly different from zero; a positive sign on the latent difference factor mean indicates that the latent scores of the respective construct increased between the respective time points. The variance of the latent difference factor reflects individual differences in the latent change scores, indicating interindividual differences in intraindividual change. All TICMs were based on the measurement models of the respective measures of dispositional envy or self-esteem.

To analyze correlated change and prospective effects between dispositional envy and self-esteem, we then specified bivariate models that simultaneously combined two TICMs: one for dispositional envy and one for self-esteem (see Figure 1 for a schematic representation). For the analysis of *correlated change*, we first specified bivariate models that were purely correlational (see Model 1a in Figure 1). In these models, the initial levels of dispositional envy and self-esteem were allowed to correlate (Path A), representing a

cross-sectional correlation at baseline. Correlated change was modeled as the correlation between the change factors of dispositional envy and self-esteem within the same time interval (Paths B and C).

In an additional step, we included prospective effects of dispositional envy on self-esteem and vice versa as well as autoregressive effects of the initial levels/change factors on later change in the same construct (see Model 1b in Figure 1). *Level on change* effects were modeled as cross-lagged paths between the initial level factors of dispositional envy/self-esteem on the latent difference factor indicating change between Time 1 and Time 2 in the respective other construct (D paths). To investigate whether change in self-esteem predicted later change in dispositional envy or vice versa, we added cross-lagged paths between the respective difference factors of neighboring time intervals, thus indicating a *change on change* effect (E paths).

Results

Measurement Invariance and Univariate Analyses

As a first step, we tested all measures of dispositional envy and self-esteem for invariance across time (for a detailed overview of the results, see Table 2). Results indicated strict invariance for global dispositional envy and self-esteem with excellent fit for the strict invariance model (CFI = .996, RMSEA = .018, SRMR = .035 for global dispositional envy and CFI = 1, RMSEA = 0, SRMR = .011 for global self-esteem). Model fit indices revealed only a minimal drop in model fit when comparing the restrictive model with the less constrained models and thus supported structural consistency (i.e., the measurement models had similar factor structures over time). Moreover, analyses revealed strict invariance for all domain-specific measures of dispositional envy and self-esteem except for wealth envy, with CFIs for the strict invariance models ranging from .991 to 1 and RMSEAs ranging from 0 to .029 and only a minimal drop in model fit when constraints were imposed on the models. In the case of wealth envy, results indicated partial strict invariance after one residual variance was freed (CFI = .984; RMSEA = .036). In line with the preregistration, the following analyses were based on latent models with (partial) strict measurement invariance.

Before conducting the bivariate analyses of correlated change and prospective effects, we specified univariate TICMs in order to examine the mean-level change and the variance of the change in all measures of dispositional envy and self-esteem. In Table 3,

we present the means and standard deviations of all measures of dispositional envy and self-esteem, as estimated in the univariate TICMs. The estimated intercorrelations between the latent factors of dispositional envy and self-esteem across time are presented in Table S-1 in the Supplement.

Table 2

Model Fit Indices from Invariance Testing Across Time (Study 1)

Measures of Envy	χ^2	df	p	BIC	TLI	CFI	RMSEA	SRMR
Global Envy								
(Configural invariance)	19.10	15	.209	14546.44	0.997	0.999	0.015	0.020
(Weak invariance)	30.73	19	.043	14529.61	0.993	0.996	0.022	0.028
(Strong invariance)	39.68	25	.031	14495.88	0.993	0.995	0.022	0.028
(Strict invariance)	43.14	31	.072	14456.65	0.996	0.996	0.018	0.035
Attraction Envy								
(Configural invariance)	22.08	15	.106	16466.39	0.995	0.998	0.020	0.020
(Weak invariance)	26.08	19	.128	16441.94	0.996	0.998	0.017	0.024
(Strong invariance)	37.84	25	.048	16411.01	0.995	0.996	0.020	0.026
(Strict invariance)	47.98	31	.026	16378.47	0.994	0.995	0.021	0.027
Competence Envy								
(Configural invariance)	7.44	15	.944	17147.74	1.005	1.000	0.000	0.014
(Weak invariance)	14.23	19	.770	17126.07	1.002	1.000	0.000	0.020
(Strong invariance)	17.79	25	.851	17086.95	1.003	1.000	0.000	0.020
(Strict invariance)	20.31	31	.929	17046.79	1.003	1.000	0.000	0.021
Wealth Envy								
(Configural invariance)	32.99	15	.005	13308.11	0.986	0.994	0.031	0.023
(Weak invariance)	41.63	19	.002	13288.30	0.986	0.993	0.031	0.024
(Strong invariance)	48.67	25	.003	13252.65	0.989	0.992	0.028	0.024
(Partial strict invar.) ^a	78.63	30	<.001	13247.04	0.981	0.984	0.036	0.036
Global Self-Esteem								
(Configural invariance)	12.36	15	.652	14709.29	1.000	1.000	0.000	0.011
(Weak invariance)	17.08	19	.584	14685.48	1.000	1.000	0.000	0.025
(Strong invariance)	24.79	25	.474	14650.38	1.000	1.000	0.000	0.030
(Strict invariance)	25.43	31	.748	14490.13	1.000	1.000	0.000	0.029
Social Contact SE								
(Configural invariance)	24.67	15	.055	16294.29	0.994	0.998	0.023	0.018
(Weak invariance)	27.27	19	.098	16268.36	0.996	0.998	0.019	0.023
(Strong invariance)	34.15	25	.105	16232.43	0.997	0.998	0.017	0.027
(Strict invariance)	39.81	31	.133	16195.29	0.997	0.998	0.015	0.032

Social Criticism SE								
(Configural invariance)	26.47	15	.033	16953.71	0.992	0.997	0.025	0.023
(Weak invariance)	36.56	19	.009	16935.26	0.991	0.995	0.027	0.033
(Strong invariance)	46.51	25	.006	16902.41	0.991	0.994	0.026	0.043
(Strict invariance)	63.41	31	.001	16876.51	0.990	0.991	0.029	0.048
Performance Self-Esteem								
(Configural invariance)	17.89	15	.269	15502.69	0.998	0.999	0.012	0.019
(Weak invariance)	21.78	19	.295	15478.06	0.998	0.999	0.011	0.026
(Strong invariance)	24.90	25	.468	15438.40	1.000	1.000	0.000	0.029
(Strict invariance)	37.04	31	.210	15407.77	0.998	0.998	0.012	0.033
Physical Appearance SE								
(Configural invariance)	37.45	15	.001	16166.89	0.986	0.994	0.035	0.021
(Weak invariance)	42.31	19	.002	16143.22	0.988	0.994	0.031	0.026
(Strong invariance)	45.89	25	.007	16104.03	0.992	0.994	0.026	0.029
(Strict invariance)	56.21	31	.004	16071.57	0.992	0.993	0.026	0.033
Physical Ability SE								
(Configural invariance)	23.02	15	.084	18165.88	0.991	0.996	0.021	0.021
(Weak invariance)	23.10	19	.233	18137.45	0.997	0.998	0.013	0.022
(Strong invariance)	30.10	25	.221	18101.67	0.997	0.998	0.013	0.025
(Strict invariance)	40.12	31	.126	18068.91	0.995	0.996	0.015	0.031

Note. BIC = Bayesian Information Criterion, TLI = Tucker-Lewis Index, CFI = Comparative Fit Index, RMSEA = Root Mean Square Error of Approximation, SRMR = Standardized Root-Mean-Square Residual. $N = 1,229$ - $1,254$ due to missing data.

^a In the case of wealth envy, one residual variance was freed in order to achieve partial strict invariance.

As can be seen in Table 3, the difference factor means were small and nonsignificant for almost all measures of dispositional envy and self-esteem, with the exception of the social self-esteem domains, which showed a significant (albeit small) increase in mean levels between Time 1 and Time 2. Most importantly, all measures of dispositional envy and self-esteem exhibited a significant variance in the change between measurement occasions ranging from 0.25 to 1.04 (all $ps < .001$). This finding indicates that participants showed significant differences in how much their dispositional envy and self-esteem scores changed between measurement occasions (i.e., interindividual differences in intraindividual change), an important precondition for the investigation of correlated change and prospective effects.

Table 3*Estimated Means, Standard Deviations, and Difference Factor Means and Variances Across Measurement Occasions (Study 1)*

Measure	<i>M (SD)</i>			Difference Factor Mean			Difference Factor Variance		
	Time 1	Time 2	Time 3	Time 1 – Time 2	Time 2 – Time 3	Time 1 – Time 2	Time 1 – Time 2	Time 2 – Time 3	Time 1 – Time 2
Global Envy	2.68 (1.26)	2.64 (1.29)	2.63 (1.31)	-0.05 [-0.15, 0.06], .397	0.00 [-0.10, 0.09], .940	0.67 [0.49, 0.85], <.001	0.61 [0.46, 0.76], <.001		
Attraction Envy	2.60 (1.22)	2.53 (1.27)	2.51 (1.26)	-0.07 [-0.17, 0.04], .219	-0.02 [-0.12, 0.08], .696	0.68 [0.51, 0.86], <.001	0.62 [0.46, 0.78], <.001		
Competence Envy	2.91 (1.34)	2.93 (1.40)	2.95 (1.38)	0.02 [-0.10, 0.14], .708	0.02 [-0.09, 0.13], .685	1.04 [0.79, 1.29], <.001	0.77 [0.59, 0.96], <.001		
Wealth Envy	1.96 (1.12)	1.91 (0.91)	1.94 (1.15)	-0.05 [-0.13, 0.04], .289	0.04 [-0.05, 0.12], .400	0.39 [0.27, 0.50], <.001	0.47 [0.35, 0.59], <.001		
Global Self-Esteem	5.15 (1.07)	5.22 (1.09)	5.27 (1.08)	0.06 [-0.02, 0.15], .151	0.05 [-0.03, 0.13], .210	0.43 [0.30, 0.56], <.001	0.33 [0.24, 0.42], <.001		
Social Contact SE	4.83 (1.44)	4.94 (1.44)	4.93 (1.43)	0.11 [0.01, 0.21], .026	-0.01 [-0.11, 0.08], .770	0.42 [0.27, 0.57], <.001	0.53 [0.39, 0.67], <.001		
Social Criticism SE	4.50 (1.27)	4.65 (1.27)	4.62 (1.32)	0.15 [0.04, 0.25], .006	-0.02 [-0.12, 0.07], .609	0.60 [0.43, 0.78], <.001	0.49 [0.36, 0.63], <.001		
Performance SE	4.93 (0.98)	4.97 (1.00)	4.97 (1.00)	0.04 [-0.05, 0.13], .353	0.00 [-0.08, 0.08], .961	0.56 [0.41, 0.70], <.001	0.34 [0.23, 0.44], <.001		
Physical Appearance SE	4.46 (1.37)	4.46 (1.42)	4.46 (1.38)	0.00 [-0.11, 0.11], .952	0.00 [-0.10, 0.10], .979	0.78 [0.57, 1.00], <.001	0.52 [0.37, 0.67], <.001		
Physical Ability SE	4.38 (0.97)	4.36 (1.03)	4.29 (1.02)	-0.02 [-0.11, 0.07], .666	-0.07 [-0.15, 0.01], .086	0.35 [0.21, 0.50], <.001	0.25 [0.13, 0.36], <.001		

Note. $N = 1,229-1,254$ due to missing data.

Table 4*Correlated Change Between Dispositional Envy and Self-Esteem (Study 1)*

Measures of Dispositional Envy and Self-Esteem	Initial Level Correlation	Correlated Change T1-T2	Correlated Change T2-T3
Global	-.591 [-.651, -.531]	-.454 [-.616, -.292]	-.568 [-.712, -.423]
Attraction Envy and Social Contact SE	-.540 [-.602, -.479]	-.505 [-.677, -.334]	-.558 [-.705, -.411]
Attraction Envy and Social Criticism SE	-.741 [-.786, -.697]	-.627 [-.763, -.492]	-.746 [-.867, -.624]
Attraction Envy and Physical Appearance SE	-.523 [-.587, -.459]	-.441 [-.599, -.283]	-.750 [-.881, -.619]
Competence Envy and Performance SE	-.524 [-.588, -.460]	-.402 [-.550, -.255]	-.423 [-.592, -.254]

Note. Cells present coefficients from True Intraindividual Change Model analyses. Domains of dispositional envy and self-esteem were matched according to their content. Initial level correlation = the correlation between the initial levels of dispositional envy and self-esteem; correlated change = the correlation between the latent change factors of dispositional envy and self-esteem. 95% confidence intervals are included in parentheses. $N = 1,248$ -1,254 due to missing data. All $ps < .001$.

Table 5*Prospective Effects of Dispositional Envy and Self-Esteem (Study 1)*

Measures of Dispositional Envy and Self-Esteem	Dispositional Envy => Self-Esteem		Self-Esteem => Dispositional Envy	
	Level _{DE} – Change _{SE}	Change _{DE} – Change _{SE}	Level _{SE} – Change _{DE}	Change _{SE} – Change _{DE}
Global	-0.079 [-0.199, 0.041], .197	-0.027 [-0.200, 0.147], .762	-0.131 [-0.291, 0.030], .110	-0.047 [-0.311, 0.218], .730
Attraction Envy and Social Contact Self-Esteem	-0.030 [-0.164, 0.103], .655	0.055 [-0.168, 0.277], .630	-0.132 [-0.233, -0.031], .011	-0.017 [-0.311, 0.278], .912
Attraction Envy and Social Criticism Self-Esteem	-0.121 [-0.297, 0.055], .177	0.054 [-0.201, 0.309], .679	-0.062 [-0.226, 0.101], .455	-0.105 [-0.382, 0.172], .458
Attraction Envy and Physical Appearance Self-Esteem	-0.040 [-0.173, 0.094], .561	0.164 [-0.025, 0.353], .089	-0.021 [-0.134, 0.091], .709	0.039 [-0.170, 0.248], .716
Competence Envy and Performance Self-Esteem	0.013 [-0.080, 0.105], .784	0.026 [-0.081, 0.132], .640	-0.251 [-0.420, -0.082], .004	-0.287 [-0.516, -0.057], .014

Note. Domains of dispositional envy and self-esteem were matched according to their content. Values represent unstandardized cross-lagged regression coefficients from True Intraindividual Change Model analyses [95% confidence interval], *p* value. Bold values are statistically significant ($\alpha = .05$). $N = 1,248$ –1,254 due to missing data.

Correlated Change and Prospective Effects

Global Dispositional Envy and Self-Esteem. The bivariate TICMs of global dispositional envy and self-esteem showed excellent model fit, with CFI = .995 and RMSEA = .016 for the correlational model and CFI = .993 and RMSEA = .017 for the cross-lagged model (i.e., the model including autoregressive effects and cross-lagged paths). Coefficients from the bivariate TICMs are displayed in Tables 4 (correlational models) and 5 (cross-lagged models).

We found that global dispositional envy and self-esteem were negatively associated at baseline ($r = -.59$, 95% CI $[-.65, -.53]$, $p = .011$). This result means that participants with lower self-esteem were more prone to experiencing envy. When looking at the correlated change (i.e., correlation between the latent factors representing change in global dispositional envy and self-esteem within the same time intervals), we again found negative associations ($r = -.45$, 95% CI $[-.62, -.29]$ for change between Time 1 and Time 2, and $r = -.57$, 95% CI $[-.71, -.42]$ for change between Time 2 and Time 3, all $ps < .001$). These findings indicate that when a participant's self-esteem increased across time, their dispositional envy levels simultaneously decreased.

When investigating prospective effects between dispositional envy and self-esteem, we did not find any significant cross-lagged *level on change* or *change on change* effects for the global constructs. Initial self-esteem levels did not predict change in dispositional envy ($b = -0.13$, 95% CI $[-0.29, 0.03]$, $p = .110$) or vice versa ($b = -0.08$, 95% CI $[-0.20, 0.04]$, $p = .197$). Similarly, change in self-esteem within the first time interval did not predict later change in dispositional envy ($b = -0.05$, 95% CI $[-0.31, 0.22]$, $p = .730$) or vice versa ($b = -0.03$, 95% CI $[-0.20, 0.15]$, $p = .762$).

Dispositional Envy and Self-Esteem Domains. We then proceeded to examine correlated change and cross-lagged effects within dispositional envy and self-esteem domains that were matched on content. Model fit indices were good to excellent for the domain-specific bivariate TICMs (CFIs ranging from .964 to .995, RMSEAs ranging from 0 to .015).

In the correlational models, the corresponding dispositional envy and self-esteem domains were negatively correlated at baseline, with correlation coefficients ranging from $r = -.52$ for the cross-sectional association between competence envy and performance self-esteem to $r = -.74$ for attraction envy and social criticism self-esteem. Participants who

were low in domain-specific self-esteem at Time 1 were therefore especially prone to experiencing dispositional envy in the same domain. Moreover, resembling our results on global envy and self-esteem, concurrent change in corresponding domains of dispositional envy and self-esteem was strongly negatively correlated, with coefficients ranging from $r = -.40$ to $r = -.75$ (see also Table 4). For example, participants who experienced an increase in dispositional envy with regard to their competence across measurement occasions simultaneously experienced a decrease in performance self-esteem.

As was the case for global dispositional envy and self-esteem, we did not find much evidence for cross-lagged *level on change* or *change on change* effects (see Table 5). However, we found a significant effect of the initial level of social contact self-esteem on change in attraction envy ($b = -0.13$, 95% CI $[-0.23, -0.03]$, $p = .011$). Conversely, the *level on change* effect of attraction envy on social contact self-esteem failed to reach significance ($b = -0.03$, 95% CI $[-0.16, 0.10]$, $p = .655$). This finding means that participants who started out with higher levels of social contact self-esteem showed a larger decrease in attraction envy between Time 1 and Time 2 but not vice versa. Moreover, performance self-esteem had significant negative *level on change* ($b = -0.25$, 95% CI $[-0.42, -0.08]$, $p = .004$) and *change on change* ($b = -0.29$, 95% CI $[-0.52, -0.06]$, $p = .014$) effects on competence envy. Again, the effects of dispositional envy on self-esteem were nonsignificant ($b = 0.01$, 95% CI $[-0.08, 0.11]$, $p = .784$ for the *level on change* effect of competence envy on performance self-esteem and $b = 0.03$, 95% CI $[-0.08, 0.13]$, $p = .640$ for the *change on change* effect). Participants with higher initial levels of performance self-esteem therefore showed larger decreases in competence envy across the first time interval; and participants who showed increases in performance self-esteem between Time 1 and Time 2 experienced a later decrease in dispositional envy with regard to competence. However, this was not true for the opposite direction of effects.

Summary

To sum up, the present study showed that, as expected, dispositional envy and self-esteem were strongly negatively correlated at the cross-sectional level, and increases in self-esteem were associated with concurrent decreases in dispositional envy (i.e., correlated change). Regarding prospective effects, there was no evidence of cross-lagged effects between global dispositional envy and self-esteem. However, within domains of

dispositional envy and self-esteem, we found that levels or change in self-esteem predicted later change in dispositional envy but not the other way around.

STUDY 2

The purpose of Study 2 was to replicate the findings on the longitudinal interplay between global dispositional envy and self-esteem from Study 1 in a representative sample from the German population.

Method

The data for this study (GESIS, 2023) were collected as part of the GESIS panel, an open probability-based mixed-mode panel of the general population in Germany (Bosnjak et al., 2018). All hypotheses and analyses were specified prior to data collection as part of the associated study application for Time 2 and were preregistered on the OSF before the data from the second wave of measurement were available (i.e., before any longitudinal analyses could be performed; https://osf.io/k5yj8/?view_only=e134c676ee6042acb12b8ed154cd68fc).

Participants and Procedure

The GESIS panel is an ongoing longitudinal panel study that provides researchers with the opportunity to collect data from a random sample that is representative of the German population. Data collection began in 2013, and new waves are conducted every 2 to 3 months. In the initial sampling process, a random sample was drawn from the German-speaking population living in Germany between the ages of 18 and 70 years, resulting in a starting cohort of almost 5,000 panelists (Bosnjak et al., 2018). To compensate for attrition, refreshment cohorts were drawn in 2016, 2018, and 2022. In these refreshment samples, there was no upper restriction for age (i.e., participants could be older than 70). In all waves, panelists can participate online or via mail. Participants were offered an incentive of 5 Euros. The codebook, wave reports, and study descriptions can be accessed via <https://www.gesis.org/en/gesis-panel/documentation/>.

For the present study, we used data from two waves of measurement where dispositional envy and self-esteem were assessed (Waves “cf” and “ja”). A total of 44 participants had to be excluded due to missing data on all dispositional envy and self-esteem variables. At Time 1 in December 2015/January 2016, 3,502 people participated in

the survey. Six years later (Time 2, February to April 2022), the number of participants was 4,868. A total of $n = 2,248$ people participated at both measurement occasions. Whereas the Time 1 sample included only the first, original GESIS cohort, the Time 2 sample also included three refreshment samples (second to fourth cohorts). For our analyses, we included all participants who provided data at a minimum of one measurement occasion, resulting in an overall sample size of $N = 6,134$ participants.⁵ Detailed information on sample size and demographics is presented in Table 6.

Table 6

Sample Size and Demographics Across Waves (Study 2)

Wave	2015/2016 (Time 1)	2022 (Time 2)
Sample size n	3,502	4,868
<i>Age</i> ^{a b}		
Mean (SD)	49.8 (14.2)	56.7 (14.5)
Range	21-73	27-79
<i>Gender</i> ^b		
Male (%)	1,598 (47.6%)	2,358 (49.8%)
Female (%)	1,757 (52.4%)	2,373 (50.2%)
<i>Education</i>		
Student	11 (0.3%)	7 (0.1%)
Main school (Hauptschule)	669 (19.1%)	744 (15.3%)
Middle school (Mittlere Reife)	1,154 (33.0%)	1,602 (33.0%)
Entrance qualification college of applied science (Fachhochschulreife)	415 (11.9%)	632 (13.0%)
High school degree (Abitur)	1,202 (34.3%)	1,822 (37.5%)
No degree	35 (1.0%)	29 (0.6%)
Other	16 (0.5%)	19 (0.4%)

Note. Sample sizes differ due to missing data.

^a Age was computed by subtracting participants' year of birth from 2016 (Time 1) and 2022 (Time 2). ^b Participants with inconsistent information regarding their year of birth or gender were excluded.

Measures

As in Study 1, global dispositional envy was measured with the Domain-Specific Envy Scale (DSES; Rentzsch & Gross, 2015). Cronbach's alpha (α) for the 15-item global

scale was .93 at Time 1 and .94 at Time 2. To measure self-esteem, we used the Single-Item Self-Esteem Scale (SISE) developed by Robins et al. (2001; for the German translation, see von Collani & Herzberg, 2003). Participants were asked to indicate their agreement with the statement: “I have high self-esteem.” Responses were given on a 5-point rating scale ranging from 1 (*does not apply at all*) to 5 (*fully applies*). The SISE has been shown to be a valid and reliable instrument for the assessment of self-esteem in German-speaking samples (Brailovskaia & Margraf, 2020) and was chosen due to limitations on the length of the questionnaire.

Analytic Strategy

For reasons of comparability, we aimed to keep the analytic strategy equivalent to the analyses used in Study 1. Again, all scripts used for the analyses are available on the OSF (https://osf.io/5jvcx/?view_only=c8356273953f47e7bb0277cf8d7e16d1). We are not allowed to publicly share the data; however, researchers can apply for free data access via <https://www.gesis.org/en/gesis-panel/data>.

As in Study 1, we used latent longitudinal analyses based on confirmatory factor models for all analyses. The first-order measurement model of global dispositional envy was again composed of a latent envy factor measured with three manifest parcels that were created via the internal-consistency approach (Little et al., 2002). For self-esteem, we used a measurement model with one single-indicator latent variable per measurement occasion. Compared with manifest indicators, single-indicator latent variables have the advantage that they account for the unreliability of the single-item measure, which is included in the model by fixing the observed indicator’s factor loading to 1 and its residual variance to a value $a = \text{Var}(x) \times (1 - \text{Rel})$, where $\text{Var}(x)$ is the indicator’s variance, and Rel is its estimated reliability (Brown, 2006). As a reliability estimate, we used the test-retest reliability of the German version of the SISE by Brailovskaia and Margraf (2020), which was $r = .72$.

All models were estimated with Mplus Version 8.5 (Muthén & Muthén, 1998-2019) and based on full information maximum likelihood estimation (Enders, 2010). For the assessment of model fit, we used the same analytic strategy as in Study 1. In accordance with the preregistration, we used $p < .05$ and 95% confidence intervals for nondirectional hypotheses. For directional hypotheses, we used $p < .10$ and 90% confidence intervals.

Again, dispositional envy was tested for *measurement invariance* across time. The invariance testing procedure was the same as described in Study 1. As strict invariance

could be demonstrated, the measurement model of global dispositional envy in the following analyses (i.e., the latent change models) was based on the strict invariance model. For the one-item measure of self-esteem, invariance tests were not feasible.

To analyze correlated change and prospective effects of dispositional envy and self-esteem, we used *Latent Change Score (LCS)* models (McArdle & Hamagami, 2001; see also Kievit et al., 2018). These models include latent variables representing individual differences in true intraindividual change over time corrected for random measurement error (Steyer et al., 1997). These latent variables are equivalent to the latent difference variables from the TICMs that we used in Study 1. For the present study, we decided to use LCS models because they can be used with only two waves of data collection, whereas the TICMs need at least three measurement occasions to be identified due to the inclusion of an additional initial level factor.

As a first step, we again modeled change in dispositional envy and self-esteem separately. In the univariate LCS models, we introduced a latent difference factor representing change between the measurement occasions, which was measured by the latent envy/self-esteem factor at Time 2 with a factor loading fixed to 1. Moreover, the latent factor at Time 2 was regressed on the latent factor at Time 1 with a regression weight fixed to one and residual variance and intercept set to zero. These steps ensure that the latent change factor represents the change between Time 1 and Time 2. The mean and variance of the latent change factor were again freely estimated. A significant latent difference factor mean indicates that the mean change between time points is significantly different from zero; a positive sign on the latent difference factor mean indicates that the latent scores of dispositional envy/self-esteem increased between the respective time points. The variance of the latent difference factor reflects individual differences in the latent change scores, indicating interindividual differences in intraindividual change. The latent difference factor and the latent factor at Time 1 were allowed to correlate. For self-esteem, we used single-indicator latent variables, resulting in a just-identified model.

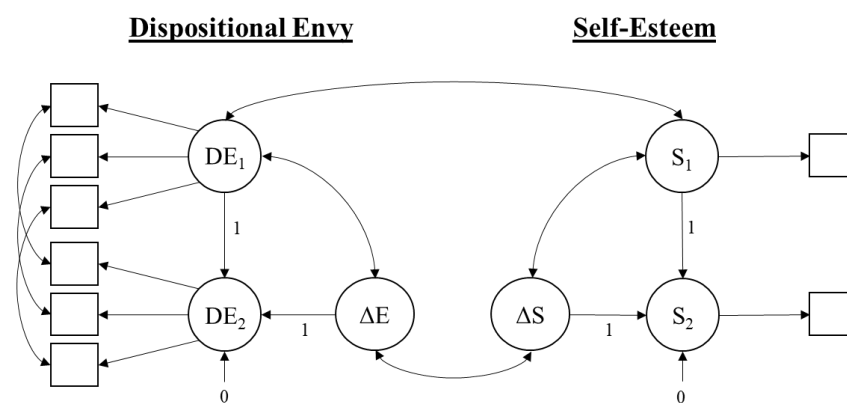
For the analysis of correlated change and cross-lagged *level on change* effects, we used bivariate LCS models (Kievit et al., 2018). In these models, we combined the univariate LCS models of dispositional envy and self-esteem into one model (see Figure 2 for a schematic representation). As in Study 1, we first computed correlations between the initial levels of dispositional envy and self-esteem and between the latent difference factors

of both measures (see Model 2a). In a second step, we added autoregressive and cross-lagged paths between the initial levels and change factors (Model 2b). Cross-lagged paths between the initial level of dispositional envy or self-esteem on change in the other construct are conceptually equivalent to the *level on change* effects investigated in Study 1. Because Study 2 had only two measurement occasions, it was not possible to examine cross-lagged *change on change* effects.

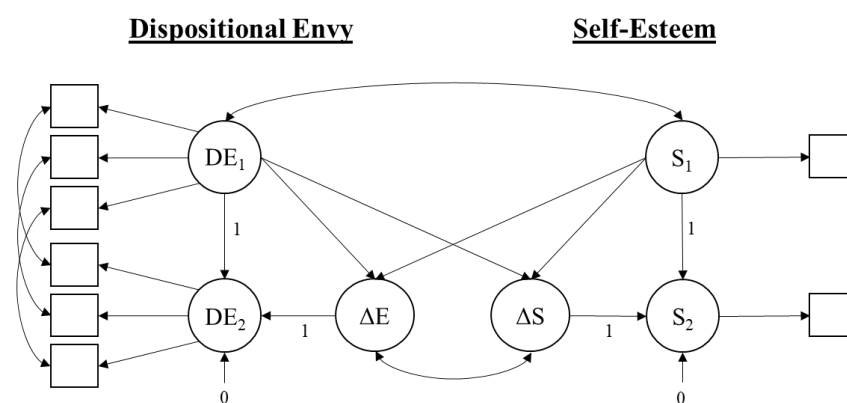
Figure 2

Bivariate Latent Change Score Model (Study 2)

2a. Correlational model



2b. Cross-lagged model



Note. DE = latent envy factors, S = latent self-esteem factors. A first set of models (2a) was purely correlational; in a second step, we added autoregressions and cross-lagged effects (2b).

Results

Measurement Invariance and Univariate Analyses

As in Study 1, we first tested the measure of global dispositional envy for invariance across time (see also Table 7). Results indicated strict invariance with minimal drops in model fit when restrictions were introduced and an excellent fit for the strict invariance model (CFI = .992, RMSEA = .040, SRMR = .029). The following analyses were based on the latent model of global dispositional envy with strict measurement invariance. Invariance tests were not feasible for self-esteem due to the use of a single-item measure.

Table 7

Model Fit Indices from Invariance Testing Across Time (Study 2)

Measures of Envy	χ^2	<i>df</i>	<i>p</i>	BIC	TLI	CFI	RMSEA	SRMR
Global Dispositional Envy								
(Configural invariance)	12.56	5	.028	59702.52	0.999	1.000	0.016	0.008
(Weak invariance)	19.35	7	.007	59691.86	0.998	0.999	0.017	0.011
(Strong invariance)	92.05	10	<.001	59738.40	0.993	0.995	0.037	0.033
(Strict invariance)	137.52	13	<.001	59757.71	0.991	0.992	0.040	0.029

Note. BIC = Bayesian Information Criterion, TLI = Tucker-Lewis Index, CFI = Comparative Fit Index, RMSEA = Root Mean Square Error of Approximation, SRMR = Standardized Root-Mean-Square Residual. *N* = 6,132.

Before the bivariate analyses, we used univariate LCS models for global dispositional envy and self-esteem in order to separately examine the mean-level change and the variance of the change in both constructs. In Table 8, we present the means and standard deviations of dispositional envy and self-esteem as estimated in the univariate LCS models. The estimated intercorrelations between the latent factors of dispositional envy and self-esteem across time are presented in Table S-2 in the Supplement.

As can be seen in Table 8, both dispositional envy and self-esteem showed significant decreases in mean levels across time, representing small effects (latent Cohen's $d = -0.129$ for global dispositional envy and $d = -0.158$ for self-esteem). Moreover, the difference factors of dispositional envy and self-esteem exhibited significant variances ($S^2 = 0.69$ and 0.36 , $ps < .001$, respectively), indicating interindividual differences in intraindividual change.

Table 8

Estimated Means, Standard Deviations, and Difference Factor Means and Variances Across Measurement Occasions (Study 2)

Measure	<i>M (SD)</i>		Difference Factor Mean	Difference Factor Variance
	Time 1	Time 2		
Global Disp. Envy	2.18 (1.06)	2.04 (1.04)	-0.14 [-0.17, -0.10], <.001	0.69 [0.64, 0.74], <.001
Self-Esteem	3.59 (0.80)	3.46 (0.84)	-0.13 [-0.16, -0.10], <.001	0.36 [0.31, 0.41], <.001

Note. $N = 6,132$ for global dispositional envy and $N = 6,122$ for self-esteem due to missing data.

Correlated Change and Prospective Effects

The bivariate LCS models of global dispositional envy and self-esteem showed excellent model fits, with CFI = .996 and RMSEA = .025 for both the correlational and cross-lagged models. Replicating previous research and our findings from Study 1, we found that global dispositional envy and self-esteem were negatively associated at baseline ($r = -.32$, 95% CI [-0.35, -.28], $p < .001$). This finding means that participants with low self-esteem were more prone to experiencing envy. Moreover, in line with the preregistration and our findings from Study 1, change in dispositional envy and change in self-esteem were negatively correlated ($r = -.19$, 90% CI [-0.25, -.13], $p < .001$). Again, this finding indicates that increases in self-esteem across time were associated with concurrent decreases in dispositional envy and vice versa.

When investigating prospective *level on change* effects between dispositional envy and self-esteem, we found that the initial level of self-esteem predicted subsequent change in dispositional envy ($b = -0.07$, 95% CI [-0.12, -0.02], $p = .010$). Participants with lower initial levels of self-esteem experienced a more pronounced increase in dispositional envy across the 6 years of assessment compared with participants with higher self-esteem levels, even when the baseline level of dispositional envy was controlled for. However, there was no significant effect of the initial level of dispositional envy on change in self-esteem ($b = -0.02$, 95% CI [-0.06, 0.01], $p = .225$).

Summary

In summary, in Study 2, we again found that global dispositional envy and self-esteem were negatively associated at baseline. Moreover, in line with our expectations, and

replicating the findings from Study 1, we found evidence of correlated change between global dispositional envy and self-esteem, indicating that increases in self-esteem were associated with concurrent decreases in dispositional envy. Regarding prospective effects, we found a significant negative *level on change* effect of self-esteem on global dispositional envy. This finding means that the lower a person's self-esteem level was at baseline, the stronger was the increase in their level of dispositional envy between measurement occasions, but not the other way around.

DISCUSSION

The aim of the present research was to investigate the longitudinal interplay of global and domain-specific dispositional envy and self-esteem. Correlated change and prospective effects between the two constructs were examined via latent change models, drawing on data from two large-scale longitudinal studies with a total sample size of more than 7,000 adult participants.

At the cross-sectional level, we found that participants who were more prone to envy tended to have lower self-esteem, as indicated by a negative correlation between dispositional envy and self-esteem in both studies. Whereas these findings replicate evidence from previous cross-sectional research (e.g., Rentzsch & Gross, 2015; Smith et al., 1999; Vrabel et al., 2018), they do not necessarily allow conclusions to be drawn about the longitudinal interplay between dispositional envy and self-esteem. In order to be able to empirically examine whether dispositional envy and self-esteem develop in unison and/or whether decreases in self-esteem lead to increases in dispositional envy or vice versa, we therefore used a longitudinal research design. In the following, we discuss the results of the longitudinal analyses in detail.

Change in Dispositional Envy is Negatively Related to Change in Self-Esteem

Across both studies and in line with our expectations, we found that change in dispositional envy was negatively associated with change in self-esteem. This correlated change indicates that when a person experiences an increase in self-esteem across time, their level of dispositional envy tends to decrease within the same time span. Crumbling self-esteem, on the other hand, seems to be associated with concomitant increases in dispositional envy. In addition to correlated change between global dispositional envy and self-esteem, we found evidence of correlated change within specific social comparison

domains. This finding means that people who become more self-confident in the academic domain tend to experience simultaneous decreases in their tendency to envy others who are perceived as more intelligent or creative. Moreover, people who grow more prone to envying others who are perceived as attractive or popular tend to suffer from simultaneous decreases in the self-esteem domains of social contact, social criticism, and physical appearance. A person's development of dispositional envy across the life span thus seems to be closely linked to their self-esteem development, both at the global level and within specific comparison domains.

Our results underpin the assumption that change in dispositional envy and self-esteem might be the consequence of similar overarching developmental principles or causal factors (e.g., third variables or life events) that exercise an influence on both constructs. For instance, one reason for the close connection between change in dispositional envy and self-esteem might be normative developmental trends that affect both constructs. In line with the maturity principle (Roberts et al., 2001, 2008), many individuals may have experienced a decrease in dispositional envy and a simultaneous increase in self-esteem while they developed greater social maturity (i.e., the capacity to become a productive member of society). According to Social Investment Theory, a person's personality matures when they adopt new social roles, such as taking on a job, having a romantic relationship, or becoming a parent (Roberts et al., 2005). Thus, entering a romantic relationship, for example, may have had a positive effect on a person's self-esteem (see also Luciano & Orth, 2017), whereas at the same time, it may have reduced the frequency of upward comparisons in the romantic domain and therefore made a person less prone to experiencing envy in the present study. Similarly, given that starting a first job has been associated with slight increases in self-esteem (Reitz et al., 2020), the transition from university to work might have had the opposite effect on a person's disposition toward envy, as a regular salary might reduce a person's tendency to envy others' financial success. The experience of taking on new social roles might thus have had an opposing impact on the development of dispositional envy and self-esteem, resulting in the correlated change that we found in the present research.

Moreover, in line with previous reports on individual differences in personality maturation (Bleidorn, 2015; Roberts & Mroczek, 2008), we also found that not all individuals experienced the same degree of personality maturation. As indicated by the significant individual differences in intraindividual change, some participants underwent

changes that were opposed to the normative developmental trend (e.g., decreases in self-esteem accompanied by increases in envy across young adulthood). These non-normative changes in dispositional envy and self-esteem might happen when an individual fails to adopt age-appropriate social roles or experiences stressful life events that interfere with developmental tasks. For instance, failing to have a romantic relationship in early adulthood is associated with declines in self-esteem (Lehnart et al., 2010) and might at the same time increase a person's tendency to envy others who have more romantic success. Moreover, stressful life events that are associated with declines in self-esteem (e.g., losing one's job; Reitz et al., 2022) might at the same time be related to increases in dispositional envy.

Our finding of a close association between envy and self-esteem development might also be explained by principles from evolutionary psychology. In this framework, envy and self-esteem have been viewed as emotional adaptations that enhance survival and reproductive success: envy by serving as a signal that one is being outperformed by others in important domains (Hill & Buss, 2008) and self-esteem by working as a sort of gauge that monitors one's social inclusion or status (Leary et al., 1995; Mahadevan et al., 2019). Following this line of argument, particularly life events that have an impact on a person's social standing might have been prominent sources of change in both dispositional envy and self-esteem. For example, receiving a promotion or an award might have led some participants to experience increases in self-esteem. At the same time, such positive events might have decreased their tendency to be envious of others' success, thereby linking the developmental trajectories of dispositional envy and self-esteem.

Our results on correlated change might also point to ongoing bidirectional influences between envy and self-esteem at the state level. As pointed out in the TESSERA framework (Wrzus & Roberts, 2017), states that are repeatedly activated together in specific situations are likely to exhibit correlated change as daily experiences that are repeated across time accumulate and are incorporated into personality development. For instance, having a critical supervisor who often compares one's performance with one's colleagues might lead to repeated situations that simultaneously activate low state self-esteem and envy of one's colleagues who receive better feedback. With increasing time, repeatedly experiencing these states together might slowly accumulate into the correlated change found in the present study.

Insecurity Might Indeed Lead to Envy but not Vice Versa

We then proceeded to investigate whether change in dispositional envy or self-esteem could be predicted by the previous level of the other construct (i.e., prospective *level on change* effect) or by antecedent change in the other construct (i.e., prospective *change on change* effect). For the global constructs, we found a significantly negative *level on change* effect of self-esteem on dispositional envy in Study 2, indicating that participants who started out with lower self-esteem levels were more likely to experience a subsequent increase in their level of dispositional envy. In Study 1, the prospective effects of dispositional envy on self-esteem failed to reach significance for the global constructs. However, we found significant negative *level on change* and *change on change* effects of self-esteem on dispositional envy in the performance domain. These findings mean that when individuals had low or decreasing self-esteem with respect to their job or school performance, they experienced a subsequent increase in competence envy (i.e., the tendency to feel envious because others are perceived as more intelligent or creative). With regard to attraction envy, most domain-specific effects were nonsignificant except for a *level on change* effect of social contact self-esteem, indicating that participants who were particularly insecure about their social skills later experienced a greater increase in attraction envy. Across both samples and all measures, we did not find any evidence of prospective effects of dispositional envy on self-esteem.

Even though prospective effects do not necessarily allow conclusions about causality, their existence might hint at a causal flow between two constructs. In the overall picture (i.e., some evidence of prospective effects of self-esteem on dispositional envy but no evidence whatsoever of prospective effects of dispositional envy on self-esteem), our findings contradicted the notion of envy having a directional effect on self-esteem. If envy indeed were an antecedent of low self-esteem (e.g., Foster, 1972; Thompson et al., 2016), we should have found that changes in a person's dispositional envy had an impact on later change in self-esteem. This was not the case; however, there was preliminary evidence of a prospective effect of self-esteem on dispositional envy. Our finding is thus in line with lay psychological perceptions as well as previous theoretical conceptualizations of envy as a consequence of low self-esteem (Salovey & Rodin, 1984; Silver & Sabini, 1978; Sullivan, 1953).

The prospective effect of self-esteem on dispositional envy might operate via different mechanisms. For instance, high or increasing self-esteem might act as a buffer against the consequences of negative feedback (Brown, 2010), thereby making negative feedback less likely to elicit envy toward others who have received more positive feedback. Moreover, there is a large body of research showing that people high in self-esteem objectively show better performance and have more success in different life domains, including romantic relationships, school achievement, and job performance (Harris & Orth, 2020; Krauss & Orth, 2022; Orth & Robins, 2022; Valentine et al., 2004). Having success in turn might leave fewer opportunities for upward comparisons and thereby reduce dispositional envy. As reflected in our analyses, this mechanism seems to be especially important in the domain of competence/performance, where success and failure might be more visible and objectifiable than in other domains due to institutionalized feedback (e.g., via grades or performance reports).

Similarly, the prospective effects of self-esteem on dispositional envy found in the present study might be mediated by changes in social comparison orientation (i.e., the trait-like tendency to engage in social comparison with others). It has been shown by previous research that individuals with low self-esteem are particularly prone to making upward comparisons (Gibbons & Buunk, 1999; Wayment & Taylor, 1995) and that upward comparisons lead to envy (Alicke & Zell, 2008; White et al., 2006). Therefore, decreases in a person's level of self-esteem might make that person more likely to engage in upward comparisons, thereby making that person more susceptible to envy. For instance, students experiencing a drop in performance self-esteem after receiving a bad grade on an essay might start to compare their grades with their fellow students more often, resulting in frequent experiences of envy when others perform better.

Strengths, Limitations, and Directions for Future Research

To our knowledge, the present research is the first to empirically investigate the longitudinal interplay of dispositional envy and self-esteem. In terms of the strength of the present research, we want to highlight that we examined our research question in two large-scale samples, one of which was representative of the German population. Both studies were preregistered. We used established measures of dispositional envy and self-esteem with excellent psychometric properties and considered the domain-specificity of both constructs in addition to a global perspective. Moreover, our modeling approach allowed

us to disentangle correlated change from prospective *level on change* and *change on change* effects, thereby providing nuanced insights into the longitudinal interplay of dispositional envy and self-esteem. As traditional cross-lagged models have been criticized for not adequately separating within-person from between-person effects and for not allowing the investigation of interindividual differences in intraindividual change (Hamaker et al., 2015; Mund & Nestler, 2019), we used bivariate latent change models where intraindividual change is represented more directly via latent difference factors.

However, the present study has some limitations. First, because our research design relied exclusively on correlational data, it allowed only limited conclusions about the causal flow between dispositional envy and self-esteem. The present paper can be seen as a first step toward establishing a causal link between dispositional envy and self-esteem. In the past, the investigation of cross-lagged effects in longitudinal designs has often been used to draw conclusions about causal effects (see Orth et al., 2021). Indeed, these designs are more informative about causality than mere cross-sectional correlations because they establish temporal order. However, the present research has weaknesses with respect to causal inference, as there are a number of alternative explanations for our results that cannot be ruled out with our research design. For instance, it might be the case that change in both constructs is caused by the same life event but that changes in self-esteem manifest more quickly than changes in dispositional envy, leading to a significant cross-lagged effect without causal implications. Future research might approach this issue with the help of experimental designs or with observational studies that are carefully designed to control for the influence of third variables (e.g., by using directed acyclic graphs; Rohrer, 2018). Assuming that the directional effect of self-esteem on dispositional envy holds across future studies, there are important implications that might be investigated in future research. As previous research has shown that envy mediates the relationship between self-esteem and hostility (Rentzsch et al., 2015), this effect might also emerge in the long term. Decreases in self-esteem might thus lead to an increase in the tendency to engage in hostile behavior, an effect that might be at least partially mediated by changes in dispositional envy. Moreover, with regard to psychotherapy, our research indicates that it might be worthwhile to include techniques that are aimed at building up self-esteem, when a patient's goal is to reduce envy (see Leahy, 2021). Psychotherapy research might thus investigate whether self-esteem training is effective for reducing envy.

Second, we had to rely on a one-item measure of self-esteem in Study 2 due to restraints on the length of the questionnaire. This measure might account for why effect sizes for the cross-sectional correlation and correlated change were slightly smaller in Study 2 than in Study 1. Even though we used latent self-esteem variables that were adjusted for the reliability of the single-item scale, the self-esteem factors in Study 2 might have included more unsystematic variance. Another reason for differences between studies might be the COVID-19 pandemic, which took place during the measurement interval of Study 2. As a severely disruptive life event, the pandemic might have caused some individuals' levels of dispositional envy and self-esteem to change in unusual ways, thereby diminishing the correlated change. This explanation is underpinned by the unexpected and rather unusual decrease in the mean level of self-esteem found in Study 2.

Third, although our research shows that the development of dispositional envy is closely connected to self-esteem development, mechanisms guiding the longitudinal interplay between these two constructs remain unclear. Whereas we referred to personality maturation and life events as possible explanations for correlated change, future research should examine the simultaneous impact of life events and role transitions on both constructs (e.g., a pay raise, retirement, or a new relationship). Moreover, as both constructs have been connected to frequent upward comparisons, the role that social comparison orientation plays in the development of dispositional envy and self-esteem should be investigated. For instance, low self-esteem might lead to high levels of dispositional envy by increasing a person's social comparison orientation.

Last, with time intervals between measurement occasions ranging from 2 to 6 years, the present research investigated the interplay of dispositional envy and self-esteem at the trait level. Given previous evidence indicating that changes in dispositional envy and self-esteem unfold rather slowly (Erz & Rentzsch, 2022; Rentzsch & Schröder-Abé, 2022; Wagner et al., 2023), we chose time intervals of several years in order to investigate correlated change and prospective effects. However, correlated change and directional effects between envy and self-esteem might appear not only at the trait level but also at the state level if smaller time intervals are investigated. For instance, a person's momentary loss of self-esteem following a failure in their everyday life might instantly lead to feelings of state envy directed at another person who is more successful. Future research should investigate the short-term dynamics of envy and self-esteem, for instance, by using state measures of envy and self-esteem in an experience sampling or daily diary study.

Moreover, whereas the present research relied on adult samples, it might be interesting to investigate the relationship between the developmental trajectories of dispositional envy and self-esteem during developmental stages in which personality might be especially susceptible to change (e.g., adolescence and old age). Similarly, future research should investigate the longitudinal interplay of dispositional envy and self-esteem in childhood, when stable individual differences in these two constructs first emerge.

Conclusion

Even though theoretical accounts have pointed to a close association between envy and self-esteem for many decades, the longitudinal interplay between the two constructs has never been investigated. The present study extends prior research on the association between dispositional envy and self-esteem by examining these relationships longitudinally across 6 years of assessment. Our results from two different samples indicate that dispositional envy and self-esteem change in concert, such that intraindividual increases in dispositional envy are accompanied by decreases in self-esteem and vice versa. Moreover, there was preliminary evidence of prospective effects of self-esteem on dispositional envy, suggesting a possible causal flow between the two constructs. By showing that insecurity might indeed lead to envy, our findings advance the understanding of the complex interplay between dispositional envy and self-esteem.

FOOTNOTES

¹ The preregistration was uploaded to the Open Science Framework on July 17, 2019 before data were collected for Time 3. Data from Time 2 had been collected but not analyzed prior to the preregistration. As the preregistration belongs to an overarching project, only some of the methods and analyses specified in the preregistration were used in the present paper.

² Data from the SELF study were analyzed and reported in the following papers: Rentzsch and Gross (2015; cross-sectional data on dispositional envy and self-esteem from Time 1), Erz and Rentzsch (2022; data on dispositional envy from Time 1-3), Rentzsch and Schröder-Abé (2018; data on self-esteem from Time 1), Rentzsch and Schröder-Abé (2022; data on self-esteem from Time 1-3), and Jung et al. (2022; data on narcissism and self-esteem from Time 1-3). Data on the longitudinal interplay of dispositional envy and self-esteem have not been reported in any previous paper.

³ The planned sample size was 500 participants per wave based on considerations regarding the size and previous response rates of the participant pool. At the time of the preregistration, the participant pool contained about 2,000 e-mail addresses from volunteers. The response rate in the first two waves of data collection was around 25%.

⁴ In line with the preregistration, we used bivariate True Intraindividual Change Models (TICM) to examine the longitudinal interplay of dispositional envy and self-esteem. However, the two-step procedure (i.e., the specification of merely a correlational model followed by a model with cross-lagged effects) was not preregistered as such.

⁵ The sample size of Study 2 was determined by the GESIS panel.

OPEN SCIENCE STATEMENT

For Study 1, open science material including codebooks, data, and analysis code can be accessed at https://osf.io/5jvcx/?view_only=c8356273953f47e7bb0277cf8d7e16d1. For Study 2, the analysis code is available on the OSF (https://osf.io/5jvcx/?view_only=c8356273953f47e7bb0277cf8d7e16d1). We are not allowed to publicly share the data; however, researchers can apply for free data access via <https://www.gesis.org/en/gesis-panel/data>. The Study 2 codebook, wave reports, and study descriptions can be accessed via <https://www.gesis.org/en/gesis-panel/documentation/>.

REFERENCES

- Alicke, M. D., & Zell, E. (2008). Social comparison and envy. In R. H. Smith (Ed.), *Envy: Theory and research* (pp. 73–93). Oxford University Press. <https://doi.org/10.1093/acprof:oso/9780195327953.003.0005>
- Appel, H., Crusius, J., & Gerlach, A. L. (2015). Social comparison, envy, and depression on Facebook: A study looking at the effects of high comparison standards on depressed individuals. *Journal of Social and Clinical Psychology*, 34(4), 277–289. <https://doi.org/10.1521/jscp.2015.34.4.277>
- Barth, F. D. (1988). The role of self-esteem in the experience of envy. *The American Journal of Psychoanalysis*, 48(3), 198–210. <https://doi.org/10.1007/BF01252843>
- Baumeister, R. F. (1998). The self. In S. T. Gilbert, S. T. Fiske, & G. Lindzey (Eds.), *The handbook of social psychology* (pp. 680–740). McGraw.
- Behler, A. M. C., Wall, C. S., Bos, A., & Green, J. D. (2020). To help or to harm? Assessing the impact of envy on prosocial and antisocial behaviors. *Personality and Social Psychology Bulletin*, 46(7), 1156–1168. <https://doi.org/10.1177/0146167219897660>
- Bleidorn, W. (2015). What accounts for personality maturation in early adulthood? *Current Directions in Psychological Science*, 24(3), 245–252. <https://doi.org/10.1177/0963721414568662>
- Bollen, K. A., & Curran, P. J. (2006). *Latent curve models: A structural equation perspective*. John Wiley & Sons.
- Bosnjak, M., Dannwolf, T., Enderle, T., Schaurer, I., Struminskaya, B., Tanner, A., & Weyandt, K. W. (2018). Establishing an open probability-based mixed-mode panel of the general population in Germany: The GESIS panel. *Social Science Computer Review*, 36(1), 103–115. <https://doi.org/10.1177/0894439317697949>
- Brailovskaia, J., & Margraf, J. (2020). How to measure self-esteem with one item? Validation of the German single-item self-esteem scale (G-SISE). *Current Psychology*, 39(6), 2192–2202. <https://doi.org/10.1007/s12144-018-9911-x>

- Brown, J. D. (2010). High self-esteem buffers negative feedback: Once more with feeling. *Cognition and Emotion*, 24(8), 1389–1404. <https://doi.org/10.1080/02699930903504405>
- Brown, T. A. (2006). *Confirmatory factor analysis for applied research*. Guilford Press.
- Chae, J. (2018). Explaining females' envy toward social media influencers. *Media Psychology*, 21(2), 246–262. <https://doi.org/10.1080/15213269.2017.1328312>
- Cheung, G. W., & Rensvold, R. B. (2002). Evaluating goodness-of-fit indexes for testing measurement invariance. *Structural Equation Modeling*, 9(2), 233–255. https://doi.org/10.1207/S15328007SEM0902_5
- Cohen-Charash, Y., & Mueller, J. S. (2007). Does perceived unfairness exacerbate or mitigate interpersonal counterproductive work behaviors related to envy? *Journal of Applied Psychology*, 92(3), 666–680. <https://doi.org/10.1037/0021-9010.92.3.666>
- Coopersmith, S. (1967). *The antecedents of self-esteem*. Freeman.
- Crusius, J., Thierhoff, J., & Lange, J. (2021). Dispositional greed predicts benign and malicious envy. *Personality and Individual Differences*, 168, 110361. <https://doi.org/10.1016/j.paid.2020.110361>
- DelPriore, D. J., Hill, S. E., & Buss, D. M. (2012). Envy: Functional specificity and sex-differentiated design features. *Personality and Individual Differences*, 53(3), 317–322. <https://doi.org/10.1016/j.paid.2012.03.029>
- Duffy, M. K., Scott, K. L., Shaw, J. D., Tepper, B. J., & Aquino, K. (2012). A social context model of envy and social undermining. *Academy of Management Journal*, 55(3), 643–666. <https://doi.org/10.5465/amj.2009.0804>
- Enders, C. K. (2010). *Applied missing data analysis*. Guilford Press.
- Erz, E., & Rentzsch, K. (2022). Stability and change in dispositional envy: Longitudinal evidence on envy as a stable trait. *European Journal of Personality*. Advance online publication. <https://doi.org/10.1177/08902070221128137>
- Fiske, S. T. (2010). Envy up, scorn down: How comparison divides us. *American Psychologist*, 65(8), 698–706. <https://doi.org/10.1037/0003-066X.65.8.698>

- Fleming, J. S., & Courtney, B. E. (1984). The dimensionality of self-esteem: II. Hierarchical facet model for revised measurement scales. *Journal of Personality and Social Psychology*, 46(2), 404–421. <https://doi.org/10.1037/0022-3514.46.2.404>
- Foster, G. M. (1972). The anatomy of envy: A study in symbolic behavior. *Current Anthropology*, 13(2), 165–202. <https://doi.org/10.1086/201267>
- Geiser, C. (2020). *Longitudinal structural equation modeling with Mplus: A latent state-trait perspective*. Guilford Publications.
- GESIS. (2023). *GESIS panel—Standard edition* (GESIS data archive ZA5665; version 47.0.0) [dataset]. <https://doi.org/10.4232/1.14035>
- Gibbons, F. X., & Buunk, B. P. (1999). Individual differences in social comparison: Development of a scale of social comparison orientation. *Journal of Personality and Social Psychology*, 76(1), 129–142. <https://doi.org/10.1037/0022-3514.76.1.129>
- Hamaker, E. L., Kuiper, R. M., & Grasman, R. P. (2015). A critique of the cross-lagged panel model. *Psychological Methods*, 20(1), 102–116. <https://doi.org/10.1037/a0038889>
- Harris, M. A., & Orth, U. (2020). The link between self-esteem and social relationships: A meta-analysis of longitudinal studies. *Journal of Personality and Social Psychology*, 119(6), 1459–1477. <https://doi.org/10.1037/pspp0000265>
- Heider, F. (1958). *The psychology of interpersonal relations*. John Wiley.
- Henniger, N. E., & Harris, C. R. (2015). Envy across adulthood: The what and the who. *Basic and Applied Social Psychology*, 37(6), 303–318. <https://doi.org/10.1080/01973533.2015.1088440>
- Hill, S. E., & Buss, D. M. (2008). The evolutionary psychology of envy. In R. H. Smith (Ed.), *Envy: Theory and research*. (pp. 60–70). Oxford University Press. <https://doi.org/10.1093/acprof:oso/9780195327953.003.0004>
- Jung, J., Rentzsch, K., & Schröder-Abé, M. (2022). The development and correlated change of narcissism and self-esteem in adulthood. *European Journal of Personality*. Advance online publication. <https://doi.org/10.1177/08902070221134410>

- Kievit, R. A., Brandmaier, A. M., Ziegler, G., Van Harmelen, A.-L., de Mooij, S. M., Moutoussis, M., Goodyer, I. M., Bullmore, E., Jones, P. B., & Fonagy, P. (2018). Developmental cognitive neuroscience using latent change score models: A tutorial and applications. *Developmental Cognitive Neuroscience*, 33, 99–117. <https://doi.org/10.1016/j.dcn.2017.11.007>
- Krauss, S., & Orth, U. (2022). Work experiences and self-esteem development: A meta-analysis of longitudinal studies. *European Journal of Personality*, 36(6), 849–869. <https://doi.org/10.1177/08902070211027142>
- Lange, J., & Crusius, J. (2015). Dispositional envy revisited: Unraveling the motivational dynamics of benign and malicious envy. *Personality and Social Psychology Bulletin*, 41(2), 284–294. <https://doi.org/10.1177/0146167214564959>
- Lange, J., Weidman, A. C., & Crusius, J. (2018). The painful duality of envy: Evidence for an integrative theory and a meta-analysis on the relation of envy and schadenfreude. *Journal of Personality and Social Psychology*, 114(4), 572–598. <https://doi.org/10.1037/pspi0000118>
- Leahy, R. L. (2021). Cognitive-behavioral therapy for envy. *Cognitive Therapy and Research*, 45(3), 418–427. <https://doi.org/10.1007/s10608-020-10135-y>
- Leary, M. R., Tambor, E. S., Terdal, S. K., & Downs, D. L. (1995). Self-esteem as an interpersonal monitor: The sociometer hypothesis. *Journal of Personality and Social Psychology*, 68(3), 518–530. <https://doi.org/10.1037/0022-3514.68.3.518>
- Lehnart, J., Neyer, F. J., & Eccles, J. (2010). Long-term effects of social investment: The case of partnering in young adulthood. *Journal of Personality*, 78(2), 639–670. <https://doi.org/10.1111/j.1467-6494.2010.00629.x>
- Little, T. D., Cunningham, W. A., Shahar, G., & Widaman, K. F. (2002). To parcel or not to parcel: Exploring the question, weighing the merits. *Structural Equation Modeling*, 9(2), 151–173. https://doi.org/10.1207/S15328007SEM0902_1
- Luciano, E. C., & Orth, U. (2017). Transitions in romantic relationships and development of self-esteem. *Journal of Personality and Social Psychology*, 112(2), 307–328. <https://doi.org/10.1037/pspp0000109>

- Mahadevan, N., Gregg, A. P., & Sedikides, C. (2019). Is self-regard a sociometer or a hierometer? Self-esteem tracks status and inclusion, narcissism tracks status. *Journal of Personality and Social Psychology*, 116(3), 444–466. <https://doi.org/10.1037/pspp0000189>
- Marsh, H. W., Trautwein, U., Lüdtke, O., Köller, O., & Baumert, J. (2006). Integration of multidimensional self-concept and core personality constructs: Construct validation and relations to well-being and achievement. *Journal of Personality*, 74(2), 403–456. <https://doi.org/10.1111/j.1467-6494.2005.00380.x>
- McArdle, J. J. (2009). Latent variable modeling of differences and changes with longitudinal data. *Annual Review of Psychology*, 60, 577–605. <https://doi.org/10.1146/annurev.psych.60.110707.163612>
- McArdle, J. J., & Hamagami, F. (2001). Latent difference score structural models for linear dynamic analyses with incomplete longitudinal data. In L. M. Collins & A. G. Sayer (Eds.), *New methods for the analysis of change* (pp. 139–175). American Psychological Association.
- McWilliams, M. A., Nier, J. A., & Singer, J. A. (2013). The implicit self and the specificity-matching principle: Implicit self-concept predicts domain-specific outcomes. *Personality and Individual Differences*, 54(4), 474–478. <https://doi.org/10.1016/j.paid.2012.09.014>
- Meredith, W. (1993). Measurement invariance, factor analysis and factorial invariance. *Psychometrika*, 58(4), 525–543. <https://doi.org/10.1007/bf02294825>
- Miceli, M., & Castelfranchi, C. (2007). The envious mind. *Cognition and Emotion*, 21(3), 449–479. <https://doi.org/10.1080/02699930600814735>
- Michel, Y. A., Steinmayr, R., Frenzel, A. C., & Ziegler, M. (2022). Unpacking domain-specific achievement motivation: The role of contextualising items for test-criterion correlations. *Educational Psychology*, 42(4), 501–525. <https://doi.org/10.1080/01443410.2020.1713303>
- Mund, M., & Nestler, S. (2019). Beyond the cross-lagged panel model: Next-generation statistical tools for analyzing interdependencies across the life course. *Advances in Life Course Research*, 41, 100249. <https://doi.org/10.1016/j.alcr.2018.10.002>

- Muthén, L. K., & Muthén, B. O. (1998-2019). *Mplus user's guide* (8th ed.). Muthén & Muthén.
- Ng, J. C., Au, A. K., Wong, H. S., Sum, C. K., & Lau, V. C. (2021). Does dispositional envy make you flourish more (or less) in life? An examination of its longitudinal impact and mediating mechanisms among adolescents and young adults. *Journal of Happiness Studies*, 22(3), 1089–1117. <https://doi.org/10.1007/s10902-020-00265-1>
- Orth, U., Clark, D. A., Donnellan, M. B., & Robins, R. W. (2021). Testing prospective effects in longitudinal research: Comparing seven competing cross-lagged models. *Journal of Personality and Social Psychology*, 120(4), 1013–1034. <https://doi.org/10.1037/pspp0000358>
- Orth, U., & Robins, R. W. (2014). The development of self-esteem. *Current Directions in Psychological Science*, 23(5), 381–387. <https://doi.org/10.1177/0963721414547414>
- Orth, U., & Robins, R. W. (2022). Is high self-esteem beneficial? Revisiting a classic question. *American Psychologist*, 77(1), 5–17. <https://doi.org/10.1037/amp0000922>
- Orth, U., Robins, R. W., & Widaman, K. F. (2012). Life-span development of self-esteem and its effects on important life outcomes. *Journal of Personality and Social Psychology*, 102(6), 1271–1288. <https://doi.org/10.1037/a0025558>
- Orth, U., Trzesniewski, K. H., & Robins, R. W. (2010). Self-esteem development from young adulthood to old age: A cohort-sequential longitudinal study. *Journal of Personality and Social Psychology*, 98(4), 645–658. <https://doi.org/10.1037/a0018769>
- Parrott, W. G., & Smith, R. H. (1993). Distinguishing the experiences of envy and jealousy. *Journal of Personality and Social Psychology*, 64(6), 906–920. <https://doi.org/10.1037/0022-3514.64.6.906>
- Reitz, A. K., Luhmann, M., Bleidorn, W., & Denissen, J. J. (2022). Unraveling the complex relationship between work transitions and self-esteem and life satisfaction. *Journal of Personality and Social Psychology*, 123(3), 597–620. <https://doi.org/10.1037/pspp0000423>

- Reitz, A. K., Shrout, P. E., Denissen, J. J., Dufner, M., & Bolger, N. (2020). Self-esteem change during the transition from university to work. *Journal of Personality*, 88(4), 689–702. <https://doi.org/10.1111/jopy.12519>
- Rentzsch, K. (2021). *Self-Evaluations Across Life (SELF) study*. <https://osf.io/je924>
- Rentzsch, K., Erz, E., & Schütz, A. (2022). Development of short and ultra-short forms of the Multidimensional Self-Esteem Scale: Relations to the Big Five, narcissism, and academic achievement in adults and adolescents. *European Journal of Psychological Assessment*, 38(4), 270–281. <https://doi.org/10.1027/1015-5759/a000660>
- Rentzsch, K., & Gross, J. J. (2015). Who turns green with envy? Conceptual and empirical perspectives on dispositional envy. *European Journal of Personality*, 29(5), 530–547. <https://doi.org/10.1002/per.2012>
- Rentzsch, K., & Schröder-Abé. (2022). Top down or bottom up? Evidence from the longitudinal development of global and domain-specific self-esteem in adulthood. *Journal of Personality and Social Psychology*, 122(4), 714–730. <https://doi.org/10.1037/pspp0000393>
- Rentzsch, K., & Schröder-Abé, M. (2018). Stability and change in domain-specific self-esteem and global self-esteem. *European Journal of Personality*, 32(4), 353–370. <https://doi.org/10.1002/per.2167>
- Rentzsch, K., Schröder-Abé, M., & Schütz, A. (2015). Envy mediates the relation between low academic self-esteem and hostile tendencies. *Journal of Research in Personality*, 58, 143–153. <https://doi.org/10.1016/j.jrp.2015.08.001>
- Rentzsch, K., Wenzler, M. P., & Schütz, A. (2016). The structure of multidimensional self-esteem across age and gender. *Personality and Individual Differences*, 88, 139–147. <https://doi.org/10.1016/j.paid.2015.09.012>
- Roberts, B. W., Caspi, A., & Moffitt, T. E. (2001). The kids are alright: Growth and stability in personality development from adolescence to adulthood. *Journal of Personality and Social Psychology*, 81(4), 670–683. <https://doi.org/10.1037/0022-3514.81.4.670>

- Roberts, B. W., & Mroczek, D. (2008). Personality trait change in adulthood. *Current Directions in Psychological Science*, 17(1), 31–35. <https://doi.org/10.1111/j.1467-8721.2008.00543.x>
- Roberts, B. W., Wood, D., & Caspi, A. (2008). The development of personality traits in adulthood. In O. P. John, R. W. Robins, & L. A. Pervin (Eds.), *Handbook of personality: Theory and research* (pp. 375–398). The Guilford Press.
- Roberts, B. W., Wood, D., & Smith, J. L. (2005). Evaluating Five Factor Theory and social investment perspectives on personality trait development. *Journal of Research in Personality*, 39(1), 166–184. <https://doi.org/10.1016/j.jrp.2004.08.002>
- Robins, R. W., Hendin, H. M., & Trzesniewski, K. H. (2001). Measuring global self-esteem: Construct validation of a single-item measure and the Rosenberg Self-Esteem Scale. *Personality and Social Psychology Bulletin*, 27(2), 151–161. <https://doi.org/10.1177/0146167201272002>
- Rohrer, J. M. (2018). Thinking clearly about correlations and causation: Graphical causal models for observational data. *Advances in Methods and Practices in Psychological Science*, 1(1), 27–42. <https://doi.org/10.1177/2515245917745629>
- Rosenberg, M. (1965). *Society and the adolescent self-image*. Princeton University Press.
- Salovey, P., & Rodin, J. (1984). Some antecedents and consequences of social-comparison jealousy. *Journal of Personality and Social Psychology*, 47(4), 780–792. <https://doi.org/10.1037/0022-3514.47.4.780>
- Salovey, P., & Rodin, J. (1991). Provoking jealousy and envy: Domain relevance and self-esteem threat. *Journal of Social and Clinical Psychology*, 10(4), 395–413. <https://doi.org/10.1521/jscp.1991.10.4.395>
- Schütz, A., Rentzsch, K., & Sellin, I. (2016). *Multidimensionale Selbstwertkala* (2. überarb. neunorm. Aufl.) [Multidimensional Self-Esteem Scale (2nd ed.)]. Hogrefe.
- Shavelson, R. J., Hubner, J. J., & Stanton, G. C. (1976). Self-concept: Validation of construct interpretations. *Review of Educational Research*, 46(3), 407–441. <https://doi.org/10.3102/00346543046003407>
- Silver, M., & Sabini, J. P. (1978). The perception of envy. *Social Psychology*, 41(2), 105–117. <https://doi.org/10.2307/3033570>

- Smith, R. H., & Kim, S. H. (2007). Comprehending envy. *Psychological Bulletin*, 133(1), 46–64. <https://doi.org/10.1037/0033-2909.133.1.46>
- Smith, R. H., Parrott, W. G., Diener, E. F., Hoyle, R. H., & Kim, S. H. (1999). Dispositional envy. *Personality and Social Psychology Bulletin*, 25(8), 1007–1020. <https://doi.org/10.1177/01461672992511008>
- Smith, R. H., Turner, T. J., Garonzik, R., Leach, C. W., Urch-Druskat, V., & Weston, C. M. (1996). Envy and Schadenfreude. *Personality and Social Psychology Bulletin*, 22(2), 158–168. <https://doi.org/10.1177/0146167296222005>
- Sowislo, J. F., & Orth, U. (2013). Does low self-esteem predict depression and anxiety? A meta-analysis of longitudinal studies. *Psychological Bulletin*, 139(1), 213–240. <https://doi.org/10.1037/a0028931>
- Steyer, R., Eid, M., & Schwenkmezger, P. (1997). Modeling true intraindividual change: True change as a latent variable. *Methods of Psychological Research Online*, 2(1), 21–33.
- Stinson, D. A., Logel, C., Zanna, M. P., Holmes, J. G., Cameron, J. J., Wood, J. V., & Spencer, S. J. (2008). The cost of lower self-esteem: Testing a self-and social-bonds model of health. *Journal of Personality and Social Psychology*, 94(3), 412–428. <https://doi.org/10.1037/0022-3514.94.3.412>
- Sullivan, H. S. (1953). *The interpersonal theory of psychiatry*. Norton.
- Swann Jr, W. B., Chang-Schneider, C., & Larsen McClarty, K. (2007). Do people's self-views matter? Self-concept and self-esteem in everyday life. *American Psychologist*, 62(2), 84–94. <https://doi.org/10.1037/0003-066X.62.2.84>
- Takahashi, H., Kato, M., Matsuura, M., Mobbs, D., Suhara, T., & Okubo, Y. (2009). When your gain is my pain and your pain is my gain: Neural correlates of envy and schadenfreude. *Science*, 323(5916), 937–939. <https://doi.org/10.1126/science.1165604>
- Thompson, G., Glasø, L., & Martinsen, Ø. (2016). Antecedents and consequences of envy. *The Journal of Social Psychology*, 156(2), 139–153. <https://doi.org/10.1080/00224545.2015.1047439>

- Valentine, J. C., DuBois, D. L., & Cooper, H. (2004). The relation between self-beliefs and academic achievement: A meta-analytic review. *Educational Psychologist*, 39(2), 111–133. https://doi.org/10.1207/s15326985ep3902_3
- van de Ven, N. (2017). Envy and admiration: Emotion and motivation following upward social comparison. *Cognition and Emotion*, 31(1), 193–200. <https://doi.org/10.1080/02699931.2015.1087972>
- van de Ven, N., & Zeelenberg, M. (2020). Envy and social comparison. In J. Suls, R. L. Collins, & L. Wheeler (Eds.), *Social comparison, judgment, and behavior* (pp. 226–250). Oxford University Press.
- von Collani, G., & Herzberg, P. Y. (2003). Eine revidierte Fassung der deutschsprachigen Skala zum Selbstwertgefühl von Rosenberg. *Zeitschrift für Differentielle und Diagnostische Psychologie*, 24(1), 3–7. <https://doi.org/10.1024//0170-1789.24.1.3>
- Vrabel, J. K., Zeigler-Hill, V., & Southard, A. C. (2018). Self-esteem and envy: Is state self-esteem instability associated with the benign and malicious forms of envy? *Personality and Individual Differences*, 123, 100–104. <https://doi.org/10.1016/j.paid.2017.11.001>
- Wagner, J., Wieczorek, L. L., & Brandt, N. D. (2023). Boosting yourself? Associations between momentary self-esteem, daily social interactions, and self-esteem development in late adolescence and late adulthood. *Journal of Personality and Social Psychology*. Advance online publication. <https://doi.org/10.1037/pspp0000481>
- Wayment, H. A., & Taylor, S. E. (1995). Self-evaluation processes: Motives, information use, and self-esteem. *Journal of Personality*, 63(4), 729–757. <https://doi.org/10.1111/j.1467-6494.1995.tb00315.x>
- White, J. B., Langer, E. J., Yariv, L., & Welch, J. C. (2006). Frequent social comparisons and destructive emotions and behaviors: The dark side of social comparisons. *Journal of Adult Development*, 13(1), 36–44. <https://doi.org/10.1007/s10804-006-9005-0>

- Wittmann, W. W. (1988). Multivariate reliability theory. In J. R. Nesselroade & R. B. Cattell (Eds.), *Handbook of multivariate experimental psychology* (pp. 505–560). Plenum.
https://doi.org/10.1007/978-1-4613-0893-5_16
- Wrzus, C., & Roberts, B. W. (2017). Processes of personality development in adulthood: The TESSERA framework. *Personality and Social Psychology Review*, 21(3), 253–277. <https://doi.org/10.1177/1088868316652279>

SUPPLEMENT

Table S-1

Estimated Intercorrelations Between Latent Factors of Dispositional Envy and Self-Esteem Across Time (Study 1)

Part I										
Measure	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
1. Global Envy T1	1									
2. Global Envy T2	.82	1								
3. Global Envy T3	.81	.85	1							
4. Attraction Envy T1	.96	.79	.78	1						
5. Attraction Envy T2	.79	.97	.82	.76	1					
6. Attraction Envy T3	.79	.82	.97	.76	.79	1				
7. Competence Envy T1	.86	.71	.69	.83	.68	.68	1			
8. Competence Envy T2	.72	.87	.74	.69	.84	.72	.62	1		
9. Competence Envy T3	.71	.74	.87	.68	.71	.85	.61	.64	1	
10. Wealth Envy T1	.75	.61	.61	.72	.59	.59	.64	.54	.53	1
11. Wealth Envy T2	.66	.80	.68	.63	.78	.66	.57	.70	.59	.49
12. Wealth Envy T3	.62	.65	.77	.60	.63	.75	.53	.57	.67	.47
13. Global SE T1	-.59	-.52	-.44	-.57	-.50	-.43	-.51	-.45	-.39	-.44
14. Global SE T2	-.53	-.64	-.53	-.51	-.62	-.52	-.46	-.56	-.46	-.40
15. Global SE T3	-.48	-.56	-.65	-.46	-.54	-.63	-.41	-.49	-.56	-.36
16. Social Contact SE T1	-.56	-.52	-.46	-.54	-.51	-.45	-.48	-.46	-.40	-.42
17. Social Contact SE T2	-.54	-.64	-.53	-.52	-.62	-.52	-.46	-.56	-.47	-.40
18. Social Contact SE T3	-.50	-.55	-.62	-.48	-.53	-.60	-.43	-.48	-.54	-.38
19. Social Criticism SE T1	-.76	-.61	-.51	-.73	-.59	-.50	-.65	-.53	-.45	-.57
20. Social Criticism SE T2	-.67	-.78	-.64	-.64	-.75	-.62	-.57	-.68	-.56	-.50
21. Social Criticism SE T3	-.65	-.70	-.80	-.63	-.67	-.78	-.56	-.61	-.70	-.49
22. Performance SE T1	-.50	-.44	-.37	-.48	-.43	-.36	-.43	-.39	-.32	-.38
23. Performance SE T2	-.45	-.60	-.48	-.43	-.58	-.46	-.39	-.52	-.42	-.34
24. Performance SE T3	-.47	-.56	-.60	-.45	-.54	-.59	-.40	-.48	-.53	-.35
25. Physical Appear. SE T1	-.54	-.44	-.34	-.51	-.42	-.33	-.46	-.38	-.30	-.40
26. Physical Appear. SE T2	-.46	-.55	-.38	-.44	-.53	-.37	-.40	-.48	-.33	-.35
27. Physical Appear. SE T3	-.45	-.45	-.50	-.43	-.43	-.49	-.39	-.39	-.44	-.34
28. Physical Ability SE T1	-.41	-.37	-.32	-.40	-.36	-.32	-.35	-.32	-.28	-.31
29. Physical Ability SE T2	-.41	-.49	-.42	-.39	-.48	-.41	-.35	-.43	-.37	-.31
30. Physical Ability SE T3	-.36	-.41	-.44	-.35	-.39	-.43	-.31	-.36	-.39	-.27

Part II										
Measure	11.	12.	13.	14.	15.	16.	17.	18.	19.	20.
11. Wealth Envy T2	1									
12. Wealth Envy T3	.52	1								
13. Global SE T1	-.41	-.34	1							
14. Global SE T2	-.51	-.41	.82	1						
15. Global SE T3	-.45	-.50	.75	.85	1					
16. Social Contact SE T1	-.42	-.35	.64	.56	.52	1				
17. Social Contact SE T2	-.52	-.41	.58	.65	.60	.90	1			
18. Social Contact SE T3	-.44	-.48	.57	.57	.70	.85	.87	1		
19. Social Criticism SE T1	-.49	-.39	.75	.63	.52	.65	.60	.54	1	
20. Social Criticism SE T2	-.63	-.49	.62	.75	.62	.59	.74	.62	.81	1
21. Social Criticism SE T3	-.56	-.62	.61	.68	.76	.56	.60	.71	.74	.86
22. Performance SE T1	-.36	-.28	.80	.63	.61	.52	.51	.44	.66	.53
23. Performance SE T2	-.48	-.37	.63	.80	.69	.48	.59	.49	.52	.69
24. Performance SE T3	-.45	-.46	.68	.71	.82	.44	.54	.58	.52	.58
25. Physical Appear. SE T1	-.35	-.26	.61	.54	.53	.54	.49	.48	.52	.43
26. Physical Appear. SE T2	-.44	-.29	.49	.66	.57	.47	.55	.50	.43	.54
27. Physical Appear. SE T3	-.36	-.39	.48	.56	.66	.46	.47	.58	.37	.43
28. Physical Ability SE T1	-.30	-.25	.49	.44	.35	.49	.47	.38	.46	.41
29. Physical Ability SE T2	-.40	-.32	.42	.52	.44	.41	.49	.45	.40	.49
30. Physical Ability SE T3	-.33	-.34	.41	.52	.55	.47	.48	.52	.37	.42
Part III										
Measure	21.	22.	23.	24.	25.	26.	27.	28.	29.	30.
21. Social Criticism SE T3	1									
22. Performance SE T1	.51	1								
23. Performance SE T2	.62	.72	1							
24. Performance SE T3	.71	.78	.83	1						
25. Physical Appear. SE T1	.37	.47	.35	.36	1					
26. Physical Appear. SE T2	.43	.37	.46	.41	.80	1				
27. Physical Appear. SE T3	.51	.36	.37	.50	.81	.87	1			
28. Physical Ability SE T1	.34	.38	.35	.33	.59	.48	.45	1		
29. Physical Ability SE T2	.48	.36	.44	.41	.46	.62	.51	.81	1	
30. Physical Ability SE T3	.49	.34	.44	.45	.56	.63	.66	.80	.86	1

Note. SE = self-esteem. T1 = Time 1 (2013); T2 = Time 2 (2017); T3 = Time 3 (2019). $N = 1,254$.

All $ps < .001$.

Table S-2

Estimated Intercorrelations Between Latent Factors of Dispositional Envy and Self-Esteem Across Time (Study 2)

	Global Envy T1	Global Envy T2	Self-Esteem T1	Self-Esteem T2
Global Dispositional Envy Time 1	-			
Global Dispositional Envy Time 2	.68	-		
Self-Esteem Time 1	-.32	-.27	-	
Self-Esteem Time 2	-.26	-.32	.73	-

Note. T1 = Time 1 (2015/2016); T2 = Time 2 (2022). $N = 6,134$.
All $ps < .001$.

ARTICLE 3:
VACCINE ENVY DURING THE COVID-19 PANDEMIC

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ABSTRACT

The term *vaccine envy* (i.e., envy experienced when others are given the opportunity to receive a COVID-19 vaccine) was coined during the COVID-19 pandemic and has received media attention. This study is the first to systematically investigate vaccine envy. In two preregistered online surveys conducted in May 2021 ($N = 1,174$) and October/November 2021 ($N = 535$), we collected data from vaccinated and unvaccinated German participants, including measures of vaccine envy, well-being, personal experiences during the pandemic, and various trait constructs (e.g., justice sensitivity and self-esteem). We found that in May 2021, 47% of participants experienced vaccine envy at least sometimes and that vaccine envy was connected to victim sensitivity, subjective perceptions of being threatened by the pandemic, and an increased willingness to be vaccinated. By November 2021, however, vaccine envy among unvaccinated participants had almost disappeared. Our findings advance the understanding of the psychological impact of the COVID-19 pandemic.

Keywords: envy, COVID-19, vaccine, justice sensitivity, deservingness

INTRODUCTION

Disrupting our everyday lives and confronting us with existential fears, the COVID-19 pandemic has had manifold effects on our psyches. The start of the vaccination campaign was eagerly awaited by the public and raised hopes that people's lives might soon return to normal. However, as was true for many countries, COVID-19 vaccines in Germany remained in short supply throughout the first half of 2021 (Robert-Koch-Institut, 2022). Due to the shortage, many people, especially the young and healthy, had to wait for months before they could get vaccinated.

The term *vaccine envy* was coined in this first phase of the vaccination campaign. It refers to envy experienced as a reaction to others getting the opportunity to receive a COVID-19 vaccine. At the time of this writing, the German term for vaccine envy ("Impfneid") generated more than 13,000 search results on Google. However, even though countless media reports during the first months of the vaccination campaign suggested that vaccine envy was widespread, empirical data on vaccine envy remains scarce.

We believe that vaccine envy might have important implications for emotions, well-being, and solidarity during the pandemic. Moreover, as the pandemic is still ongoing, and inequality regarding the distribution of COVID-19 vaccines continues to exist on a global scale, vaccine envy might still be a common experience for individuals who do not have the opportunity to get vaccinated against COVID-19. This study aims to introduce the concept of vaccine envy to the scientific community by systematically examining its nomological network and correlates as well as changes in vaccine envy over the course of the vaccination campaign.

According to a widely recognized definition, envy is an unpleasant, painful emotion that arises when a person realizes that someone else possesses something that the person longs for, strives for, or desires (Parrott & Smith, 1993; Smith & Kim, 2007). This possession does not necessarily have to be an object but can also be, for example, a social position, an attribute (Smith & Kim, 2007), or a certain vaccination status. We thus define vaccine envy as an unpleasant emotion that is experienced when one becomes aware that another person is vaccinated while one is still waiting for the vaccination. Previous research on generic envy has provided important insights that should also be applicable to the new phenomenon of vaccine envy—if vaccine envy is actually envy in a true sense (i.e., a painful emotion). However, what is commonly considered vaccine "envy" on the basis of

popular media reports does not necessarily have to correspond to the scientific definition of envy. Rather, the phenomenon might reflect a cognitive (i.e., nonemotional) evaluation of the distribution of the vaccine as unjust. To shed light on this question, we derived hypotheses on the nomological network and correlates of vaccine envy on the basis of previous findings on generic (malicious) envy. Our hypotheses should find support if vaccine envy is actually envy in a strict sense.

As a comparison-based emotion, envy is experienced as a reaction to an upward social comparison with another person (Alicke & Zell, 2008; White et al., 2006). Accordingly, previous research has shown that people with a pronounced social comparison orientation are more prone to envy (Rentzsch & Gross, 2015). Similarly, self-esteem holds an important position in the nomological network of envy, with a number of studies showing that envy is connected to low self-esteem (Salovey & Rodin, 1991; Smith et al., 1999). Therefore, we expected vaccine envy to be connected to comparison orientation and low self-esteem. Moreover, some people are more prone to envy than others, marking stable interindividual differences in people's disposition toward envy (Erz & Rentzsch, 2022; Rentzsch & Gross, 2015; Smith et al., 1999). Dispositional envy is a powerful predictor of everyday experiences of envy (Rentzsch & Gross, 2015) and should thus be closely connected to vaccine envy.

Furthermore, as shown in several studies, envy is connected to specific appraisal patterns. For instance, envy can be elicited by perceptions that the envied person's advantage is undeserved (van de Ven et al., 2012). Moreover, envy is associated with a sense of injustice (Smith et al., 1994). In line with these results, a recent study found that envy was associated with victim justice sensitivity (i.e., a habitual tendency to experience strong negative emotions when confronted with injustice; Hong et al., 2023). Therefore, we expected vaccine envy to be connected to appraisals of injustice and undeservingness and an increased victim sensitivity.

During the public debate on vaccine envy in Germany, commentators raised concerns that vaccine envy might undermine social cohesion and solidarity (e.g., Amann, 2021). Indeed, generic envy has been shown to be connected to a vast range of negative social outcomes, such as antisocial behaviour (Behler et al., 2020), hostility (Rentzsch et al., 2015), and social undermining (Duffy et al., 2012). Moreover, previous research has found that dispositional envy is related to neuroticism, mental health problems, and low

life satisfaction (Rentzsch & Gross, 2015). At the same time, however, it has been shown that experiencing envy can motivate people to improve themselves (Lange & Crusius, 2015; Van de Ven, 2017). Taken together, these findings suggest that vaccine envy might have detrimental effects on personal well-being and social cohesion while simultaneously being associated with an increased motivation to get vaccinated.

The Present Study

In this study, we aim to investigate vaccine envy by systematically examining its correlates and nomological network as well as changes in vaccine envy over the course of the vaccination campaign. For this purpose, we conducted two online surveys in May 2021 and October/November 2021. To our knowledge, this is the first study to provide empirical data on vaccine envy.

First, we investigated whether vaccine envy was actually a common phenomenon in our society when the vaccination campaign began and how self-reports of vaccine envy changed as the availability of COVID-19 vaccines increased. When we administered our first survey in May 2021, COVID-19 vaccines were in short supply, and many people who were willing to get vaccinated did not have the opportunity, a situation that provides fertile ground for experiences of envy. On the first day of our survey (7 May 2021), about one third of the German population was vaccinated (Robert-Koch-Institut, 2022). This percentage increased to more than two thirds in October/November 2021 when the follow-up survey took place. As the shortage of vaccines was a thing of the past at the end of 2021, we believe that being unvaccinated in October/November 2021 was usually the result of a conscious decision not to get vaccinated and did not entail an upward comparison with another person—a precondition for the experience of envy (Alicke & Zell, 2008; White et al., 2006). We thus hypothesized that vaccine envy among the unvaccinated would be less frequent in October/November 2021 than in May 2021.

Second, in order to determine whether vaccine envy can actually be considered envy in the strict sense (i.e., a painful emotion), we sought to examine the nomological network of vaccine envy. For this purpose, we examined the associations between vaccine envy and specific trait characteristics and appraisal patterns that have been shown to be closely connected to generic envy in previous research. We preregistered the hypotheses that vaccine envy should be positively related to dispositional envy, social comparison orientation, and justice sensitivity and negatively related to self-esteem. Moreover, we

expected vaccine envy to be related to appraisals of undeservingness and injustice (see Smith et al., 1994; van de Ven et al., 2012).

Third, we examined further correlates and life outcomes associated with vaccine envy. In line with research on benign forms of envy (Lange & Crusius, 2015; Van de Ven, 2017), we preregistered the hypothesis that the motivating effect of envy might express itself in an increased willingness to get vaccinated. Moreover, we exploratorily examined associations with life satisfaction and depressivity as well as personal experiences and attitudes related to the pandemic.

METHOD

We collected data using a preregistered online survey with two measurement occasions. All methods, hypotheses, and analyses were preregistered on the OSF (Time 1: <https://osf.io/dmj5f/>, Time 2: <https://osf.io/fdsw4/>).

All procedures were in accordance with the ethical standards of the ethics committee of the Psychologische Hochschule Berlin and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. Informed consent was obtained from all participants included in the study.

Participants and Procedure

Participants were recruited via mailing lists and social media and were promised an overview of the study results as an incentive. Participants who did not provide information on their vaccination status, who participated multiple times per measurement occasion, who were below the age of 18, or whose data were defective were not included in the final data set. At the beginning of the vaccination campaign in May 2021 (Time 1), the final sample included 558 vaccinated and 616 unvaccinated German participants ($N = 1,174$) with an average age of 40.9 years ($SD = 13.3$, Range: 18 to 88). Half a year later (October/November 2021, Time 2), we conducted a follow-up survey, including both newly recruited and previous participants. A total of 535 individuals (437 vaccinated and 98 unvaccinated) responded to the invitation ($M_{\text{age}} = 44.0$, $SD_{\text{age}} = 13.2$). For detailed information about the sample, see Table S2_1 in the Electronic Supplementary Material 2 (ESM2).

Measures

The present study included measures of vaccine envy, trait constructs (e.g., victim sensitivity and self-esteem), envy-specific appraisals, and further potential correlates of vaccine envy. We used two measures of vaccine envy: the self-reported frequency of experiences of vaccine envy and the intensity of envy experienced as a reaction to a hypothetical scenario that described a person receiving a COVID-19 vaccine. A detailed overview of all measures, including descriptions of the response scales and example items, can be found in the Electronic Supplementary Material 1 (ESM1). Table 1 presents the internal consistencies of the multiitem scales.

Frequency of Vaccine Envy

To investigate whether vaccine envy was actually a common phenomenon in our society, we assessed the *frequency of experiences of vaccine envy* via self-reports from unvaccinated participants and the *frequency of experiences of being envied* via self-reports from vaccinated participants at Times 1 and 2. Unvaccinated participants were asked to rate the frequency of experiences of vaccine envy within the last 2 weeks on a 5-point scale ranging from 1 (*never*) to 5 (*very often*) on a one-item measure (“In the last 2 weeks, how often have you experienced more or less intense envy of others who have already received a COVID-19 vaccine?”). Self-reports of vaccine envy were supplemented by reports from vaccinated participants on how often they had been envied by others within the last 2 weeks (“In the last 2 weeks, how often did you have the impression that others were feeling more or less intense envy toward you because you have already received a COVID-19 vaccine?”).

Nomological Network of Vaccine Envy

In order to investigate the nomological network of vaccine envy, at Time 1, we assessed a number of trait characteristics that were connected to envy in previous research: *dispositional envy* (Domain-Specific Envy Scale; Rentzsch & Gross, 2015), *social comparison orientation* (Iowa-Netherlands Comparison Orientation Measure; Gibbons & Buunk, 1999), *victim sensitivity* (Justice Sensitivity Scales-8; Beierlein et al., 2012), and *self-esteem* (Multidimensional Self-Esteem 12-Item Short Scale; Rentzsch et al., 2022).

Moreover, we examined the association between vaccine envy and envy-specific appraisal patterns of perceived injustice and undeservingness at Time 1. Perceived *injustice*

was measured via a one-item measure (“I find it unfair that I haven’t been vaccinated so far”). To investigate *deservingness*, unvaccinated participants were randomly assigned to one of three hypothetical scenarios that described a person receiving a COVID-19 vaccine. In these scenarios, the deservingness of the fictitious person (Elisabeth M.) was systematically manipulated by varying their age and job (low vs. high deservingness vs. no deservingness information). For example, the vignette for the low-deservingness scenario read: “You’re chatting with a friend. They tell you about an acquaintance who has just been vaccinated. Elisabeth M. is 36 years old and works mainly from home. She was able to get an early vaccination appointment because she has good connections with her family physician even though she does not belong to a risk group.” As a manipulation check, participants were asked to rate the person’s deservingness. Feelings of envy were measured with three items: “I feel a bit envious of Elisabeth M.”; “I envy Elisabeth M.”; and “I feel envy.” For further analyses, a mean score was computed for the three items.

The *intensity of envy experienced as a reaction to the hypothetical scenario* in the low deservingness condition ($n = 198$) was used as a second indicator of vaccine envy (correlation between the two indicators of vaccine envy: $r = .79, p < .001$).

Further Correlates and Life Outcomes of Vaccine Envy

To investigate the correlates and life outcomes of vaccine envy, we assessed *demographic variables* (age and gender), life satisfaction, depressivity, vaccination willingness, and attitudes and experiences related to the pandemic. *Life satisfaction* was measured via the General Life Satisfaction Short Scale (Beierlein et al., 2015). *Depressivity* (“Since last week, to what extent have you felt sad, depressed, or uninterested in life?”) and *vaccination willingness* (“Would you get the vaccine against COVID-19 if you had the opportunity?”) were assessed via one-item measures. Assessments of *attitudes and experiences related to the COVID-19 pandemic* included participants’ perceived infection risk, feeling threatened or feeling restricted in one’s everyday life, worries about one’s own health, worries about others, the number of COVID-19 infections in one’s social environment, financial issues due to the pandemic, and the endorsement of privileges for the vaccinated (see ESM1 for example items and the response scales). In this context, we also assessed participants’ political orientation on an 11-point scale adapted from the German Socio-Economic Panel (SOEP; see Kroh, 2007).

Analytic Strategy

All analyses were preregistered. As preregistered, we used $p < .05$ for nondirectional hypotheses/exploratory analyses and $p < .10$ for directional hypotheses. All analyses were computed in R version 3.6.1.

Differences in the *frequency of experiences of vaccine envy* between Time 1 and Time 2 in unvaccinated participants were examined via t tests. In line with the preregistered protocol, we used independent-samples t tests because the covariance coverage between measurement occasions was low ($< 10\%$) due to attrition and changes in vaccination status. Differences in the *frequency of experiences of being envied* among vaccinated participants were also investigated via independent-samples t tests.

To investigate the *nomological network* of vaccine envy, we computed the Pearson correlations between vaccine envy and trait characteristics (i.e., dispositional envy, social comparison orientation, victim sensitivity, and self-esteem) as well as perceived injustice. To test the hypothesis on the relationship between vaccine envy and deservingness, we used a one-way ANOVA with three groups (low vs. high deservingness vs. no information) and envy intensity as the dependent variable (for the manipulation check, perceived deservingness was used as the DV). Further *correlates and life outcomes* of vaccine envy were investigated via Pearson correlation coefficients.

The anonymized data and R scripts are available on the OSF (<https://osf.io/vz2sk/>).

RESULTS

Frequency of Vaccine Envy

One of our main goals was to examine whether vaccine envy was actually a common phenomenon in our society. Results showed that at Time 1, 21% of unvaccinated participants reported experiencing vaccine envy often or very often in the last 2 weeks and 26% reported sometimes experiencing vaccine envy (for more details, see Figure S2_1 in ESM 2). Among vaccinated participants, 30% reported being envied by others at least sometimes. At Time 2, 97% of unvaccinated participants reported never or rarely experiencing vaccine envy in the previous 2 weeks (see also Figure S2_2 in ESM2). Unvaccinated participants thus reported experiencing vaccine envy significantly less frequently by the end of 2021 ($M = 1.2$, $SD = 0.6$) than in the initial survey in May 2021

($M = 2.4$, $SD = 1.3$), $t(266.3) = 16.3$, $p < .001$, with a large effect (Cohen's $d = 1.07$). Vaccinated participants' reports of being envied also were significantly less frequent in October/November 2021 ($M = 1.1$, $SD = 0.4$) than in May 2021 ($M = 2.0$, $SD = 1.0$), $t(757.0) = 18.3$, $p < .001$, $d = 1.10$.

Nomological Network of Vaccine Envy

When investigating vaccine envy's nomological network, we found that unvaccinated participants high in victim sensitivity ($r = .41$), social comparison orientation ($r = .35$), and dispositional envy ($r = .28$) as well as individuals with low self-esteem ($r = -.16$) reported experiencing vaccine envy more frequently, all $ps < .001$ (for detailed information on the means, standard deviations, and intercorrelations of the trait measures, see Table 1). The correlations with the intensity of envy experienced as a reaction to the hypothetical scenario in the low deservingness condition yielded similar results (see Table 1). With regard to envy-specific appraisal patterns, we found a strong and significantly positive association between perceived injustice and the frequency of vaccine envy ($r = .64$, $p < .001$). This result means that participants who found it unfair that they had not already been vaccinated had a stronger tendency to feel vaccine envy. Results were in line with the preregistration.

Table 1
Nomological Network of Vaccine Envy: Intercorrelations With Envy-Related Traits and Perceived Injustice at Time 1 (Unvaccinated Particip.)

	<i>N</i>	<i>M</i>	<i>SD</i>	α	1.	2.	3.	4.	5.	6.	7.
1. Vaccine envy frequency ^a	593	2.44	1.26	-	1						
2. Vaccine envy after scenario ^{1, b}	167	3.08	2.07	.97	.79**	1					
3. Dispositional envy (DSES) ^b	493	2.29	0.95	.90	.28**	.35**	1				
4. Social comparison orientation (INCOM) ^a	477	2.92	0.72	.83	.35**	.34**	.58**	1			
5. Victim sensitivity (USS-8) ^c	461	3.11	1.34	.80	.41**	.45**	.56**	.45**	1		
6. Self-esteem (MSES-12) ^b	469	4.84	1.48	.79	-.16**	-.22*	-.48**	-.44**	-.37**	1	
7. Perceived injustice ^b	593	2.75	1.94	-	.64**	.53**	.13**	.18**	.28**	-.10*	1

Note. DSES = Domain-Specific Envy Scale. INCOM = Iowa-Netherlands Comparison Orientation Measure; USS-8 = Justice Sensitivity Scales-8, victim sensitivity subscale; MSES-12: Multidimensional Self-Esteem 12-Item Short Scale, global self-esteem subscale. α = Cronbach's alpha. Correlations: $N = 155$ -593 due to missing data.

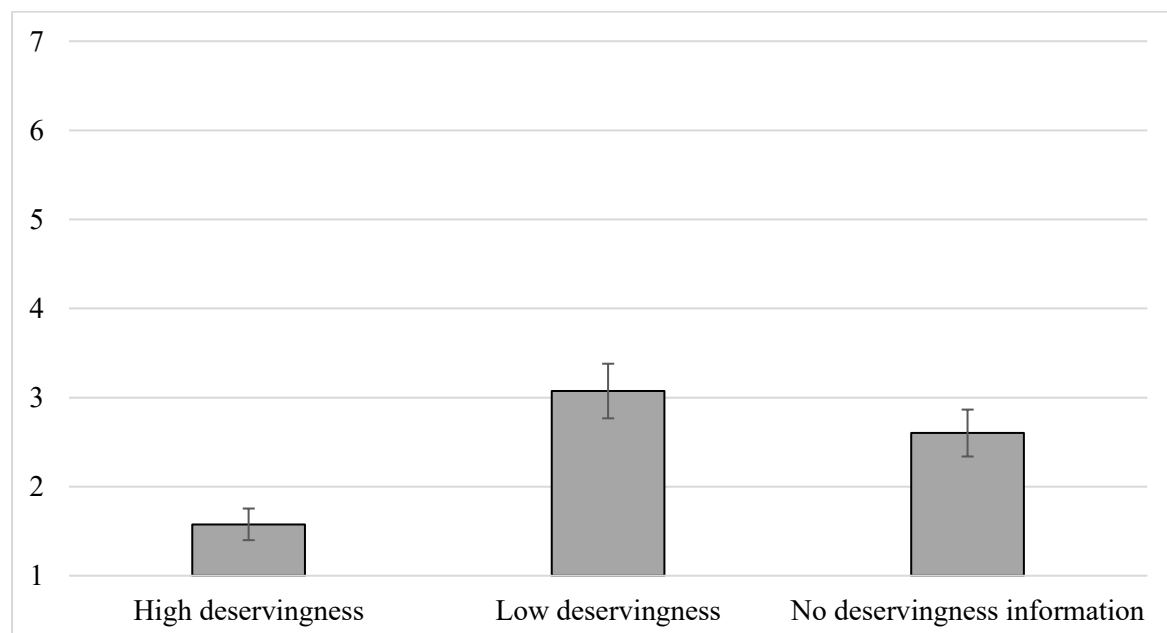
¹ Intensity of envy experienced as a reaction to the hypothetical scenario in the low deservingness condition. ^a Scale ranging from 1-5. ^b Scale ranging from 1-7. ^c Scale ranging from 1-6.

* $p < .05$. ** $p < .001$.

To investigate whether people experience more vaccine envy when the vaccination seems undeserved, we examined the effect of three hypothetical scenarios describing a person who received a COVID-19 vaccine in which deservingness was systematically manipulated. As expected, the manipulation check showed that the high deservingness scenario resulted in significantly higher ratings of deservingness ($M = 6.2$, $SD = 1.6$) than the scenarios with low deservingness ($M = 3.3$, $SD = 2.0$) or no deservingness information ($M = 4.6$, $SD = 1.9$), $F(2, 501) = 106.98$, $p < .001$, $\eta^2 = .30$ (post hoc tests: all $ps < .001$). Moreover, as preregistered, we found a significant effect of deservingness on vaccine envy, $F(2, 499) = 35.62$, $p < .001$, $\eta^2 = .13$. Post hoc comparisons revealed that vaccine envy was significantly higher for the low deservingness condition ($M = 3.1$, $SD = 2.1$) than for the conditions with high deservingness ($M = 1.6$, $SD = 1.2$) or no deservingness information ($M = 2.6$, $SD = 1.7$), with $p < .001$ and $p = .046$, respectively (see also Figure 1). This means that participants reported more intense envy when informed about the vaccination of a person who seemed undeserving of the vaccine due to their young age and option to work from home when compared with a scenario with an older person working in the health sector or with no further information.

Figure 1

Effect of Deservingness on Vaccine Envy



Note. Vaccine envy after the presentation of a scenario with high versus low deservingness versus no deservingness information. $N = 502$ (unvaccinated participants). Error bars represent 95% confidence intervals.

Further Correlates and Life Outcomes of Vaccine Envy

Our investigation of the correlates of vaccine envy showed that women reported significantly more vaccine envy than men ($r = .16, p < .001$) and that reports of vaccine envy decreased with age ($r = -.25, p < .001$). Concerning the association between vaccine envy and well-being, we found that participants who reported more vaccine envy showed significantly higher depressivity ($r = .19, p < .001$) and lower life satisfaction ($r = -.09, p = .047$). As preregistered and in line with previous research on the motivational effect of envy, vaccine envy was associated with an increased willingness to get vaccinated ($r = .45, p < .001$). For detailed information about the means and standard deviations of the correlates of vaccine envy, see Table S2_2 in ESM2.

When investigating attitudes and experiences related to the COVID-19 pandemic, we found that vaccine envy was reported more frequently by participants who felt threatened by the virus ($r = .36$), had a strong sense that their daily lives were affected by anti-COVID measures ($r = .27$), worried more about their own health or the safety of their loved ones ($r = .35/.32$), and judged their own risk of being infected as particularly high ($r = .22$), all $ps < .001$. However, objective criteria, such as the number of COVID-19 infections in one's social environment ($r = 0, p = .952$) or one's own financial losses due to the pandemic ($r = -.05, p = .192$), did not play a role in the experience of vaccine envy. Moreover, participants who reported more frequent vaccine envy did not differ significantly in their political orientation ($r = .02, p = .577$) and were not more sceptical about privileges for the vaccinated ($r = .03, p = .482$). The correlations with the intensity of envy experienced as a reaction to the hypothetical scenario in the low deservingness condition yielded mostly similar results (see Table S2_2, ESM2).

DISCUSSION

The goal of this study was to empirically investigate the phenomenon of vaccine envy that emerged during the COVID-19 pandemic. In line with the many media reports from the beginning of the vaccination campaign, we found that vaccine envy was indeed a common experience at the time. In May 2021, half of unvaccinated participants reported experiencing vaccine envy at least sometimes, and one third of vaccinated participants said that they had been envied due to their vaccination status.

According to our data, vaccine envy decreased dramatically over the course of the vaccination campaign. By the end of 2021, vaccine envy among unvaccinated participants had almost disappeared. The decrease in vaccine envy was to be expected considering the increase in the availability of COVID-19 vaccines.

Is Vaccine Envy Really Envy?

Even though our data showed that many participants could relate to the new phenomenon, this does not necessarily mean that vaccine envy is really envy in a strict sense (i.e., a painful emotion). In order to shed some light on this question, we investigated vaccine envy's nomological network, which yielded mixed results. On the one hand, the associations with dispositional envy, justice sensitivity, social comparison orientation, and low self-esteem were in line with previous empirical studies on generic envy (e.g., Rentzsch & Gross, 2015) and with the preregistration. Moreover, vaccine envy was associated with envy-specific appraisals of injustice and undeservingness (Smith et al., 1994; van de Ven et al., 2012). On the other hand, the association between vaccine envy and dispositional envy was weaker than expected, and victim sensitivity and social comparison orientation emerged as the most important correlates of vaccine envy. These results raise doubts about whether vaccine envy can be considered envy in a strict sense or whether it reflects merely a cognitive appraisal of the situation as unjust (see also distinction between envy and “resentment proper” as proposed by Smith & Kim, 2007).

Still, it is important to bear in mind that victim sensitivity and envy have a common core that goes beyond injustice appraisals. The two constructs have similar nomological networks: Like envy, victim sensitivity is related to antisocial tendencies, a proclivity to engage in social comparison, and low life satisfaction (Baumert et al., 2014; Schmitt et al., 2005). Moreover, justice sensitivity has a strong emotional component (Mohiyeddini & Schmitt, 1997), which is reflected by the wording of the victim sensitivity items (e.g., “It makes me angry when others are undeservingly better off than me”). Similar to anger, vaccination envy might thus be an emotion that individuals high in victim sensitivity tend to experience in situations that are perceived as unjust.

All things considered, we believe that “vaccine envy” might be a mixture of justice-related concerns and envy in the true sense (i.e., a painful emotion). An exploratory review of the answers to an open-ended question in the present study supports this notion. In this question, participants were asked to describe a situation in which they had experienced

vaccine envy. Whereas some participants reported experiencing “abstract vaccine envy” and general perceptions of unfairness regarding the distribution of vaccines, others described painful emotional states (for a compilation of the answers to the open-ended question, see ESM3).

Implications of Vaccine Envy for Enviars and Society

In line with previous envy literature (van de Ven et al., 2012), we found that the experiences of vaccine envy were associated with perceptions of deservingness. Vaccine envy is thus primarily directed toward people who are judged to be undeserving of a COVID vaccine, for instance, because they are young or can work from home. This finding highlights the relevancy of deservingness appraisals for the process of envy generation and might simultaneously point out the importance of adequately justifying decisions about the distribution of vaccines in order to prevent vaccine envy.

Such justifications might be particularly important for societal groups that report more vaccine envy than others. In our data, we found that women and younger people experienced vaccine envy more often. These findings are in line with previous literature that showed that women and younger people are more prone to envy (e.g., Erz & Rentzsch, 2022; Henniger & Harris, 2015). Moreover, the age effect we found might be a consequence of political decisions about the distribution of vaccines. In Germany, citizens were assigned to priority groups in order to ensure an efficient and fair distribution of the available vaccines. Younger people had to wait longer than others for their vaccination, and this wait may have resulted in more frequent experiences of vaccine envy.

However alarming vaccine envy might have appeared in the media, it is important to keep in mind that there might also be some positive side effects. In line with previous research on the motivational effect of envy (Lange & Crusius, 2015; Van de Ven, 2017), we found that vaccine envy was associated with an increased willingness to be vaccinated against COVID-19. Vaccine envy might thus be an expression of positive attitudes and hope associated with the vaccination campaign. Similarly, we did not find any evidence that individuals who frequently experienced vaccine envy were more critical of privileges for the vaccinated. This might suggest that even though some people had a strong emotional response to others being vaccinated, they did not feel ill will toward all vaccinated people and might still have approved of the political agenda regarding the vaccination campaign. Vaccine envy might thus represent a benign form of envy which lacks the hostile character

of malicious envy (see Dual Envy Theory; Lange & Crusius, 2015). The concern that vaccine envy might lead to an erosion of solidarity in our society thus seems to be unfounded.

Concerning COVID-related attitudes and experiences, we did not find a relationship between vaccine envy and “hard” indicators, such as financial losses due to the pandemic and the number of infections in one’s social environment. What seemed to be more relevant were subjective indicators, such as perceived threat and infection risk and worries about one’s own health or others’ health. Vaccine envy thus seems to thrive in an atmosphere of subjective fear and might be reduced by effective and trust-building communication.

Moreover, we found evidence that vaccine envy was connected to depressivity and low life satisfaction. These findings are in line with previous literature that showed that people who are more prone to envy tend to suffer from mental health problems and low life satisfaction (Rentzsch & Gross, 2015). Even though the present data do not allow conclusions about a causal relationship between envy and well-being, the decline in subjective well-being that has been observed during the pandemic (Zacher & Rudolph, 2021) might be connected to the emergence of vaccine envy. Policies or interventions that aim at preserving well-being and mental health might thus also help reduce vaccine envy.

While vaccine envy was a novel phenomenon that arose during the most severe public health crisis of the last decades, we believe that our results may not be restricted to the COVID-19 pandemic. Similar cases of widespread health-related envy might occur in the future, if there is a health emergency which is perceived as threatening by many people, and there is a shortage of a medicinal product (e.g., vaccines), which is perceived as highly desirable by many.

Strengths, Limitations, and Directions for Future Research

Strengths of the present research include the preregistration and the novel research questions. Moreover, we used two different indicators of vaccine envy (i.e., self-reported frequency within the last 2 weeks and state envy after the presentation of a hypothetical scenario).

However, there are some limitations worth mentioning. Whereas the age range of our sample was quite broad with a mean age resembling that of the German population, women and highly educated participants were overrepresented. The study thus allows only

limited conclusions about the prevalence of vaccine envy in the general population. Future research should validate our findings using representative samples, for instance, in countries where access to COVID-19 vaccines remains limited or in the context of future vaccination campaigns against COVID-19 or other infectious diseases.

Moreover, our study mostly relied on self-reports, which might have been subject to bias due to socially desirable responding. Even though a definition of vaccine envy was provided in the instructions, participants' concepts of vaccine envy might have been influenced by media reports on vaccine envy, some of which focused more on a societal imbalance in the distribution of vaccines than on personal feelings of envy. Future research should thus include measures of vaccine envy that are less susceptible to bias, such as other reports or behavioural observations. Moreover, as the measures of vaccine envy used in the present study focused mainly on the experience of a painful feeling, future research might want to use measures that also include other aspects of envy such as aggression and improvement motivation (Lange et al., 2018).

Regarding the motivational effect of vaccine envy, it might be interesting to investigate whether the increase in vaccination willingness found in this study translates into tangible changes in people's behaviour, such as procuring a timely vaccination appointment.

Conclusion

The present study presents initial empiric evidence of vaccine envy as an important phenomenon that occurred during the pandemic. We believe that our research advances the knowledge about envy during the COVID-19 pandemic and thus makes an important contribution to understanding the implications of the pandemic on emotions and well-being.

REFERENCES

- Alicke, M. D., & Zell, E. (2008). Social comparison and envy. In R. H. Smith (Ed.), *Envy: Theory and research* (pp. 73–93). Oxford University Press. <https://doi.org/10.1093/acprof:oso/9780195327953.003.0005>
- Amann, M. (2021, April 29). Impfneid ist typisch deutsch. *Spiegel*. <https://www.spiegel.de/politik/deutschland/coronavirus-warum-der-deutsche-impfneid-so-gefaehrlich-ist-leitartikel-a-8533165f-0002-0001-0000-000177330628>
- Baumert, A., Beierlein, C., Schmitt, M., Kemper, C. J., Kovaleva, A., Liebig, S., & Rammstedt, B. (2014). Measuring four perspectives of justice sensitivity with two items each. *Journal of Personality Assessment*, 96(3), 380–390. <https://doi.org/10.1080/00223891.2013.836526>
- Behler, A. M. C., Wall, C. S., Bos, A., & Green, J. D. (2020). To help or to harm? Assessing the impact of envy on prosocial and antisocial behaviors. *Personality and Social Psychology Bulletin*, 46(7), 1156–1168. <https://doi.org/10.1177/0146167219897660>
- Beierlein, C., Baumert, A., Schmitt, M., Kemper, C. J., Kovaleva, A., & Rammstedt, B. (2012). *Short Scales to Measure Justice Sensitivity: The Justice Sensitivity Scales-8*. Mannheim: GESIS - Leibniz-Institut für Sozialwissenschaften. <https://nbn-resolving.org/urn:nbn:de:0168-ssoar-312112>
- Beierlein, C., Kovaleva, A., László, Z., Kemper, C. J., & Rammstedt, B. (2015). Eine Single-Item-Skala zur Erfassung der Allgemeinen Lebenszufriedenheit: Die Kurzsкала Lebenszufriedenheit-1 (L-1). *Zusammenstellung Sozialwissenschaftlicher Items Und Skalen (ZIS)*. <https://doi.org/10.6102/zis229>
- Duffy, M. K., Scott, K. L., Shaw, J. D., Tepper, B. J., & Aquino, K. (2012). A social context model of envy and social undermining. *Academy of Management Journal*, 55(3), 643–666. <https://doi.org/10.5465/amj.2009.0804>
- Erz, E., & Rentzsch, K. (2022). Stability and change in dispositional envy: Longitudinal evidence on envy as a stable trait. *European Journal of Personality*. <https://doi.org/10.1177/08902070221128137>

- Gibbons, F. X., & Buunk, B. P. (1999). Individual differences in social comparison: Development of a scale of social comparison orientation. *Journal of Personality and Social Psychology*, 76(1), 129–142. <https://doi.org/10.1037/0022-3514.76.1.129>
- Henniger, N. E., & Harris, C. R. (2015). Envy across adulthood: The what and the who. *Basic and Applied Social Psychology*, 37(6), 303–318. <https://doi.org/10.1080/01973533.2015.1088440>
- Hong, Y., Lin, R., Wang, Q., & Lian, R. (2023). Effects of victim justice sensitivity on envy: The role of upward social comparison and perceived control. *Current Psychology*, 42, 781–788. <https://doi.org/10.1007/s12144-020-01338-3>
- Kroh, M. (2007). Measuring left–right political orientation: The choice of response format. *Public Opinion Quarterly*, 71(2), 204–220. <https://doi.org/10.1093/poq/nfm009>
- Lange, J., & Crusius, J. (2015). Dispositional envy revisited: Unraveling the motivational dynamics of benign and malicious envy. *Personality and Social Psychology Bulletin*, 41(2), 284–294. <https://doi.org/10.1177/0146167214564959>
- Mohiyeddini, C., & Schmitt, M. J. (1997). Sensitivity to befallen injustice and reactions to unfair treatment in a laboratory situation. *Social Justice Research*, 10(3), 333–353. <https://doi.org/10.1007/BF02683307>
- Parrott, W. G., & Smith, R. H. (1993). Distinguishing the experiences of envy and jealousy. *Journal of Personality and Social Psychology*, 64(6), 906–920. <https://doi.org/10.1037/0022-3514.64.6.906>
- Rentzsch, K., Erz, E., & Schütz, A. (2022). Development of short and ultra-short forms of the Multidimensional Self-Esteem Scale: Relations to the Big Five, narcissism, and academic achievement in adults and adolescents. *European Journal of Psychological Assessment*, 38(4), 270–281. <https://doi.org/10.1027/1015-5759/a000660>
- Rentzsch, K., & Gross, J. J. (2015). Who turns green with envy? Conceptual and empirical perspectives on dispositional envy. *European Journal of Personality*, 29(5), 530–547. <https://doi.org/10.1002/per.2012>

- Rentzsch, K., Schröder-Abé, M., & Schütz, A. (2015). Envy mediates the relation between low academic self-esteem and hostile tendencies. *Journal of Research in Personality*, 58, 143–153. <https://doi.org/10.1016/j.jrp.2015.08.001>
- Robert Koch-Institut (2022). *Digitales Impfquotenmonitoring zur COVID-19-Impfung*. www.rki.de/covid-19-impfquoten (accessed 21 June 2022).
- Salovey, P., & Rodin, J. (1991). Provoking jealousy and envy: Domain relevance and self-esteem threat. *Journal of Social and Clinical Psychology*, 10(4), 395–413. <https://doi.org/10.1521/jscp.1991.10.4.395>
- Schmitt, M., Gollwitzer, M., Maes, J., & Arbach, D. (2005). Justice sensitivity: Assessment and location in the personality space. *European Journal of Psychological Assessment*, 21(3), 202–211. <https://doi.org/10.1027/1015-5759.21.3.202>
- Smith, R. H., & Kim, S. H. (2007). Comprehending envy. *Psychological Bulletin*, 133(1), 46–64. <https://doi.org/10.1037/0033-2909.133.1.46>
- Smith, R. H., Parrott, W. G., Diener, E. F., Hoyle, R. H., & Kim, S. H. (1999). Dispositional envy. *Personality and Social Psychology Bulletin*, 25(8), 1007–1020. <https://doi.org/10.1177/01461672992511008>
- Smith, R. H., Parrott, W. G., Ozer, D., & Moniz, A. (1994). Subjective injustice and inferiority as predictors of hostile and depressive feelings in envy. *Personality and Social Psychology Bulletin*, 20(6), 705–711. <https://doi.org/10.1177/0146167294206008>
- van de Ven, N. (2017). Envy and admiration: Emotion and motivation following upward social comparison. *Cognition and Emotion*, 31(1), 193–200. <https://doi.org/10.1080/02699931.2015.1087972>
- van de Ven, N., Zeelenberg, M., & Pieters, R. (2012). Appraisal patterns of envy and related emotions. *Motivation and Emotion*, 36(2), 195–204. <https://doi.org/10.1007/s11031-011-9235-8>
- White, J. B., Langer, E. J., Yariv, L., & Welch, J. C. (2006). Frequent social comparisons and destructive emotions and behaviors: The dark side of social comparisons. *Journal of Adult Development*, 13(1), 36–44. <https://doi.org/10.1007/s10804-006-9005-0>

Zacher, H., & Rudolph, C. W. (2021). Individual differences and changes in subjective wellbeing during the early stages of the COVID-19 pandemic. *American Psychologist*, 76(1), 50–62. <https://doi.org/10.1037/amp0000702>

SUPPLEMENT

The Electronic Supplementary Material 1 (ESM 1) and the Electronic Supplementary Material 3 (ESM 3) can be found online at <https://onlinelibrary.wiley.com/doi/10.1002/ijop.12929>. ESM1 contains an overview of all relevant measures and ESM3 contains the answers to the open-ended question in which participants described a situation in which they had experienced vaccine envy. The following tables are part of Electronic Supplementary Material 2 (ESM 2).

Table S2_1

Sample Size and Demographics

	May 2021 (Time 1)	Oct/Nov 2021 (Time 2)
<i>Sample size</i>	1174	535
<i>Vaccination Status</i>		
Vaccinated	558 (47.5%)	437 (81.7%)
Unvaccinated	616 (52.5%)	98 (18.3%)
<i>Age</i>		
Mean (SD)	40.9 (13.3)	44.0 (13.2)
Range	18-88	19-89
<i>Gender</i>		
Male	465 (39.6%)	206 (38.6%)
Female	698 (59.5%)	324 (60.7%)
Diverse	11 (0.9%)	4 (0.8%)
<i>Education</i>		
Main school (Hauptschule)	11 (0.9%)	11 (2.1%)
Middle school (Mittlere Reife)	76 (6.5%)	46 (8.6%)
Entrance qualification college of applied science (Fachhochschulreife)	61 (5.2%)	34 (6.4%)
High school degree (Abitur)	165 (14.1%)	73 (13.7%)
College/University degree	861 (73.3%)	370 (69.3%)
No degree	0	0

<i>Family status</i>		
Unmarried and single	296 (25.2%)	129 (24.2%)
Unmarried and in a relationship	374 (31.9%)	152 (28.5%)
Married	429 (36.5%)	213 (39.9%)
Divorced	60 (5.1%)	32 (6.0%)
Widowed	15 (1.3%)	8 (1.5%)
<i>Political party preference ^a</i>		
The Left (Die Linke)	150 (13.2%)	70 (13.5%)
Social Democratic Party (SPD)	122 (10.7%)	54 (10.4%)
The Greens (Bündnis 90/Die Grünen)	450 (39.6%)	180 (34.7%)
Christian Democratic Union/Christian Social Union (CDU/CSU)	131 (11.5%)	38 (7.3%)
Free Democratic Party (FDP)	125 (11.0%)	80 (15.4%)
Alternative for Germany (AfD)	14 (1.2%)	15 (2.9%)
Other	144 (12.7%)	82 (15.8%)

Note. ^a $N = 1136$ (Time 1) and $N = 519$ (Time 2) due to missing data.

Table S2_2

Further Correlates and Life Outcomes of Vaccine Envy (Unvaccinated Participants, Time 1)

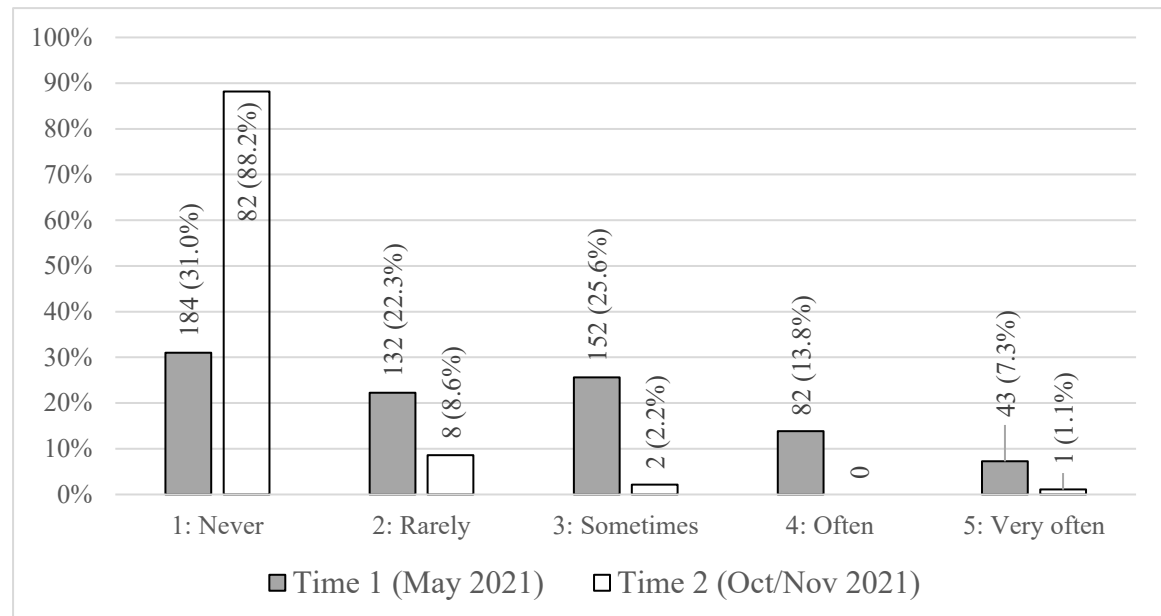
	<i>N</i>	<i>M</i>	<i>SD</i>	<i>r</i> _{fre}	<i>r</i> _{scen}
1. Gender	606	0.59	0.49	.16**	.15
2. Age	616	38.40	11.92	-.25**	-.32**
3. Depressivity ^a	499	5.00	2.69	.19**	.26**
4. Life satisfaction ^a	499	6.30	2.22	-.09*	-.04
5. Vaccination willingness ^b	616	4.36	1.22	.45**	.51**
6. Perceived threat ^c	600	3.78	1.76	.36**	.40**
7. Feeling restricted ^c	599	5.87	1.51	.27**	.35**
8. Worries about own health ^c	601	3.68	1.93	.35**	.40**
9. Worries about others' health ^c	600	4.67	1.90	.32**	.34**
10. Perceived infection risk ^b	591	2.01	0.77	.22**	.10
11. Number of infections	603	4.44	4.31	-.01	-.11
12. Financial losses ^c	600	2.48	2.14	-.05	-.15
13. Political orientation ^d	597	4.62	1.89	.02	-.12
14. Vaccine privileges ^c	600	3.84	2.20	.03	.10

Note. Gender was coded into 0 (*male*) and 1 (*female*).

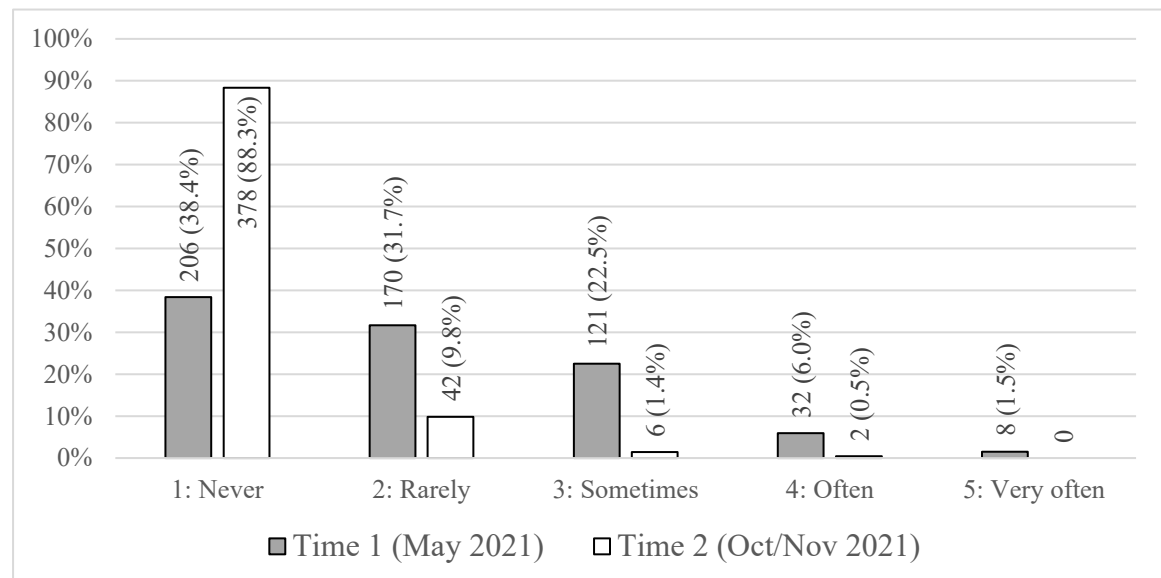
*r*_{fre} = Pearson correlation with frequency of vaccine envy (*N* = 499-593 due to missing data); *r*_{scen} = Pearson correlation with envy intensity after hypothetical scenario (low deservingness condition; *N* = 164-167 due to missing data).

^a Scale ranging from 1-10; ^b scale ranging from 1-5; ^c scale ranging from 1-7; ^d scale ranging from 1 (*completely left*) to 10 (*completely right*).

* *p* < .05. ** *p* < .001.

Figure S2_1*Frequency of Vaccine Envy in Unvaccinated Participants at Times 1 and 2*

Note. Responses to the question: “In the last 2 weeks, how often have you experienced more or less intense envy of others who have already received a COVID-19 vaccine?”
 N = 593 (Time 1) and N = 93 (Time 2).

Figure S2_2*Frequency of Perceived Vaccine Envy in Vaccinated Participants at Times 1 and 2*

Note. Responses to the question: “In the last 2 weeks, how often did you have the impression that others were feeling more or less intense envy toward you because you have already received a COVID-19 vaccine?”
 N = 537 (Time 1) and N = 428 (Time 2).

GENERAL DISCUSSION

The present dissertation was aimed at deepening the understanding of dispositional envy as an emotional trait by enriching existing research on envy with a personality psychology perspective. To this end, I derived three research questions from the multiphase research process that has been applied to other trait constructs, such as the Big Five (see Section 1.3), and conducted three studies that each illuminate a different aspect of the trait-like character of dispositional envy. Article 1 focused on the temporal *stability* of dispositional envy, as trait constructs can be expected to remain stable across time spans of several years. Moving on to explain why individuals differ in how their levels of dispositional envy *change* across time, Article 2 examined the longitudinal interplay between dispositional envy and self-esteem, a closely related trait. In order to illustrate how dispositional envy translates into experiences of state envy in specific situations (i.e., its *predictive power*), Article 3 investigated how vaccine envy during the COVID-19 pandemic emerged from person variables (e.g., dispositional envy) and envy-specific appraisals. Article 3 can also be seen as an applied case that demonstrates the sociopolitical relevance of envy research.

3.1 Summary of the Findings

The findings reported in the three articles of this dissertation were based on data from three different studies. Article 1 reported three waves of data from the SELF study (Rentzsch, 2021), a longitudinal study across 6 years. Article 2 also relied on data from the SELF study as well as on data from a representative sample collected as part of the GESIS panel (Bosnjak et al., 2018) with two measurement occasions that also spanned 6 years. For the last article, I collected data on vaccine envy in an online survey with two measurement occasions that covered a time span of 6 months.

On the basis of data from the SELF study, Article 1 aimed to provide first empirical evidence that, as postulated by state-trait theories, dispositional envy remains stable across time spans of several years and can therefore rightfully be considered a stable emotional trait (see Research Question 1, Section 1.3.1). Results from latent factor models revealed that global and domain-specific dispositional envy were stable across 6 years regarding all indicators of stability: *Rank-order stabilities* were relatively high with stability coefficients ranging around .78, which is comparable to the stability coefficients reported for established trait constructs, such as the Big Five (Specht et al., 2011) and self-esteem (Rentzsch & Schröder-Abé, 2022). This means that individuals who scored particularly

high (or low) on dispositional envy on the first measurement occasion were likely to still be among the most (or least) prone to envy 6 years later. Moreover, mean-level change across 6 years in all measures of dispositional envy was small and non-significant, indicating that participants' average level of dispositional envy did not change between measurement occasions. Similarly, a substantial amount (i.e., around 80%) of variance in global and domain-specific dispositional envy was accounted for by a stable trait factor. When comparing the stability coefficients of global and domain-specific dispositional envy, we found that dispositional envy within the comparison domains of attraction, competence, and wealth was equally as stable as the global trait. Taken together, our findings thus indicate that dispositional envy can indeed be conceptualized as a stable emotional trait.

Adding to the findings on mean-level change from the SELF sample reported in Article 1, the second article examined mean-level change in global dispositional envy in the representative GESIS sample. When integrating the findings from the two samples, one can achieve important insights on *mean-level change* which go beyond the results reported in Article 1. In a general way, the findings from the GESIS sample, where mean-level change in global dispositional envy was also small, resembled results from the SELF sample. However, despite the small effect size, mean-level change in global dispositional envy resulted to be significantly negative when analyzing data from the representative GESIS sample (latent Cohen's $d = -0.13$). This means that, unlike in the SELF sample, there was a small decrease in the average level of global dispositional envy across the 6 years of assessment. The finding of a small negative mean-level change is in line with the overall stability of dispositional envy, as most traits show a certain degree of change across the life span (Bleidorn et al., 2021; Roberts & Mroczek, 2008). Moreover, it is in line with previous cross-sectional findings of a negative relationship between dispositional envy and age (Harris & Henniger, 2013; Lange & Crusius, 2015; Rentzsch & Gross, 2015) as well as with the maturity principle of personality development according to which trait constructs change in the direction of growth and maturity with increasing age (Roberts et al., 2001, 2008). Importantly, in addition to change in the average mean levels, we found that individuals in both samples differed significantly in how their dispositional envy changed across time. This means that while some individuals experienced a decrease in their dispositional envy levels across time, others did not experience any change or even increased in their dispositional envy. These *individual differences in intraindividual change*

are an important precondition for the investigation of correlates and determinants of change because they leave variance to be explained by change in related constructs.

In Article 2, we moved on to explain individual differences in change by examining the longitudinal interplay between dispositional envy and self-esteem (Research Question 2, Section 1.3.2), as self-esteem is closely linked to dispositional envy both from a theoretical and an empirical perspective. Across both samples, we found negative *correlated change*, meaning that when a person experienced an increase in self-esteem, their level of dispositional envy tended to decrease within the same time span and vice versa. In addition to correlated change between global dispositional envy and self-esteem, we found evidence of correlated change within specific domains (e.g., in the domain of competence/performance). For instance, people who became more self-confident with regard to their performances in the academic domain tended to experience simultaneous decreases in their tendency to envy others who were perceived as more intelligent or creative. The development of dispositional envy across the life span is thus closely linked to a person's self-esteem development, both at the global level and within specific comparison domains.

As a second step, we investigated whether change in one construct could be predicted by the previous level of or antecedent change in the respective other construct (i.e., *prospective effects*). Across both samples and all global and domain-specific measures, we did not find any evidence of prospective effects of dispositional envy on self-esteem, meaning that high or increasing levels of dispositional envy did not reduce a person's self-esteem later on. However, some prospective effects of self-esteem on dispositional envy emerged. For instance, in the GESIS sample, a person's initial self-esteem level negatively predicted change in dispositional envy across 6 years, indicating that participants who started out with lower self-esteem were more likely to experience a subsequent increase in their level of dispositional envy. Similarly, in the SELF sample, individuals with a low or decreasing performance self-esteem experienced a subsequent increase in competence envy. In the overall picture, our findings thus contradicted the notion of envy having an effect on later self-esteem development, and hinted to a directional effect of self-esteem on envy.

Article 3 was a first empirical examination of the phenomenon of *vaccine envy*, which emerged during the COVID-19 pandemic. We found that vaccine envy was a

common experience in the beginning of the vaccination campaign when the supply of vaccines was still limited, with about half of the unvaccinated participants experiencing vaccine envy at least sometimes. After COVID vaccines had become increasingly more available during the course of 2021, the percentage of participants who reported experiencing vaccine envy decreased dramatically. When investigating the nomological network of vaccine envy, we found the expected associations with envy-specific appraisals (i.e., injustice and undeservingness) as well as with certain trait constructs (e.g., a positive correlation with dispositional envy and a negative correlation with self-esteem). However, victim sensitivity and social comparison orientation emerged as the most important correlates of vaccine envy, leading us to the conclusion that “vaccine envy” might be a mixture of justice-related concerns and envy in the true sense (i.e., a painful emotion). When investigating further correlates and outcomes of vaccine envy, we found that the subjective perception of the pandemic was associated more strongly with vaccine envy than objective indicators. For instance, individuals who perceived the pandemic as particularly threatening, who were worried about their own or others’ health, or who perceived their infection risk to be particularly high were more likely to experience vaccine envy, whereas the actual number of infections in their social environment or financial losses due to the pandemic did not play a role. Vaccine envy was also related to depressivity and low life satisfaction. Moreover, vaccine envy was associated with an increased willingness to get vaccinated, highlighting the motivational effect of envy. Article 3 thus used the example of the COVID-19 pandemic in order to illustrate how dispositional envy, self-esteem, and envy-specific appraisals shape experiences of envy in daily life (Research Question 3, Section 1.3.3).

3.2 Theoretical and Practical Implications

Located at different points of the continuum between basic and applied research, the articles belonging to this dissertation have a number of important implications for theory and practice. Building on data from a longitudinal study, Article 1 has important theoretical implications for the understanding of dispositional envy as a stable trait construct as proposed by state-trait theories of emotions. Similarly, the findings from Article 2 have important theoretical implications regarding the link between envy and self-esteem. Article 3, which has a stronger applied focus, emphasizes the importance of envy research during a major global crisis of the recent past, namely, the COVID-19 pandemic.

3.2.1 Integrating Dispositional Envy Into the Personality System

The finding that dispositional envy is stable across time spans of several years has important theoretical implications. First, this finding can be seen as support for the idea that dispositional envy can rightfully be conceptualized as a stable emotional trait in line with classical state-trait theories of emotions that postulate that emotions have a stable dispositional core (Izard et al., 1993; Rosenberg, 1998; Spielberger, 1972). Whereas previous studies have merely assumed that, in contrast to state envy, dispositional envy remains stable across time, the present dissertation provided empirical evidence for this claim, thereby placing research on dispositional envy on more solid ground.

Second, the results of this research raise doubts about whether the distinction between *core* and *surface* characteristics advocated by some authors (Asendorpf & Denissen, 2006; Asendorpf & Van Aken, 2003; McCrae & Costa, 2008) is accurate when it comes to emotional traits. According to this distinction, core traits (e.g., the Big Five) are based more strongly on genetic differences and are less susceptible to environmental influences when compared with surface characteristics (e.g., self-concept and emotional dispositions), resulting in an increased temporal stability of core characteristics when compared with surface characteristics. By showing that the temporal stability of dispositional envy is similar to that of the Big Five, the current results cast doubt on the classification of dispositional envy as a surface characteristic and thereby call into question the idea that personality can be fully described by a small set of core traits, such as the Big Five (see also Kandler et al., 2014, for a critical review and Rentzsch & Schröder-Abé, 2022, for similar conclusions about self-esteem).

Third, the current findings underline calls for the integration of emotional traits into conceptualizations of personality (Reisenzein et al., 2020). It has been argued that emotional traits are a central subsystem of personality (Reisenzein et al., 2020) and that they define individuality much like traditional personality traits do (Keltner & Shiota, 2021). In line with this notion, dispositional envy has emerged as an independent factor in recent endeavors to create an exhaustive taxonomy of personality facets (Irwing et al., 2023), which can be considered a first step toward integrating dispositional envy into current personality systems. These authors argued that dispositional envy can be viewed as an independent personality facet, that is, a narrow, unidimensional trait located at the intermediate level of the personality hierarchy between single-item nuances and broader

factors, such as the Big Five domains. Other examples of personality facets include sociability, self-control, and dependability. Future research might use such a comprehensive list of facets to further investigate the nomological network of dispositional envy and to identify other facet-level traits that might cluster together with dispositional envy to form a higher-order factor. For instance, on the basis of findings from the present research, one might expect dispositional envy to form a superordinate factor with self-esteem, other social emotional traits, or traits related to social comparison and justice concerns (e.g., social comparison orientation and justice sensitivity).

3.2.2 Informing Theoretical Models About the Link Between Envy and Self-Esteem

The current findings on the longitudinal interplay between dispositional envy and self-esteem have important implications for theoretical assumptions about the link between envy and self-esteem. First, by showing that dispositional envy is not only related to low self-esteem at a given point in time but that the trajectories of change across time in these two constructs are closely linked, our research supports the pervasive theoretical notion that dispositional envy and self-esteem are mutually dependent (e.g., Foster, 1972; Heider, 1958; Silver & Sabini, 1978).

Second, the findings from Article 2 underpin the assumption that changes in dispositional envy and self-esteem might have similar underlying causes. For instance, in line with the maturity principle and Social Investment Theory (Roberts et al., 2001, 2005, 2008), one reason for the close connection between change in dispositional envy and self-esteem found in the present research might be that many participants experienced decreases in dispositional envy and increases in self-esteem after taking on new social roles that facilitated personal growth and maturity (e.g., starting a first job or becoming a parent). Conversely, other individuals might have experienced non-normative changes in dispositional envy and self-esteem because they failed to adopt age-appropriate social roles or faced stressful life events that led to declines in self-esteem and simultaneous increases in dispositional envy (e.g., losing one's job). Moreover, evolutionary psychology suggests that envy and self-esteem might have evolved in order to warn individuals against similar evolutionary dangers and thereby help them navigate status hierarchies (Hill & Buss, 2008; Leary et al., 1995; Mahadevan et al., 2019). The correlated change found in the present research might therefore also be partly explained by life events that have an impact on a person's social standing and therefore lead to opposing changes in dispositional envy and

self-esteem (e.g., a promotion that increases a person's self-esteem while simultaneously decreasing their tendency to experience envy). Future research is needed to identify the determinants of correlated change between dispositional envy and self-esteem.

Third, the finding that self-esteem predicted changes in dispositional envy but not vice versa might point toward a causal effect of self-esteem on dispositional envy. This interpretation is in line with lay psychological perceptions and theoretical notions that envy is rooted in insecurity (e.g., Foster, 1972; Smith et al., 1999) as well as with previous empirical studies that conceptualized low self-esteem as an antecedent of envy (Appel et al., 2015; Chae, 2018; Rentzsch et al., 2015). Previous research has provided insights into possible mechanisms that might explain how exactly self-esteem influences a person's disposition to experience envy. For instance, the prospective effect of self-esteem on dispositional envy found in the present research might indicate that low or decreasing self-esteem enhances a person's tendency to make upward comparisons, which then leads to increases in their level of dispositional envy. Substantiating this notion, previous research has shown that individuals with low self-esteem are particularly prone to making upward comparisons (Gibbons & Buunk, 1999; Wayment & Taylor, 1995) and that upward comparisons lead to envy (Alicke & Zell, 2008; White et al., 2006). The effect of self-esteem on upward comparisons might also be mediated by a person's actual life outcomes, as it has been shown that people with high self-esteem show better performance and are more successful in different life domains (Harris & Orth, 2020; Krauss & Orth, 2022; Orth & Robins, 2022; Valentine et al., 2004), which might then reduce the risk of upward comparisons. However, it is important to add that our longitudinal design has limitations when it comes to causal inference and should therefore be interpreted with caution.

3.2.3 Underpinning the Importance of a Domain-Specific Perspective

By investigating domains of envy and self-esteem, the present research provides new insights into the domain-specificity of dispositional envy. In Article 1, we found that the stability of domain-specific dispositional envy in all three comparison domains was similar to that of global dispositional envy, implying that domain-specific dispositional envy is as trait-like as the global construct. This finding might be especially relevant when aiming to prospectively predict life outcomes in specific comparison domains. For instance, as envy has been connected to social loafing in the work context (Awee et al., 2020), employers might want to use measures of dispositional envy to prospectively predict a

person's work performance. As indicated by theoretical accounts that stress the importance of symmetry between predictor and criterion (e.g., McWilliams et al., 2013; Wittmann, 1988), a domain-specific life outcome (e.g., a person's job performance) can be predicted more accurately by a person's domain-specific dispositional envy (e.g., in the competence domain) when compared with global dispositional envy. The finding of high temporal stability in domain-specific dispositional envy indicates that competence envy can be successfully used to prospectively predict a person's job performance or other domain-specific outcomes, even across time spans of several years.

Similarly, in Article 2, we found that correlated change in corresponding domains of dispositional envy and self-esteem was similar to correlated change in the global constructs. Article 2 also provided initial evidence that prospective effects of self-esteem might be particularly pronounced in the domain of competence/performance. This finding indicates that, more so than in the other life domains, change in one's confidence that one will perform well in job or school contexts might lead to change in one's tendency to experience envy in that domain. One explanation for this phenomenon might be that success and failure are more visible and objectifiable in the performance domain than in other life domains due to institutionalized feedback (e.g., via grades or performance reports). Such visible indicators of success might force people to more often compare themselves with others, thereby enhancing the possible effect of self-esteem on envy via social comparisons.

3.2.4 Implications for Interventions to Reduce Envy

Our findings on stability and change in dispositional envy have important implications for interventions and clinical psychology approaches that aim to reduce envy (see Leahy, 2021). On the one hand, the finding that dispositional envy remains stable across several years with stability coefficients that are comparable to those of established trait constructs, such as self-esteem and the Big Five, indicates that, in most cases, a person's tendency to experience envy remains similar across long periods of their life and might therefore be difficult to change. On the other hand, we consistently found evidence of individual differences in intraindividual change, showing that some individuals experienced decreases in their levels of dispositional envy. Moreover, we found initial cross-sectional and longitudinal evidence indicating that, for the average person, dispositional envy might decrease across the life span. It can therefore be concluded that a

person's enviousness is not set in stone but, at least in some people, it may change across the life span.

Considering that the subjective experience of envy is unpleasant or even painful (Smith et al., 1996; Takahashi et al., 2009) and that, in line with previous studies (Gold, 1996; Mujcic & Oswald, 2018; Oren-Yagoda et al., 2021), envy was found to be associated with depressivity, low life satisfaction, and low self-esteem in the present research, people who are particularly prone to experiencing envy might be motivated to reduce their high level of dispositional envy. As we found that the stability of dispositional envy was similar to that of established trait constructs (e.g., the Big Five and self-esteem), insights about how to change personality or how to increase self-esteem might be applicable to dispositional envy. For instance, there is evidence showing that interventions can lead to pronounced and lasting changes in personality trait measures in clinical populations and that these changes happen more quickly than previously thought (i.e., within the first month of therapy; Roberts et al., 2017). Similarly, a recent meta-analysis found that self-esteem interventions are effective in clinical and nonclinical populations (Niveau et al., 2021). Moreover, there is evidence that it might be possible to change personality traits with brief, low-level interventions, such as smartphone-based trainings (Stieger et al., 2020). It might thus be feasible to achieve change in dispositional envy via methods that are less time-consuming and costly than psychotherapy (see also Allemand & Flückiger, 2022).

Our findings might also be used to derive specific techniques for reducing dispositional envy. For instance, the finding of a prospective effect of self-esteem on dispositional envy indicates that, when a patient's goal is to reduce envy, it might be worthwhile to include techniques that are aimed at building up self-esteem (see Leahy, 2021). Similarly, as previous research has shown that envy is related to hostility (Rentzsch et al., 2015), it might be productive for anger management training programs to include interventions targeting self-esteem in order to reduce envy as an antecedent of hostile behavior. Moreover, it has been shown that, in addition to a malicious form of envy that is associated with the motivation to pull the envied person down, there is also a benign form of envy characterized by the motivation to improve oneself (Lange & Crusius, 2015). This notion is in line with the findings from Article 3 showing that vaccine envy was associated with an increased willingness to get vaccinated against COVID-19. In addition to attempts to reduce a person's dispositional envy, it might therefore also be possible to channel a person's tendency to experiencing envy into positive and functional motivations that are

not harmful for either the envier or the envied person. However, more research is needed to identify potential moderators that might determine whether envy is expressed in a malicious or benign way (e.g., a person's emotion regulation or specific characteristics of the situation).

3.2.5 Underscoring the Sociopolitical Relevance of Envy Research

With buzzwords such as “Neidgesellschaft” (German for an envious society) and “Sozialneid” (German for social/class envy), political commentators often suggest that envy has a political and societal dimension. However, psychological research on the political implications of envy remains scarce and inconsistent, with some accounts stressing the destructive side of envy, linking it to stereotypes (Cuddy et al., 2008; Fiske, 2010; Fiske et al., 2002) or even to anti-Semitism (Smith & Hoogland, 2019), whereas another study found no relationship between dispositional envy and political attitudes when they controlled for participants' age (Harris & Henniger, 2013). Our findings from Article 3 add to this literature by showing that experiences of vaccine envy were not related to participants' political orientation but rather affected people from across the political spectrum. Moreover, our findings on vaccine envy provide insights into the relationship between envy and the current political situation. For instance, we saw that envy was a common phenomenon in an existentially threatening situation where a limited resource was deemed highly desirable by large parts of the population. Moreover, the results indicated that envy might be exacerbated when the distribution of the envied good is perceived as unjust and unfair, which might also be the case for other forms of envy that are relevant on a societal level (e.g., envy of the rich).

Underlining the policy relevance of personality psychology (see also Bleidorn et al., 2019), our research allowed us to derive possible starting points for interventions. For instance, as we found that vaccine envy was connected to subjective fears, a sense of injustice regarding the distribution of the available vaccines, and low well-being, programs aimed at reducing vaccine envy should focus on building trust in the manageability of the pandemic, give a detailed explanation of the distribution policies, and include measures to preserve or restore well-being. Moreover, we identified groups that were particularly prone to experiencing vaccine envy (e.g., women and younger people), thus providing information about who these interventions should target. These implications therefore underscore the practical relevance of envy research.

Additionally, Article 3 can be seen as an example of how research is able to counteract scaremongering and unfounded media claims. Whereas some commentators judged vaccine envy to be dangerous on the grounds that it might undermine social cohesion and solidarity (Amann, 2021), the present research did not find evidence that vaccine envy is related to dark and destructive impulses. People who frequently experienced vaccine envy were not more skeptical of privileges for the vaccinated and even professed a greater willingness to get vaccinated. However, vaccine envy might be different from other forms of envy because, in this special case, enviers could be confident that they would also receive the envied object and become part of the vaccinated group at some point, whereas in other cases of envy (e.g., envy of the rich), enviers can never expect to attain the envied good. The destructive side of envy might thus become more evident in situations where there is no hope of ever becoming a member of the envied outgroup. This hypothesis should be investigated further in future research.

3.3 Strengths and Limitations

In the following, I will outline what I consider to be major strengths as well as limitations of the present research regarding the design and samples as well as the measures and methodological approach used in the different studies.

3.3.1 Design and Samples

A major strength of the present research is that, unlike previous studies on dispositional envy, we used *longitudinal designs* in which dispositional envy was measured on multiple measurement occasions. With 6 years, the time spans covered by the SELF study and the GESIS panel were quite broad. The longitudinal design is novel in the field of envy research and allowed us to directly examine stability and change in dispositional envy across time as well as its longitudinal interplay with self-esteem, thereby initiating a thorough investigation of dispositional envy from a personality psychology perspective.

Moreover, it is important to note that all studies were *preregistered*. In all cases, the preregistrations took place before all the data were collected and before any data were analyzed and included a detailed description of the methods, hypotheses, and analyses. Possible deviations from the preregistered protocols were explained in the articles. The need for preregistration is frequently emphasized, as preregistrations help researchers avoid engaging in questionable research practices, such as *P*-hacking and hypothesizing after the

results are known, thereby increasing the reproducibility of research (Munafò et al., 2017; Simmons et al., 2021; van 't Veer & Giner-Sorolla, 2016). In addition to preregistering our research, I adopted open science practices by uploading the study materials and analysis scripts whenever possible. By committing to open research practices, I aimed to increase the credibility and reproducibility of this research, which might be particularly important in light of the replication crisis in psychological research (see Shrout & Rodgers, 2018).

I would also like to draw attention to the *samples* used in the present research. With more than 1,000 participants each, all three samples were quite large, which is important for increasing the power and replicability of the results (Asendorpf et al., 2016). Moreover, with the data from the GESIS panel, we had access to a representative sample of the German population. We used this sample to replicate our findings from the nonrepresentative sample from the SELF study. However, in the two nonrepresentative samples, women and participants with high levels of education were overrepresented, which might have introduced some bias into our analyses and hampered the generalizability of our results.

A major limitation of the present research is that, with the exception of the deservingness manipulation in Article 3, our research relied exclusively on *correlational data* and is therefore limited with respect to causal inferences. Our research therefore does not allow definite conclusions about the causal flow between different constructs. For instance, the direction of influence between vaccine envy and vaccination willingness could not be established due to the correlational design, leaving room for alternative explanations. Similarly, the prospective effect of self-esteem on dispositional envy found in Article 2 might not necessarily represent a causal effect. Future research should therefore use designs that are better suited for investigating causal effects.

3.3.2 Measures and Manipulations

In all studies, dispositional envy was assessed with the *Domain-Specific Envy Scale* (DSES; Rentzsch & Gross, 2015). One major advantage of the DSES is that it assesses dispositional envy in three comparison domains in addition to global dispositional envy and therefore allowed us to test the stability of domain-specific dispositional envy as well as domain-specific associations with self-esteem. Moreover, the DSES is an established instrument that has been shown to demonstrate excellent psychometric properties with regard to reliability and validity, including convergent validity with other measures of

dispositional envy (Crusius et al., 2021; Rentzsch & Gross, 2015). Our use of the DSES sets our research apart from the only other large-scale longitudinal study on change in envy, where enviousness was assessed with a one-item measure (Mujcic & Oswald, 2018).

In Article 3, in addition to the DSES, we used two *different measures of vaccine envy* located at different points on the state-trait continuum: vaccine envy after the presentation of a hypothetical scenario (a typical state envy measure) and the frequency of vaccine envy in the last 2 weeks (an aggregation of states). Using different measures of vaccine envy had the advantage that it allowed us to investigate their convergent validity and to examine whether the nomological network and associations with correlates and life outcomes replicated across measures. Moreover, in Article 3, we used an experimental design to examine the effect of deservingness on vaccine envy, as participants were randomly assigned to three groups that were presented vaccine envy scenarios with different levels of deservingness.

However, a limitation of the present research is that, in all articles, envy was assessed via *self-report measures*. Self-reports are susceptible to bias due to socially desirable responding, which might be even more relevant for envy than for other constructs due to its stigmatization (see Miceli & Castelfranchi, 2007). As envy does not have an easily observable facial expression or unique physiological response, the choice of a measure that does not rely on self-reports is not trivial. However, as there is evidence that people can accurately perceive envy in others (Lange et al., 2020, 2022), other-reports might prove to be useful sources of information in future studies. Moreover, envy might be assessed via observations of envy-typical behaviors, such as hostile and harmful behavior, in future studies (Behler et al., 2020; Rentzsch et al., 2015).

3.3.3 Methodological Approach

A major strength of the present research was that we used a *latent variable approach* to model the development of dispositional envy and self-esteem across time. Latent variables have the advantage that they reduce bias in parameter estimates because they allow researchers to separate true score variance from variance that is attributable to random measurement error (Geiser, 2020). The true score variance can be further separated into trait-specific (person) effects and an occasion-specific variable representing situation or person $\times$ situation interaction effects. Latent state-trait theory therefore allowed us to empirically test the predictions of state-trait theories of emotions. Moreover, latent

variables allow for the empirical investigation of measurement invariance as a precondition for the meaningful analysis of change across time.

In Articles 1 and 2, we approached the research questions with *complex longitudinal models* in order to achieve a nuanced understanding of the stability of dispositional envy and its interplay with self-esteem. In Article 1, we examined stability with three indicators (i.e., rank-order stability, mean-level change, and latent state-trait modeling). In Article 2, we investigated correlated change and prospective *level on change* and *change on change* effects in order to paint a differentiated picture of the longitudinal interplay of dispositional envy and self-esteem. Moreover, in both articles, we used latent change models, which have advantages compared with other modeling approaches, such as cross-lagged panel models or latent growth-curve models. For instance, traditional cross-lagged models have been criticized for not adequately separating within-person from between-person effects and for not allowing for the investigation of individual differences in intraindividual change (Hamaker et al., 2015; Mund & Nestler, 2019), whereas in latent change models, intraindividual change is represented more directly via latent difference factors. Moreover, compared with latent growth curve models, latent change models are more flexible in the sense that they do not require change patterns to follow a specific form (e.g., linear or quadratic change; Geiser, 2020).

As for limitations, it should be noted that attrition was relatively high in all samples, with a substantial proportion of participants not providing data on all measurement occasions. Moreover, in the online survey on vaccine envy, some participants terminated the survey before reaching the end of the questionnaire. For the longitudinal analyses reported in Articles 1 and 2, we used full information maximum likelihood estimation in order to handle missing data, which is less prone to bias than other missing data treatments, such as listwise deletion (Enders, 2010; Newman, 2014). However, the possibility that the large proportion of missingness introduced bias into our parameter estimates or led to errors in hypothesis testing cannot be ruled out.

3.4 Directions for Future Research

Whereas the present dissertation significantly advances the field of envy research, many open questions remain. First, future research might further investigate *stability and change* in dispositional envy. As the present research found mixed evidence for mean-level change in dispositional envy across time spans of several years, future research should take

a closer look at the normative life span trajectory of dispositional envy, ideally with large age-balanced samples and a larger number of measurement occasions in order to cover longer time spans. When doing so, future studies might also focus on critical developmental periods in which dispositional envy might be especially susceptible to change (i.e., childhood, adolescence, emerging adulthood, and old age). For instance, emerging adulthood has been described as a time of pronounced growth and change in personality (Arnett, 2000; Roberts & Davis, 2016), which might be reflected in lower rank-order stability and decreases in the mean level of dispositional envy. Moreover, the determinants of individual differences in change require a thorough investigation. For instance, future studies should investigate how a person's disposition to experience envy changes in reaction to specific life events, ideally while considering domain-specific effects depending on the comparison domain that is affected by these events (e.g., promotions and job losses leading to changes in competence envy; inheriting or losing money leading to changes in wealth envy). Similarly, future research might want to look at the longitudinal interplay between dispositional envy and objective criteria, such as a person's income, as well as additional constructs that are theoretically and empirically linked to dispositional envy (e.g., social comparison orientation). Moreover, in recent years, the processes behind personality development have been receiving increasing attention (Baumert et al., 2017; Wrzus & Roberts, 2017). For instance, in the TESSERA framework, personality change is attributed to repeated sequences of situations, expectancies, state expressions, and reactions (Wrzus & Roberts, 2017). In line with this, a previous study on self-esteem development in exchange students found that changes in trait self-esteem were mediated by changes in state self-esteem while being abroad (Hutteman et al., 2014). Future research should therefore try to identify the exact mechanisms behind change in dispositional envy and investigate if repeated experiences of state envy eventually lead to lasting changes in dispositional envy.

Second, whereas Article 2 represents an initial longitudinal examination of the reciprocal interplay between dispositional envy and self-esteem, the complex *relationship between envy and self-esteem* should be investigated more closely in future research. In order to further investigate a possible causal effect of self-esteem on envy, future studies might use research designs that are appropriate for drawing causal inferences. For instance, an experimental study might want to manipulate participants' state self-esteem (see Ritchie et al., 2016; Sekścińska et al., 2021) and compare the intensity of state envy following an

upward comparison between the high and low self-esteem condition. Similarly, future research might want to directly investigate whether social comparison orientation mediates the effect of self-esteem on dispositional envy. Moreover, the dynamic interplay between envy and self-esteem might be investigated at different time scales, with the present research focusing on long-term effects that play out across time spans of several years. Future research might also want to focus on short-term state dynamics between envy and self-esteem with the help of experience sampling, measurement burst designs, or daily diary studies. For instance, such studies might want to investigate how the correlated change between dispositional envy and self-esteem on the trait level that was found in the present research is reflected in microprocesses on the state level (e.g., ongoing bidirectional influences between state envy and state self-esteem).

Third, extending the present research which showed that domain-specific dispositional envy is as stable and trait-like as global dispositional envy and co-develops with domain-specific self-esteem, future research should take a closer look at the *domain-specificity* of dispositional envy. For instance, the assumption that domain-specific dispositional envy should be better suited to predicting domain-specific outcomes including state envy in specific situations (Marsh et al., 2006; Rentzsch & Gross, 2015; Swann Jr et al., 2007; Wittmann, 1988) should be systematically investigated. Another interesting avenue for future research is the question of how domain-specific dispositional envy is influenced by the subjective importance of the comparison domain. As a previous study showed that people are more likely to experience envy in life domains that they consider to be important (Salovey & Rodin, 1991), people might be especially prone to experiencing envy in life domains on which they base their self-esteem (see contingencies of self-worth; Crocker et al., 2003). Moreover, previous research on domain-specific dispositional envy exclusively investigated between-person differences in dispositional envy (i.e., a nomothetic, variable-centered approach). However, it might also be worthwhile to take a more person-centered approach by looking at within-person personality structures (i.e., an ideographic approach; see Beck & Jackson, 2020). Such research might look at within-person profiles of envy domains. For instance, a strong disposition toward envy in a specific domain (e.g., wealth envy) might have a different meaning to a person who scores high on all envy domains versus a person who otherwise has no tendency to experience envy. Moreover, person-specific relationships between domains of dispositional envy and self-esteem might be modeled as ideographic networks, which are suitable to study within-

person associations between traits across time. For instance, change in self-esteem might lead to change in attraction and wealth envy in Person 1, whereas self-esteem change might not be connected to any domain of dispositional envy in Person 2. The stability of dispositional envy might then be assessed as the longitudinal consistency of these ideographic networks, which might compliment nomothetic research on stability and change (see Jackson & Beck, 2021).

Last, future research should take a closer look at the complex *process of state envy generation*. When doing so, it might be worthwhile to combine knowledge from personality psychology with theories and findings from emotion psychology (e.g., research on person-situation interactions and appraisal models of emotions). Whereas emotional dispositions have received comparably little attention in emotion psychology (Scherer, 2021), there are initial attempts to extend the scope of appraisal theories from brief episodic processes to stable individual differences by proposing that emotional dispositions originate from stable appraisal biases (Kuppens & Tong, 2010; Scherer, 2021). Future research should therefore investigate whether individual differences in appraisal biases (e.g., a tendency to perceive social comparison outcomes as unfair) predict dispositional envy and how these biases are related to social comparison orientation and justice sensitivity. Moreover, more studies are needed to investigate how state envy emerges from the complex interplay between a person's disposition to experience envy and envy-specific appraisals in situations. Similar to previous studies that examined the effect of personality traits and situation perception on emotions and behavior in daily life (Horstmann et al., 2021; Sherman et al., 2015), future research should use an experience sampling methodology to investigate how the interaction of dispositional envy and characteristics of real-life situations shapes state envy and envy-specific behaviors (see also Rauthmann et al., 2014). Moreover, future studies might want to include systematic variations of situation characteristics across different comparison domains in order to test predictions about the domain-specificity of dispositional envy. For example, one could test whether individuals with a strong tendency to experience envy in a specific domain (e.g., the competence domain) experience more state envy following an upward comparison in this domain (e.g., being confronted with another person that performs better in a cognitive task) compared with an upward comparison in an unrelated domain (e.g., being confronted with a highly attractive person). Future research should also develop and test process models of how situations and person characteristics work together to produce state envy (see Rentzsch et al., 2023, for an example). Moreover, as envy is a

social emotion that typically emerges during social interactions, studies on the process of envy generation might investigate experiences of envy in dyadic interactions and include the perspectives of both the envier and the envied person (Rentzsch et al., 2023).

3.5 Conclusion

Enriching the field of envy research with a personality psychology perspective, the present dissertation makes a unique contribution to the understanding of dispositional envy as an emotional trait. In line with the prototypical process of trait research in personality psychology, I aimed to investigate the stability of dispositional envy across time, its longitudinal interplay with self-esteem, and the process of state envy generation through the example of vaccine envy during the COVID-19 pandemic. I derived four main implications from the present research: First, I showed that, in line with state-trait theories of emotions and previous conceptualizations of dispositional envy, a person's tendency to experience envy remains stable across time spans of several years. This finding places previous research on dispositional envy based on the premise of temporal stability on a more solid, empirically underpinned ground. Second, the findings on the longitudinal interplay between dispositional envy and self-esteem supported theoretical notions of a close and reciprocal association between the two constructs. I showed that dispositional envy and self-esteem change in concert, with increases in dispositional envy being accompanied by decreases in self-esteem and vice versa. In addition to correlated change, I presented initial evidence of prospective effects of self-esteem on dispositional envy, possibly pointing to a directional effect of self-esteem on envy. This finding could inform theoretical models on the association between envy and self-esteem as well as practical approaches on how to change a person's tendency to experience envy. Third, by examining the new phenomenon of vaccine envy, which emerged during the COVID-19 pandemic, I illustrated how state envy emerges from a complex interplay between person variables (e.g., dispositional envy and self-esteem) and envy-specific appraisals in a specific situation. The research on vaccine envy makes an important contribution to understanding the implications of the pandemic on emotions and well-being and has important practical implications for policies and mental health interventions that aim to reduce envy. Last, the present research underlines the importance of a domain-specific perspective on dispositional envy. Taken together, the present dissertation significantly advances the understanding of dispositional envy as a stable and domain-specific emotional trait.

REFERENCES

This list contains the references from the General Introduction and General Discussion.

- Alicke, M. D., & Zell, E. (2008). Social comparison and envy. In R. H. Smith (Ed.), *Envy: Theory and research* (pp. 73–93). Oxford University Press. <https://doi.org/10.1093/acprof:oso/9780195327953.003.0005>
- Allemand, M., & Flückiger, C. (2022). Personality change through digital-coaching interventions. *Current Directions in Psychological Science*, 31(1), 41–48. <https://doi.org/10.1177/096372142110677>
- Allport, G. W. (1961). *Pattern and growth in personality*. Holt, Reinhart & Winston.
- Amann, M. (2021, April 29). Impfneid ist typisch deutsch. *Spiegel*. <https://www.spiegel.de/politik/deutschland/coronavirus-warum-der-deutsche-impfneid-so-gefaehrlich-ist-leitartikel-a-8533165f-0002-0001-0000-000177330628>
- Anusic, I., & Schimmack, U. (2016). Stability and change of personality traits, self-esteem, and well-being: Introducing the meta-analytic stability and change model of retest correlations. *Journal of Personality and Social Psychology*, 110(5), 766–781. <https://doi.org/10.1037/pspp0000066>
- Appel, H., Crusius, J., & Gerlach, A. L. (2015). Social comparison, envy, and depression on Facebook: A study looking at the effects of high comparison standards on depressed individuals. *Journal of Social and Clinical Psychology*, 34(4), 277–289. <https://doi.org/10.1521/jscp.2015.34.4.277>
- Arnett, J. J. (2000). Emerging adulthood: A theory of development from the late teens through the twenties. *American Psychologist*, 55(5), 469–480. <https://doi.org/10.1037/0003-066X.55.5.469>
- Asendorpf, J. B., Conner, M., De Fruyt, F., De Houwer, J., Denissen, J. J., Fiedler, K., Fiedler, S., Funder, D. C., Kliegl, R., Nosek, B. A., Perugini, M., Roberts, B. W., Schmitt, M., van Aken, M. A. G., Weber, H., & Wicherts, J. M. (2016). Recommendations for increasing replicability in psychology. In A. E. Kazdin (Ed.),

- Methodological issues and strategies in clinical research* (pp. 607–622). American Psychological Association. <https://doi.org/10.1037/14805-038>
- Asendorpf, J. B., & Denissen, J. J. (2006). Predictive validity of personality types versus personality dimensions from early childhood to adulthood: Implications for the distinction between core and surface traits. *Merrill-Palmer Quarterly*, 52(3), 486–513. <https://doi.org/10.1353/mpq.2006.0022>
- Asendorpf, J. B., & Van Aken, M. A. (2003). Personality–relationship transaction in adolescence: Core versus surface personality characteristics. *Journal of Personality*, 71(4), 629–666. <https://doi.org/10.1111/1467-6494.7104005>
- Atherton, O. E., Grijalva, E., Roberts, B. W., & Robins, R. W. (2021). Stability and change in personality traits and major life goals from college to midlife. *Personality and Social Psychology Bulletin*, 47(5), 841–858. <https://doi.org/10.1177/0146167220949>
- Awee, A., Mohsin, F. H., & Makhbul, Z. K. M. (2020). The factors why people exert less: The relationship between workplace envy and social loafing moderated by self-esteem. *International Journal of Management Studies*, 27(2), 27–46. <https://doi.org/10.32890/ijms.27.2.2020.7523>
- Baumeister, R. F. (1998). The self. In S. T. Gilbert, S. T. Fiske, & G. Lindzey (Eds.), *The handbook of social psychology* (pp. 680–740). McGraw.
- Baumert, A., Schmitt, M., Perugini, M., Johnson, W., Blum, G., Borkenau, P., Costantini, G., Denissen, J. J., Fleeson, W., & Grafton, B. (2017). Integrating personality structure, personality process, and personality development. *European Journal of Personality*, 31(5), 503–528. <https://doi.org/10.1002/per.2115>
- Beck, E. D., & Jackson, J. J. (2020). Idiographic traits: A return to Allportian approaches to personality. *Current Directions in Psychological Science*, 29(3), 301–308. <https://doi.org/10.1177/0963721420915860>
- Behler, A. M. C., Wall, C. S., Bos, A., & Green, J. D. (2020). To help or to harm? Assessing the impact of envy on prosocial and antisocial behaviors. *Personality and Social Psychology Bulletin*, 46(7), 1156–1168. <https://doi.org/10.1177/0146167219897660>

- Belk, R. (2011). Benign envy. *AMS Review*, 1(3–4), 117–134. <https://doi.org/10.1007/s13162-011-0018-x>
- Belk, R. W. (1985). Materialism: Trait aspects of living in the material world. *Journal of Consumer Research*, 12(3), 265–280. <https://doi.org/10.1086/208515>
- Belk, R. W. (2008). Marketing and envy. In R. H. Smith (Ed.), *Envy: Theory and research* (pp. 211–226). Oxford University Press. <https://doi.org/10.1093/acprof:oso/9780195327953.003.0012>
- Benetti, C., & Kambouropoulos, N. (2006). Affect-regulated indirect effects of trait anxiety and trait resilience on self-esteem. *Personality and Individual Differences*, 41(2), 341–352. <https://doi.org/10.1016/j.paid.2006.01.015>
- Bleidorn, W. (2009). Linking personality states, current social roles and major life goals. *European Journal of Personality*, 23(6), 509–530. <https://doi.org/10.1002/per.731>
- Bleidorn, W., Hill, P. L., Back, M. D., Denissen, J. J., Hennecke, M., Hopwood, C. J., Jokela, M., Kandler, C., Lucas, R. E., & Luhmann, M. (2019). The policy relevance of personality traits. *American Psychologist*, 74(9), 1056–1067. <https://doi.org/10.1037/amp0000503>
- Bleidorn, W., Hopwood, C. J., Back, M. D., Denissen, J. J. A., Hennecke, M., Hill, P. L., Jokela, M., Kandler, C., Lucas, R. E., Luhmann, M., Orth, U., Roberts, B. W., Wagner, J., Wrzus, C., & Zimmermann, J. (2021). Personality trait stability and change. *Personality Science*, 2, 1–20. <https://doi.org/10.5964/ps.6009>
- Bleidorn, W., Hopwood, C. J., & Lucas, R. E. (2018). Life events and personality trait change. *Journal of Personality*, 86(1), 83–96. <https://doi.org/10.1111/jopy.12286>
- Bleidorn, W., Kandler, C., & Caspi, A. (2014). The behavioural genetics of personality development in adulthood—Classic, contemporary, and future trends. *European Journal of Personality*, 28(3), 244–255. <https://doi.org/10.1002/per.1957>
- Borghuis, J., Denissen, J. J., Oberski, D., Sijtsma, K., Meeus, W. H., Branje, S., Koot, H. M., & Bleidorn, W. (2017). Big Five personality stability, change, and codevelopment across adolescence and early adulthood. *Journal of Personality and Social Psychology*, 113(4), 641–657. <https://doi.org/10.1037/pspp0000138>

- Bosnjak, M., Dannwolf, T., Enderle, T., Schaurer, I., Struminskaya, B., Tanner, A., & Weyandt, K. W. (2018). Establishing an open probability-based mixed-mode panel of the general population in Germany: The GESIS panel. *Social Science Computer Review*, 36(1), 103–115. <https://doi.org/10.1177/0894439317697949>
- Bourdieu, P. (1986). The forms of capital. In J. G. Richardson (Ed.), *Handbook of theory and research for the sociology of education* (pp. 241–258). Greenwood.
- Brown, J. D. (2010). High self-esteem buffers negative feedback: Once more with feeling. *Cognition and Emotion*, 24(8), 1389–1404. <https://doi.org/10.1080/02699930903504405>
- Chae, J. (2018). Explaining females' envy toward social media influencers. *Media Psychology*, 21(2), 246–262. <https://doi.org/10.1080/15213269.2017.1328312>
- Church, A. T., Katigbak, M. S., Reyes, J. A. S., Salanga, M. G. C., Miramontes, L. A., & Adams, N. B. (2008). Prediction and cross-situational consistency of daily behavior across cultures: Testing trait and cultural psychology perspectives. *Journal of Research in Personality*, 42(5), 1199–1215. <https://doi.org/10.1016/j.jrp.2008.03.007>
- Cohen, T. R., Wolf, S. T., Panter, A. T., & Insko, C. A. (2011). Introducing the GASP scale: A new measure of guilt and shame proneness. *Journal of Personality and Social Psychology*, 100(5), 947–966. <https://doi.org/10.1037/a0022641>
- Cohen-Charash, Y., & Mueller, J. S. (2007). Does perceived unfairness exacerbate or mitigate interpersonal counterproductive work behaviors related to envy? *Journal of Applied Psychology*, 92(3), 666–680. <https://doi.org/10.1037/0021-9010.92.3.666>
- Coopersmith, S. (1967). *The antecedents of self-esteem*. Freeman.
- Crocker, J., Luhtanen, R. K., Cooper, M. L., & Bouvrette, A. (2003). Contingencies of self-worth in college students: Theory and measurement. *Journal of Personality and Social Psychology*, 85(5), 894–908. <https://doi.org/10.1037/0022-3514.85.5.894>
- Crusius, J., Thierhoff, J., & Lange, J. (2021). Dispositional greed predicts benign and malicious envy. *Personality and Individual Differences*, 168, 110361. <https://doi.org/10.1016/j.paid.2020.110361>

- Cuddy, A. J., Fiske, S. T., & Glick, P. (2008). Warmth and competence as universal dimensions of social perception: The stereotype content model and the BIAS map. *Advances in Experimental Social Psychology*, 40, 61–149. [https://doi.org/10.1016/S0065-2601\(07\)00002-0](https://doi.org/10.1016/S0065-2601(07)00002-0)
- DelPriore, D. J., Hill, S. E., & Buss, D. M. (2012). Envy: Functional specificity and sex-differentiated design features. *Personality and Individual Differences*, 53(3), 317–322. <https://doi.org/10.1016/j.paid.2012.03.029>
- Duffy, M. K., Scott, K. L., Shaw, J. D., Tepper, B. J., & Aquino, K. (2012). A social context model of envy and social undermining. *Academy of Management Journal*, 55(3), 643–666. <https://doi.org/10.5465/amj.2009.0804>
- Duffy, M. K., & Shaw, J. D. (2000). The Salieri syndrome: Consequences of envy in groups. *Small Group Research*, 31(1), 3–23. <https://doi.org/10.1177/104649640003100101>
- Enders, C. K. (2010). *Applied missing data analysis*. Guilford Press.
- Endler, N. S., & Hunt, J. M. (1966). Sources of behavioral variance as measured by the SR Inventory of Anxiousness. *Psychological Bulletin*, 65(6), 336–346. <https://doi.org/10.1037/h0023309>
- Fetvadjev, V. H., & He, J. (2019). The longitudinal links of personality traits, values, and well-being and self-esteem: A five-wave study of a nationally representative sample. *Journal of Personality and Social Psychology*, 117(2), 448–464. <https://doi.org/10.1037/pspp0000212>
- Fiske, S. T. (2010). Envy up, scorn down: How comparison divides us. *American Psychologist*, 65(8), 698–706. <https://doi.org/10.1037/0003-066X.65.8.698>
- Fiske, S. T., Cuddy, A. J., Glick, P., & Xu, J. (2002). A model of (often mixed) stereotype content: Competence and warmth respectively follow from perceived status and competition. *Journal of Personality and Social Psychology*, 82(6), 878–902. <https://doi.org/10.1037/0022-3514.82.6.878>
- Fleeson, W., & Jayawickreme, E. (2015). Whole Trait Theory. *Journal of Research in Personality*, 56, 82–92. <https://doi.org/10.1016/j.jrp.2014.10.009>
- Fleeson, W., & Nofle, E. (2008). The end of the person–situation debate: An emerging synthesis in the answer to the consistency question. *Social and Personality*

- Psychology Compass*, 2(4), 1667–1684. <https://doi.org/10.1111/j.1751-9004.2008.00122.x>
- Foster, G. M. (1972). The anatomy of envy: A study in symbolic behavior. *Current Anthropology*, 13(2), 165–202. <https://doi.org/10.1086/201267>
- Funder, D. C. (2006). Towards a resolution of the personality triad: Persons, situations, and behaviors. *Journal of Research in Personality*, 40(1), 21–34. <https://doi.org/10.1016/j.jrp.2005.08.003>
- Geiser, C. (2020). *Longitudinal structural equation modeling with Mplus: A latent state-trait perspective*. Guilford Publications.
- Gesellschaft für Konsumforschung. (2015). *Repräsentativ-Befragung zum Thema „Neid 3“ durch die GfK*. GfK Marktforschung.
- Geukes, K., van Zalk, M. H., & Back, M. D. (2017). Analyzing processes in personality development. In J. Specht (Ed.), *Personality development across the lifespan* (pp. 455–472). Elsevier. <https://doi.org/10.1016/B978-0-12-804674-6.00028-4>
- Gibbons, F. X., & Buunk, B. P. (1999). Individual differences in social comparison: Development of a scale of social comparison orientation. *Journal of Personality and Social Psychology*, 76(1), 129–142. <https://doi.org/10.1037/0022-3514.76.1.129>
- Gold, B. T. (1996). Enviousness and its relationship to maladjustment and psychopathology. *Personality and Individual Differences*, 21(3), 311–321. [https://doi.org/10.1016/0191-8869\(96\)00081-5](https://doi.org/10.1016/0191-8869(96)00081-5)
- Grimm, J., & Grimm, W. (1857). Sneewittchen [Little Snow-White]. In D. L. Ashliman (Trans.), *Kinder- und Hausmärchen [Children's and Household Tales]* (final ed., pp. 264–273). Verlag der Dieterichschen Buchhandlung.
- Grosz, M. P., Hartmann, I., Dufner, M., Leckelt, M., Gerlach, T. M., Rauthmann, J. F., Denissen, J. J., Küfner, A. C., & Back, M. D. (2022). A process × domain assessment of narcissism: The Domain-Specific Narcissistic Admiration and Rivalry Questionnaire. *Assessment*, 29(7), 1482–1495. <https://doi.org/10.1177/10731911211020>

- Haase, A. M., Prapavessis, H., & Owens, R. G. (2013). Domain-specificity in perfectionism: Variations across domains of life. *Personality and Individual Differences*, 55(6), 711–715. <https://doi.org/10.1016/j.paid.2013.05.025>
- Hamaker, E. L., Kuiper, R. M., & Grasman, R. P. (2015). A critique of the cross-lagged panel model. *Psychological Methods*, 20(1), 102–116. <https://doi.org/10.1037/a0038889>
- Hareli, S., & Parkinson, B. (2008). What's social about social emotions? *Journal for the Theory of Social Behaviour*, 38(2), 131–156. <https://doi.org/10.1111/j.1468-5914.2008.00363.x>
- Harris, C. R., & Henniger, N. E. (2013). Envy, politics, and age. *Frontiers in Psychology*, 4, Article 67. <https://doi.org/10.3389/fpsyg.2013.00067>
- Harris, M. A., & Orth, U. (2020). The link between self-esteem and social relationships: A meta-analysis of longitudinal studies. *Journal of Personality and Social Psychology*, 119(6), 1459–1477. <https://doi.org/10.1037/pspp0000265>
- Heider, F. (1958). *The psychology of interpersonal relations*. John Wiley.
- Henniger, N. E., & Harris, C. R. (2015). Envy across adulthood: The what and the who. *Basic and Applied Social Psychology*, 37(6), 303–318. <https://doi.org/10.1080/01973533.2015.1088440>
- Hill, S. E., & Buss, D. M. (2008). The evolutionary psychology of envy. In R. H. Smith (Ed.), *Envy: Theory and research*. (pp. 60–70). Oxford University Press. <https://doi.org/10.1093/acprof:oso/9780195327953.003.0004>
- Hill, S. E., DelPriore, D. J., & Vaughan, P. W. (2011). The cognitive consequences of envy: Attention, memory, and self-regulatory depletion. *Journal of Personality and Social Psychology*, 101(4), 653–666. <https://doi.org/10.1037/a0023904>
- Horstmann, K. T., Rauthmann, J. F., Sherman, R. A., & Ziegler, M. (2021). Unveiling an exclusive link: Predicting behavior with personality, situation perception, and affect in a preregistered experience sampling study. *Journal of Personality and Social Psychology*, 120(5), 1317–1343. <https://doi.org/10.1037/pspp0000357>
- Hutteman, R., Bleidorn, W., Keresteš, G., Brković, I., Butković, A., & Denissen, J. J. (2014). Reciprocal associations between parenting challenges and parents'

- personality development in young and middle adulthood. *European Journal of Personality*, 28(2), 168–179. <https://doi.org/10.1002/per.1932>
- Hutteman, R., Nestler, S., Wagner, J., Egloff, B., & Back, M. D. (2015). Wherever I may roam: Processes of self-esteem development from adolescence to emerging adulthood in the context of international student exchange. *Journal of Personality and Social Psychology*, 108(5), 767–783. <https://doi.org/10.1037/pspp0000015>
- Irwing, P., Hughes, D. J., Tokarev, A., & Booth, T. (2023). Towards a taxonomy of personality facets. *European Journal of Personality*. Advance online publication. <https://doi.org/10.1177/08902070231200919>
- Izard, C. E., Libero, D. Z., Putnam, P., & Haynes, O. M. (1993). Stability of emotion experiences and their relations to traits of personality. *Journal of Personality and Social Psychology*, 64(5), 847–860. <https://doi.org/10.1037/0022-3514.64.5.847>
- Jackson, J. J., & Beck, E. D. (2021). Personality development beyond the mean: Do life events shape personality variability, structure, and ipsative continuity? *The Journals of Gerontology: Series B*, 76(1), 20–30. <https://doi.org/10.1093/geronb/gbaa093>
- Kandler, C., Zimmermann, J., & McAdams, D. P. (2014). Core and surface characteristics for the description and theory of personality differences and development. *European Journal of Personality*, 28(3), 231–243. <https://doi.org/10.1002/per.1952>
- Keltner, D., & Shiota, M. N. (2021). Emotion and personality: A social functionalist approach. In O. P. John & R. W. Robins (Eds.), *Handbook of personality: Theory and research* (4th ed., pp. 447–486). The Guilford Press.
- Krauss, S., & Orth, U. (2022). Work experiences and self-esteem development: A meta-analysis of longitudinal studies. *European Journal of Personality*, 36(6), 849–869. <https://doi.org/10.1177/08902070211027142>
- Krizan, Z., & Johar, O. (2012). Envy divides the two faces of narcissism. *Journal of Personality*, 80(5), 1415–1451. <https://doi.org/10.1111/j.1467-6494.2012.00767.x>
- Kuppens, P., & Tong, E. M. (2010). An appraisal account of individual differences in emotional experience. *Social and Personality Psychology Compass*, 4(12), 1138–1150. <https://doi.org/10.1111/j.1751-9004.2010.00324.x>

- Lange, J., & Crusius, J. (2015). Dispositional envy revisited: Unraveling the motivational dynamics of benign and malicious envy. *Personality and Social Psychology Bulletin*, 41(2), 284–294. <https://doi.org/10.1177/0146167214564959>
- Lange, J., Fischer, A. H., & van Kleef, G. A. (2022). “You’re just envious”: Inferring benign and malicious envy from facial expressions and contextual information. *Emotion*, 22(1), 64–80. <https://doi.org/10.1037/emo0001047>
- Lange, J., Hagemeyer, B., Lösch, T., & Rentzsch, K. (2020). Accuracy and bias in the social perception of envy. *Emotion*, 20(8), 1399–1410. <https://doi.org/10.1037/emo0000652>
- Leahy, R. L. (2021). Cognitive-behavioral therapy for envy. *Cognitive Therapy and Research*, 45(3), 418–427. <https://doi.org/10.1007/s10608-020-10135-y>
- Leary, M. R., Tambor, E. S., Terdal, S. K., & Downs, D. L. (1995). Self-esteem as an interpersonal monitor: The sociometer hypothesis. *Journal of Personality and Social Psychology*, 68(3), 518–530. <https://doi.org/10.1037/0022-3514.68.3.518>
- Lievens, F., De Corte, W., & Schollaert, E. (2008). A closer look at the frame-of-reference effect in personality scale scores and validity. *Journal of Applied Psychology*, 93(2), 268–279. <https://doi.org/10.1037/0021-9010.93.2.268>
- Liu, Z., Elliot, A. J., & Li, Y. (2021). Social comparison orientation and trait competitiveness: Their interrelation and utility in predicting overall and domain-specific risk-taking. *Personality and Individual Differences*, 171, 110451. <https://doi.org/10.1016/j.paid.2020.110451>
- Mahadevan, N., Gregg, A. P., & Sedikides, C. (2019). Is self-regard a sociometer or a hierometer? Self-esteem tracks status and inclusion, narcissism tracks status. *Journal of Personality and Social Psychology*, 116(3), 444–466. <https://doi.org/10.1037/pspp0000189>
- Marsh, H. W., Trautwein, U., Lüdtke, O., Köller, O., & Baumert, J. (2006). Integration of multidimensional self-concept and core personality constructs: Construct validation and relations to well-being and achievement. *Journal of Personality*, 74(2), 403–456. <https://doi.org/10.1111/j.1467-6494.2005.00380.x>

- McCrae, R. R., & Costa, P. T. (2008). The five-factor theory of personality. In O. P. John, R. W. Robins, & L. A. Pervin (Eds.), *Handbook of personality: Theory and research* (3rd ed., pp. 159–181). The Guilford Press.
- McCullough, M. E., Emmons, R. A., & Tsang, J.-A. (2002). The grateful disposition: A conceptual and empirical topography. *Journal of Personality and Social Psychology*, 82(1), 112–127. <https://doi.org/10.1037/0022-3514.82.1.112>
- McWilliams, M. A., Nier, J. A., & Singer, J. A. (2013). The implicit self and the specificity-matching principle: Implicit self-concept predicts domain-specific outcomes. *Personality and Individual Differences*, 54(4), 474–478. <https://doi.org/10.1016/j.paid.2012.09.014>
- Meier, A., & Johnson, B. K. (2022). Social comparison and envy on social media: A critical review. *Current Opinion in Psychology*, 45, Article 101302. <https://doi.org/10.1016/j.copsyc.2022.101302>
- Miceli, M., & Castelfranchi, C. (2007). The envious mind. *Cognition and Emotion*, 21(3), 449–479. <https://doi.org/10.1080/02699930600814735>
- Michel, Y. A., Steinmayr, R., Frenzel, A. C., & Ziegler, M. (2022). Unpacking domain-specific achievement motivation: The role of contextualising items for test-criterion correlations. *Educational Psychology*, 42(4), 501–525. <https://doi.org/10.1080/01443410.2020.1713303>
- Milić, A., Kardum, I., & Švegar, D. (2023). Contours of the envious personality: Reassessing the capacity of the Big Five and the Dark Triad personality traits in predicting dispositional envy. *Current Psychology*, 42(16), 14051–14064. <https://doi.org/10.1007/s12144-021-02633-3>
- Montal-Rosenberg, R., & Moran, S. (2020). Envy and help giving. *Journal of Personality and Social Psychology*, 122(2), 222–243. <https://doi.org/10.1037/pspi0000340>
- Moors, A., Ellsworth, P. C., Scherer, K. R., & Frijda, N. H. (2013). Appraisal theories of emotion: State of the art and future development. *Emotion Review*, 5(2), 119–124. <https://doi.org/10.1177/1754073912468165>

- Mujcic, R., & Oswald, A. J. (2018). Is envy harmful to a society's psychological health and wellbeing? A longitudinal study of 18,000 adults. *Social Science & Medicine*, 198, 103–111. <https://doi.org/10.1016/j.socscimed.2017.12.030>
- Müller, S. R., Delahunty, F., & Matz, S. C. (2023). The impact of the early stages of COVID-19 on mental health in the United States, Germany, and the United Kingdom. *Journal of Personality and Social Psychology*, 124(3), 620. <https://doi.org/10.1037/pspp0000459>
- Munafò, M. R., Nosek, B. A., Bishop, D. V., Button, K. S., Chambers, C. D., Percie du Sert, N., Simonsohn, U., Wagenmakers, E.-J., Ware, J. J., & Ioannidis, J. (2017). A manifesto for reproducible science. *Nature Human Behaviour*, 1, Article 0021. <https://doi.org/10.1038/s41562-016-0021>
- Mund, M., & Nestler, S. (2019). Beyond the cross-lagged panel model: Next-generation statistical tools for analyzing interdependencies across the life course. *Advances in Life Course Research*, 41, 100249. <https://doi.org/10.1016/j.alcr.2018.10.002>
- Neufeld, D. C., & Johnson, E. A. (2016). Burning with envy? Dispositional and situational influences on envy in grandiose and vulnerable narcissism. *Journal of Personality*, 84(5), 685–696. <https://doi.org/10.1111/jopy.12192>
- Newman, D. A. (2014). Missing data: Five practical guidelines. *Organizational Research Methods*, 17(4), 372–411. <https://doi.org/10.1177/1094428114548590>
- Ng, J. C., Au, A. K., Wong, H. S., Sum, C. K., & Lau, V. C. (2021). Does dispositional envy make you flourish more (or less) in life? An examination of its longitudinal impact and mediating mechanisms among adolescents and young adults. *Journal of Happiness Studies*, 22(3), 1089–1117. <https://doi.org/10.1007/s10902-020-00265-1>
- Niveau, N., New, B., & Beaudoin, M. (2021). Self-esteem interventions in adults—A systematic review and meta-analysis. *Journal of Research in Personality*, 94, 104131. <https://doi.org/10.1016/j.jrp.2021.104131>
- Olaru, G., & Allemand, M. (2022). Correlated personality change across time and age. *European Journal of Personality*, 36(5), 729–749. <https://doi.org/10.1177/08902070211014054>

- O'Meara, M. S., & South, S. C. (2019). Big Five personality domains and relationship satisfaction: Direct effects and correlated change over time. *Journal of Personality*, 87(6), 1206–1220. <https://doi.org/10.1111/jopy.12468>
- Oren-Yagoda, R., Schwartz, M., & Aderka, I. M. (2021). The grass is always greener: Envy in social anxiety disorder. *Journal of Anxiety Disorders*, 82, 102445. <https://doi.org/10.1016/j.janxdis.2021.102445>
- Orth, U., & Robins, R. W. (2022). Is high self-esteem beneficial? Revisiting a classic question. *American Psychologist*, 77(1), 5–17. <https://doi.org/10.1037/amp0000922>
- Orth, U., Robins, R. W., & Widaman, K. F. (2012). Life-span development of self-esteem and its effects on important life outcomes. *Journal of Personality and Social Psychology*, 102(6), 1271–1288. <https://doi.org/10.1037/a0025558>
- Parrott, W. G., & Smith, R. H. (1993). Distinguishing the experiences of envy and jealousy. *Journal of Personality and Social Psychology*, 64(6), 906–920. <https://doi.org/10.1037/0022-3514.64.6.906>
- Pfund, G. N., & Allemand, M. (2022). Correlated change between personality traits and perceived social support in old age. *Personality and Social Psychology Bulletin*. Advance online publication. <https://doi.org/10.1177/01461672221120493>
- Rauthmann, J. F. (2020). Person-situation interactions. In B. J. Carducci & C. S. Nave (Eds.), *The Wiley encyclopedia of personality and individual differences: Measurement and assessment* (pp. 31–35). Wiley. <https://doi.org/10.1002/9781118970843.ch75>
- Rauthmann, J. F., Gallardo-Pujol, D., Guillaume, E. M., Todd, E., Nave, C. S., Sherman, R. A., Ziegler, M., Jones, A. B., & Funder, D. C. (2014). The Situational Eight DIAMONDS: A taxonomy of major dimensions of situation characteristics. *Journal of Personality and Social Psychology*, 107(4), 677–718. <https://doi.org/10.1037/a0037250>
- Reisenzein, R., Hildebrandt, V., & Weber, H. (2020). Personality and emotion. In P. J. Corr & G. Matthews (Eds.), *Cambridge handbook of personality psychology* (2nd ed., pp. 81–99). Cambridge University Press.

- Rentzsch, K. (2021). *Self-Evaluations Across Life (SELF) study*. osf.io/je924
- Rentzsch, K., Giese, A.-K., Hebel, V., & Lösch, T. (2023). Personality and emotions in social interactions—The PESI project. *Personality Science*, 4, Article e8241. <https://doi.org/10.5964/ps.8241>
- Rentzsch, K., & Gross, J. J. (2015). Who turns green with envy? Conceptual and empirical perspectives on dispositional envy. *European Journal of Personality*, 29(5), 530–547. <https://doi.org/10.1002/per.2012>
- Rentzsch, K., & Schröder-Abé. (2022). Top down or bottom up? Evidence from the longitudinal development of global and domain-specific self-esteem in adulthood. *Journal of Personality and Social Psychology*, 122(4), 714–730. <https://doi.org/10.1037/pspp0000393>
- Rentzsch, K., & Schröder-Abé, M. (2018). Stability and change in domain-specific self-esteem and global self-esteem. *European Journal of Personality*, 32(4), 353–370. <https://doi.org/10.1002/per.2167>
- Rentzsch, K., Schröder-Abé, M., & Schütz, A. (2015). Envy mediates the relation between low academic self-esteem and hostile tendencies. *Journal of Research in Personality*, 58, 143–153. <https://doi.org/10.1016/j.jrp.2015.08.001>
- Rentzsch, K., Wenzler, M. P., & Schütz, A. (2016). The structure of multidimensional self-esteem across age and gender. *Personality and Individual Differences*, 88, 139–147. <https://doi.org/10.1016/j.paid.2015.09.012>
- Ritchie, T. D., Sedikides, C., & Skowronski, J. J. (2016). Emotions experienced at event recall and the self: Implications for the regulation of self-esteem, self-continuity and meaningfulness. *Memory*, 24(5), 577–591. <https://doi.org/10.1080/09658211.2015.1031678>
- Roberts, B. W., Caspi, A., & Moffitt, T. E. (2001). The kids are alright: Growth and stability in personality development from adolescence to adulthood. *Journal of Personality and Social Psychology*, 81(4), 670–683. <https://doi.org/10.1037/0022-3514.81.4.670>

- Roberts, B. W., & Davis, J. P. (2016). Young adulthood is the crucible of personality development. *Emerging Adulthood*, 4(5), 318-326. <https://doi.org/10.1177/2167696816653052>
- Roberts, B. W., Luo, J., Briley, D. A., Chow, P. I., Su, R., & Hill, P. L. (2017). A systematic review of personality trait change through intervention. *Psychological Bulletin*, 143(2), 117–141. <https://doi.org/10.1037/bul0000088>
- Roberts, B. W., & Mroczek, D. (2008). Personality trait change in adulthood. *Current Directions in Psychological Science*, 17(1), 31–35. <https://doi.org/10.1111/j.1467-8721.2008.00543.x>
- Roberts, B. W., Wood, D., & Caspi, A. (2008). The development of personality traits in adulthood. In O. P. John, R. W. Robins, & L. A. Pervin (Eds.), *Handbook of personality: Theory and research* (3rd ed., pp. 375–398). The Guilford Press.
- Roberts, B. W., Wood, D., & Smith, J. L. (2005). Evaluating Five Factor Theory and social investment perspectives on personality trait development. *Journal of Research in Personality*, 39(1), 166–184. <https://doi.org/10.1016/j.jrp.2004.08.002>
- Rogier, G., Amo, A., Simmi, B., & Velotti, P. (2023). Pathological narcissism and sadistic personality: The role of rivalry and malicious envy. *Personality and Individual Differences*, 205, 112097. <https://doi.org/10.1016/j.paid.2023.112097>
- Rosenberg, E. L. (1998). Levels of analysis and the organization of affect. *Review of General Psychology*, 2(3), 247–270. <https://doi.org/10.1037/1089-2680.2.3.247>
- Rosenberg, M. (1965). *Society and the adolescent self-image*. Princeton University Press.
- Salovey, P., & Rodin, J. (1984). Some antecedents and consequences of social-comparison jealousy. *Journal of Personality and Social Psychology*, 47(4), 780–792. <https://doi.org/10.1037/0022-3514.47.4.780>
- Salovey, P., & Rodin, J. (1988). Coping with envy and jealousy. *Journal of Social and Clinical Psychology*, 7(1), 15–33. <https://doi.org/10.1521/jscp.1988.7.1.15>
- Salovey, P., & Rodin, J. (1991). Provoking jealousy and envy: Domain relevance and self-esteem threat. *Journal of Social and Clinical Psychology*, 10(4), 395–413. <https://doi.org/10.1521/jscp.1991.10.4.395>

- Scherer, K. R. (2021). Evidence for the existence of emotion dispositions and the effects of appraisal bias. *Emotion*, 21(6), 1224–1238. <https://doi.org/10.1037/emo0000861>
- Scherer, K. R., & Moors, A. (2019). The emotion process: Event appraisal and component differentiation. *Annual Review of Psychology*, 70, 719–745. <https://doi.org/10.1146/annurev-psych-122216-011854>
- Schriber, R. A., Chung, J. M., Sorensen, K. S., & Robins, R. W. (2017). Dispositional contempt: A first look at the contemptuous person. *Journal of Personality and Social Psychology*, 113(2), 280–309. <https://doi.org/10.1037/pspp0000101>
- Seifert, I. S., Rohrer, J. M., Egloff, B., & Schmukle, S. C. (2022). The development of the rank-order stability of the Big Five across the life span. *Journal of Personality and Social Psychology*, 122(5), 920–941. <https://doi.org/10.1037/pspp0000398>
- Sekścińska, K., Jaworska, D., & Rudzinska-Wojciechowska, J. (2021). Self-esteem and financial risk-taking. *Personality and Individual Differences*, 172, 110576. <https://doi.org/10.1016/j.paid.2020.110576>
- Seuntjens, T. G., Zeelenberg, M., Van de Ven, N., & Breugelmans, S. M. (2015). Dispositional greed. *Journal of Personality and Social Psychology*, 108(6), 917–933. <https://doi.org/10.1037/pspp0000031>
- Shavelson, R. J., Hubner, J. J., & Stanton, G. C. (1976). Self-concept: Validation of construct interpretations. *Review of Educational Research*, 46(3), 407–441. <https://doi.org/10.3102/00346543046003407>
- Sherman, R. A., Rauthmann, J. F., Brown, N. A., Serfass, D. G., & Jones, A. B. (2015). The independent effects of personality and situations on real-time expressions of behavior and emotion. *Journal of Personality and Social Psychology*, 109(5), 872–888. <https://doi.org/10.1037/pspp0000036>
- Shrout, P. E., & Rodgers, J. L. (2018). Psychology, science, and knowledge construction: Broadening perspectives from the replication crisis. *Annual Review of Psychology*, 69, 487–510. <https://doi.org/10.1146/annurev-psych-122216-011845>
- Silver, M., & Sabini, J. P. (1978). The perception of envy. *Social Psychology*, 41(2), 105–117. <https://doi.org/10.2307/3033570>

- Simmons, J. P., Nelson, L. D., & Simonsohn, U. (2021). Pre-registration: Why and how. *Journal of Consumer Psychology*, 31(1), 151–162. <https://doi.org/10.1002/jcpy.1208>
- Smith, R. H., & Hoogland, C. E. (2019). How envy can incite anti-semitism and genocide. In L. S. Newman (Ed.), *Confronting humanity at its worst: Social psychological perspectives on genocide* (pp. 62–88). Oxford University Press. <https://doi.org/10.1093/oso/9780190685942.003.0003>
- Smith, R. H., & Kim, S. H. (2007). Comprehending envy. *Psychological Bulletin*, 133(1), 46–64. <https://doi.org/10.1037/0033-2909.133.1.46>
- Smith, R. H., Parrott, W. G., Diener, E. F., Hoyle, R. H., & Kim, S. H. (1999). Dispositional envy. *Personality and Social Psychology Bulletin*, 25(8), 1007–1020. <https://doi.org/10.1177/01461672992511008>
- Smith, R. H., Parrott, W. G., Ozer, D., & Moniz, A. (1994). Subjective injustice and inferiority as predictors of hostile and depressive feelings in envy. *Personality and Social Psychology Bulletin*, 20(6), 705–711. <https://doi.org/10.1177/0146167294206008>
- Smith, R. H., Turner, T. J., Garonzik, R., Leach, C. W., Urch-Druskat, V., & Weston, C. M. (1996). Envy and Schadenfreude. *Personality and Social Psychology Bulletin*, 22(2), 158–168. <https://doi.org/10.1177/0146167296222005>
- Sowislo, J. F., & Orth, U. (2013). Does low self-esteem predict depression and anxiety? A meta-analysis of longitudinal studies. *Psychological Bulletin*, 139(1), 213–240. <https://doi.org/10.1037/a0028931>
- Specht, J., Egloff, B., & Schmukle, S. C. (2011). Stability and change of personality across the life course: The impact of age and major life events on mean-level and rank-order stability of the Big Five. *Journal of Personality and Social Psychology*, 101(4), 862–882. <https://doi.org/10.1037/a0024950>
- Spielberger, C. D. (1972). *Anxiety: Current trends in theory and research*. Academic Press.
- Spielberger, C. D. (1983). *Manual for the State-Trait-Anxiety Inventory*. Consulting Psychologist Press.

- Spielberger, C. D. (1988). *State-Trait-Anger-Expression-Inventory (STAXI)* (Research ed.). Psychological Assessment Resources.
- Spielberger, C. D., & Reheiser, E. C. (2009). Assessment of emotions: Anxiety, anger, depression, and curiosity. *Applied Psychology: Health and Well-Being*, 1(3), 271–302. <https://doi.org/10.1111/j.1758-0854.2009.01017.x>
- Stieger, M., Wepfer, S., Rügger, D., Kowatsch, T., Roberts, B. W., & Allemand, M. (2020). Becoming more conscientious or more open to experience? Effects of a two-week smartphone-based intervention for personality change. *European Journal of Personality*, 34(3), 345–366. <https://doi.org/10.1002/per.2267>
- Swann Jr, W. B., Chang-Schneider, C., & Larsen McClarty, K. (2007). Do people's self-views matter? Self-concept and self-esteem in everyday life. *American Psychologist*, 62(2), 84–94. <https://doi.org/10.1037/0003-066X.62.2.84>
- Takahashi, H., Kato, M., Matsuura, M., Mobbs, D., Suhara, T., & Okubo, Y. (2009). When your gain is my pain and your pain is my gain: Neural correlates of envy and schadenfreude. *Science*, 323(5916), 937–939. <https://doi.org/10.1126/science.1165604>
- Thompson, G., Glasø, L., & Martinsen, Ø. (2016). Antecedents and consequences of envy. *The Journal of Social Psychology*, 156(2), 139–153. <https://doi.org/10.1080/00224545.2015.1047439>
- Tracy, J. L., & Weidman, A. C. (2021). The self-conscious and social emotions: A personality and social functionalist account. In O. P. John & R. W. Robins (Eds.), *Handbook of personality: Theory and research* (4th ed.). The Guilford Press.
- Valentine, J. C., DuBois, D. L., & Cooper, H. (2004). The relation between self-beliefs and academic achievement: A meta-analytic review. *Educational Psychologist*, 39(2), 111–133. https://doi.org/10.1207/s15326985ep3902_3
- van de Ven, N. (2017). Envy and admiration: Emotion and motivation following upward social comparison. *Cognition and Emotion*, 31(1), 193–200. <https://doi.org/10.1080/02699931.2015.1087972>

- van de Ven, N., Zeelenberg, M., & Pieters, R. (2009). Leveling up and down: The experiences of benign and malicious envy. *Emotion*, 9(3), 419–429. <https://doi.org/10.1037/a0015669>
- van de Ven, N., Zeelenberg, M., & Pieters, R. (2012). Appraisal patterns of envy and related emotions. *Motivation and Emotion*, 36(2), 195–204. <https://doi.org/10.1007/s11031-011-9235-8>
- van 't Veer, A. E., & Giner-Sorolla, R. (2016). Pre-registration in social psychology—A discussion and suggested template. *Journal of Experimental Social Psychology*, 67, 2–12. <https://doi.org/10.1016/j.jesp.2016.03.004>
- Vrabel, J. K., Zeigler-Hill, V., & Southard, A. C. (2018). Self-esteem and envy: Is state self-esteem instability associated with the benign and malicious forms of envy? *Personality and Individual Differences*, 123, 100–104. <https://doi.org/10.1016/j.paid.2017.11.001>
- Wagner, J., Lüdtke, O., & Robitzsch, A. (2019). Does personality become more stable with age? Disentangling state and trait effects for the big five across the life span using local structural equation modeling. *Journal of Personality and Social Psychology*, 116(4), 666–680. <https://doi.org/10.1037/pspp0000203>
- Wayment, H. A., & Taylor, S. E. (1995). Self-evaluation processes: Motives, information use, and self-esteem. *Journal of Personality*, 63(4), 729–757. <https://doi.org/10.1111/j.1467-6494.1995.tb00315.x>
- White, J. B., Langer, E. J., Yariv, L., & Welch, J. C. (2006). Frequent social comparisons and destructive emotions and behaviors: The dark side of social comparisons. *Journal of Adult Development*, 13(1), 36–44. <https://doi.org/10.1007/s10804-006-9005-0>
- Wittmann, W. W. (1988). Multivariate reliability theory. In J. R. Nesselroade & R. B. Cattell (Eds.), *Handbook of multivariate experimental psychology* (pp. 505–560). Plenum. https://doi.org/10.1007/978-1-4613-0893-5_16
- Wrzus, C. (2021, September 12–15). Discussion. In Brandt, N. (Chair), *Personality Development from Adolescence to Old Age* [Symposium]. 16th Conference on Personality and Psychological Assessment (DPPD), Ulm, Germany.

Wrzus, C., & Roberts, B. W. (2017). Processes of personality development in adulthood: The TESSERA framework. *Personality and Social Psychology Review*, 21(3), 253–277. <https://doi.org/10.1177/1088868316652279>