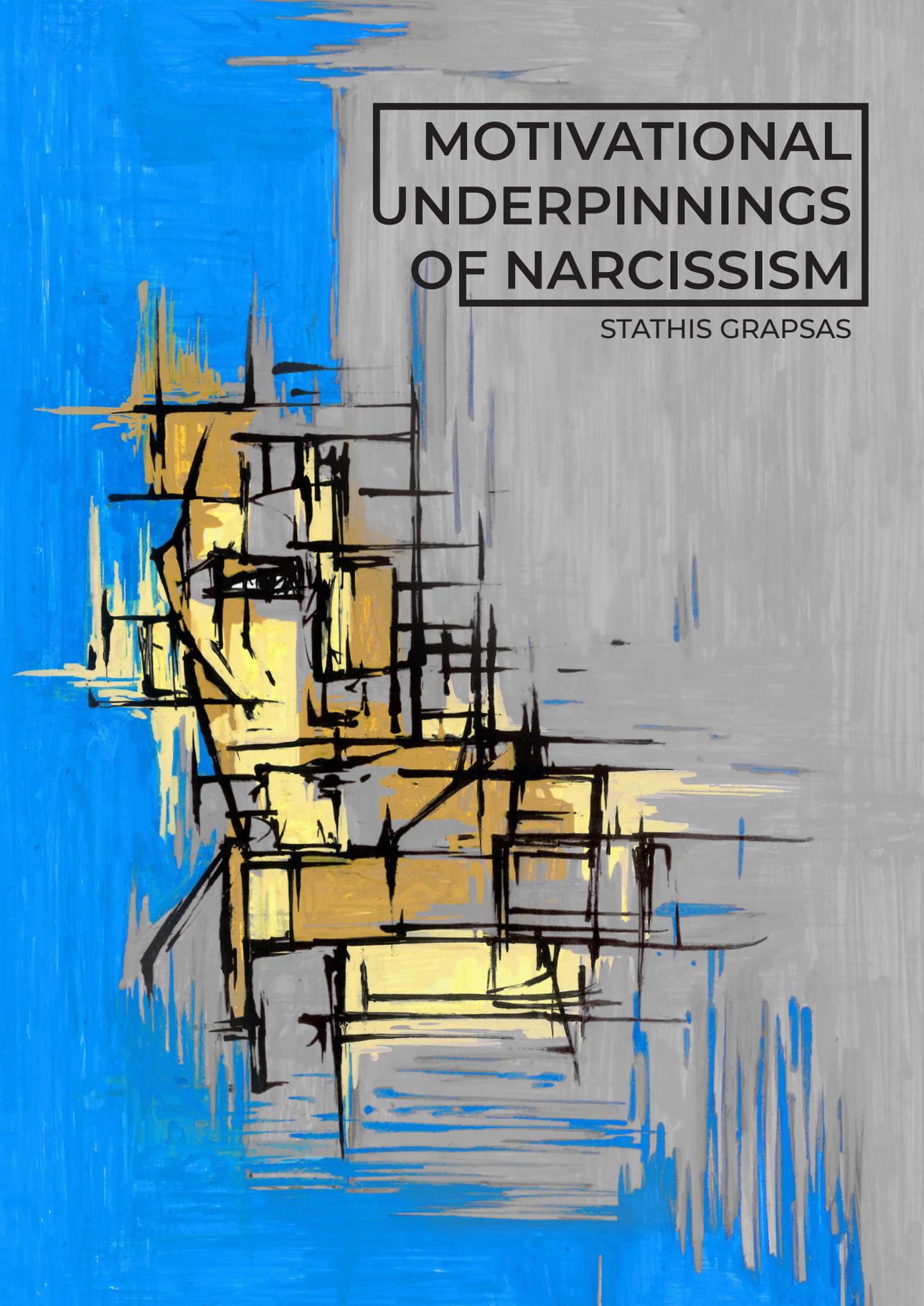


Motivational underpinnings of narcissism

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MOTIVATIONAL UNDERPINNINGS OF NARCISSISM

STATHIS GRAPSAS

Motivational Underpinnings of Narcissism

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Motivational Underpinnings of Narcissism

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Στη Φωτεινή και στον Σεβάχ

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Chapter 1

General Introduction

“We do not have knowledge of a thing until we have grasped its why”
Aristotle. (ca. 350 B.C.E.)

A key task in psychology has been to explain why and how people come to differ in how they tend to think, feel, and behave. In other words, why do people differ in their personality traits? Although research describing in which personality traits people differ and how these individual differences develop is abundant, we know little about the “why” of personality.

The present dissertation attempts to contribute to this broader issue. We investigate the “why” of trait narcissism. Narcissism is a personality trait in which individuals from the general population differ between each other across a continuum (Foster & Campbell, 2007; Miller & Campbell, 2008). At high levels, narcissism is characterized by an inflated sense of importance and entitlement. At its extreme, narcissism may reflect narcissistic personality disorder, a “pervasive pattern of grandiosity (in fantasy or behavior), a constant need for admiration, and lack of empathy” (American Psychiatric Association, 2013, p. 669). Narcissism is multifaceted, encompassing agentic tendencies (e.g., assertiveness and sense of grandiosity), antagonistic tendencies (e.g., arrogance and quarrelsomeness), and neurotic tendencies (e.g., shyness and shame; Back et al., 2013; Crowe et al., 2019; Grijalva & Zhang, 2016; Muris et al., 2017). We focus on subclinical *grandiose narcissism*, a prototypical manifestation of narcissism that encompasses agentic and antagonistic tendencies. For simplicity, we refer to individuals with relatively high levels of grandiose narcissism as “narcissists”.

The Motivational Underpinnings of Personality

Why do people differ from each other in terms of their personality trait levels? In this dissertation, we argue that personality traits are functional; they have a “why”, a reason and purpose. Several theories propose that personality traits are strategies through which people can successfully fulfill their fundamental psychological needs or motives in ways afforded by their social environments (Denissen & Penke, 2008; Dweck, 2017; Fleenon & Jayawickreme, 2015; Freud, 1927; Geukes, van Zalk, et al., 2017; Penke et al., 2007; Winter et al., 1998; Wood et al., 2015; Wrzus & Roberts, 2017). Fundamental motives are higher-order goals that arise early in development, can be satisfied across diverse social contexts, and are non-derivative of other goals (Dweck, 2017). People differ between each other in how strongly motivated they are to fulfill each of their fundamental motives (McClelland, 1987a; Neel et al., 2015). Over time, they might develop stable and consistent strategies to fulfill these motives, and individual differences in these strategies are assumed to be captured by individual differences in personality trait levels (Denissen & Penke, 2008; Dweck, 2017; Fleenon & Jayawickreme, 2015; Freud, 1927; Geukes et al., 2017; Winter et al., 1998; Wrzus & Roberts, 2017). In other words, who people are might reflect how they pursue their motives.

Motivation often operates via affect. People tend to spontaneously experience pleasure when they fulfill their motives and displeasure when they fail to do so (Berridge & Winkielman, 2003; Depue & Morrone-Strupinsky, 2005). Through recurring experiences of motive fulfillment and frustration, people can develop motive-specific “*if...then*” affective contingencies— affective reaction patterns toward satisfactions and frustrations in specific motive domains (e.g., “*if people like me, then I feel great*”; (McClelland, 1987a; Mischel & Shoda, 1995). Theorists have assumed that personality traits comprise “*if...then*” contingencies of affect, cognition, and behavior (Geukes, van Zalk, et al., 2017; Wrzus & Roberts, 2017). If personality traits are rooted in motives, motive-specific affective contingencies might represent the affective core of personality—the foundations upon which cognitive and behavioral contingencies of personality traits are grounded. Preliminary findings point to this assumption. For example, people with stronger affective contingencies in the motive domain of affiliation (i.e., the motive to get along well with others) tend to be especially warm and friendly (Dufner, Arslan, et al., 2015)—behaviors associated with the personality trait of agreeableness (Denissen & Penke, 2008). Thus, individual differences in motive-specific affective contingencies might underlie individual differences in personality traits.

Motivational Underpinnings of Narcissism

What are the motivational underpinnings of narcissism? Because humans have evolved to live in social groups, social motives play a central role in how people feel, view themselves, and behave (Leary et al., 2015; van Kleef & Lange, 2020). For that reason, we argue that narcissism is driven by social motives. Building on recent theories on the motives underlying narcissism (Anderson et al., 2015; Johnson et al., 2012; Mahadevan et al., 2016; Zeigler-Hill et al., 2018), we propose that high levels of narcissism are underpinned by a relatively strong motive for *social status* (i.e., prominence, respect, and social influence within a group; Anderson et al., 2015; van Kleef & Cheng, 2020), which can occasionally override other motives, such as the affiliation motive. Building on theories suggesting that narcissism is underpinned by affective contingencies (Back et al., 2013; Baumeister & Vohs, 2001; Morf & Rhodewalt, 2001), we propose that narcissists’ motive for status should be evident in relatively strong affective contingencies in the status domain (e.g., “*if have influence, then I feel great*”). We integrate these ideas in the first theoretical model that illustrates the cognitive and behavioral contingencies of narcissism in the domain of status. We empirically test these ideas in experimental studies that investigate narcissists’ affective contingencies.

Origins of Affective Contingencies of Narcissism

How might the affective contingencies of narcissism be acquired? One possibility is that these contingencies are genetically transmitted. Like other personality traits, narcissism is partly heritable (Luo & Cai, 2018). Twin studies have shown that approximately 50% of variance in narcissism levels can be attributed to genetic similarities (Luo et al., 2014; Vernon et al., 2008). Thus, parents and children might share a common underlying sensitivity toward

experiences of status. This genetically transmitted status sensitivity might show itself from early on in development. At preschool age, attention seeking and interpersonal antagonism—behaviors that also characterize fierce status competition—have been found to be precursors of later narcissism levels (K. S. Carlson & Gjerde, 2009). Thus, it is plausible that narcissistic children might genetically inherit from parents a dispositional affective sensitivity toward status-relevant experiences.

Another possibility is that affective contingencies are acquired through socialization. Although shared environmental influences on adult narcissism seem to be small (Luo & Cai, 2018), socialization studies suggest that some parenting practices are associated with children's narcissism. Prospective longitudinal and retrospective self-report studies show that individuals who have more overvaluing parents are more likely to develop higher levels of narcissism (Brummelman, Thomaes, Nelemans, Orobio de Castro, Overbeek, et al., 2015; Horton et al., 2006; Nguyen & Shaw, 2020; Otway & Vignoles, 2016). Overvaluing parents tend to think of their children as more special, exceptional, and deserving of special treatment than other children (Brummelman, Thomaes, Nelemans, Orobio de Castro, & Bushman, 2015). These parents might—even unknowingly—push their children to gain status through their parenting practices, for example by giving children unique, uncommon names, or by insisting that children stand out among peers (Brummelman, Thomaes, Nelemans, Orobio de Castro, & Bushman, 2015). Overvaluing parents might value their children only insofar as children gain status: when children gain status, parents might praise them and show more joy and affection, but when children lose status, parents might be disappointed, resentful, or emotionally distant (Assor & Tal, 2012; Brummelman & Sedikides, 2020). Through such status-contingent parenting, parents might instill in children their own affective contingencies in the domain of status.

The genetic and socialization perspective on the affective contingencies of narcissism are complementary. Some children might genetically inherit a sensitivity to status which can become further strengthened through socialization practices, especially so in critical developmental periods during which global self-views more strongly hinge on social feedback (Thomaes & Brummelman, 2016). If affective contingencies are shared with parents, then they should be present in parents of narcissistic children (as the genetic perspective suggests) and in more overvaluing parents (as the socialization perspective suggests).

Middle-to-late childhood (ages 8-13) might be a critical period in the development of narcissism, when individual differences in narcissistic self-views start to become more pronounced (Thomaes, Stegge, et al., 2008). During this period, children start to form global self-views that are increasingly based on realistic social comparisons (e.g., “I am more special than other children”; Ruble & Frey, 1991), which suggests that children start to form concrete mental representations of status hierarchies. Indeed, during this period children start to

care increasingly about their social status (Hawley, 1999; LaFontana & Cillessen, 2010). This concern is especially pronounced in children with higher narcissism levels (Ojanen et al., 2012; Thomaes, Stegge, et al., 2008). If narcissism is characterized by relatively strong contingencies toward status-relevant experiences, then these contingencies should be detectable in children this age. Since relevant empirical evidence is lacking, the present dissertation tested this idea.

Measuring Affective Contingencies of Narcissism

Measuring the affective contingencies of narcissism can be challenging. Self-reports are often biased by how people want to present themselves to others, including to researchers (Paulhus, 1984). This limitation appears especially relevant in narcissism research. People with higher levels of narcissism are inclined to present an idealized image of themselves to others (Kowalski et al., 2018). As a result, they might be unable or unwilling to report negative affective reactions which potentially signal their frustration or vulnerability. For example, narcissistic children were more likely to blush—a sign of embarrassment—after modest praise, yet they did not report such blushing (Brummelman, Nikolić, et al., 2018).

To tackle this issue, this dissertation used direct physiological measurements of affective contingencies. In addition to self-reports, affective contingencies were measured via facial electromyography (fEMG). fEMG is a method that can unobtrusively detect the often spontaneous, involuntary, and unconscious facial muscle movements that accompany affect. We measured activity of the zygomaticus major muscle (activated when individuals smile, suggesting positive affect) and the corrugator supercilii muscle (activated when individuals frown, suggesting negative affect). Because these spontaneous muscle contractions are difficult to suppress, they can reliably capture real-time positive and negative affective reactions (Barrett et al., 2019; Cacioppo et al., 1986, 2000; Hess et al., 2017). Moreover, fEMG activity shows incremental validity above and beyond self-reports in predicting interpersonal behavior (Dufner, Arslan, et al., 2015, 2018; Krause & Dufner, 2020), which suggests that the two methods are not interchangeable. Via the use of both subjective self-reports and objective physiological responses, this dissertation thus presents a broadband assessment of affective contingencies of narcissism.

The Present Dissertation

The present dissertation investigated theoretically and empirically the contingencies of status that possibly underlie narcissism. **Chapter 2** outlined a theoretical model of narcissistic status pursuit. The model proposes that narcissism is underpinned by a dominant status motive that can occasionally overshadow other social motives, such as the motive for affiliation. The model conceptualizes narcissism as a system of cognitive and behavioral “*if...then*” contingencies that become activated when individuals pursue social status in daily life. The model addresses issues such as when narcissists might self-promote or derogate others, how narcissism might develop throughout the life span via the pursuit and attainment of status,

and how experimental interventions in the contingencies of narcissism can facilitate changes in socially toxic behaviors of narcissistic status pursuit.

Chapter 3 tested the idea that narcissism is grounded on affective contingencies. If narcissists are more strongly motivated to pursue status, then they should also exhibit relatively strong affective contingencies in the domain of power, an instantiation of status. By contrast, such contingencies might not be equally strong in other motive domains, such as affiliation. We tested these hypotheses in a sample of young adults. To capture affective contingencies, we used fEMG reactivity across multiple lab tasks and self-reports of affective reactivity tendencies toward satisfying and frustrating experiences of power and affiliation. In addition, we examined the extent to which the affective contingencies of narcissism were also associated with power and affiliation behaviors in the lab at a one-year follow-up.

Chapter 4 tested the idea that the affective contingencies of narcissism in the domain of status are detectable from childhood and possibly shared with parents. We examined these ideas in an experimental study in late childhood (ages 8-13), when individual differences in narcissism and in the motive for status become increasingly pronounced. We first measured children's narcissism and parents' overvaluation levels. Then, we randomly assigned children to gain or lose status among fictitious peers in an online social media status contest, while parents secretly watched the contest on another computer screen. During the experiment, we tracked children's and parents' affective reactions via fEMG reactivity.

Finally, we discussed the conceptual and practical implications of this dissertation in **Chapter 5**. We presented a motivational model of psychological processes underlying narcissism, and we tested long-held assumptions about the motivational roots of narcissism in a systematic manner. More broadly, we provided insights for personality, social, and developmental psychology by addressing the possibility that personality traits are rooted in affective systems which have a social orientation, arise relatively early in development, and become intergenerationally transmitted.



Chapter 2

The “Why” and “How” of Narcissism: A Process Model of Narcissistic Status Pursuit

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Abstract

We propose a self-regulation model of grandiose narcissism. This model illustrates an interconnected set of processes through which narcissists (i.e., individuals with relatively high levels of grandiose narcissism) pursue social status in their moment-by-moment transactions with their environments. The model shows that narcissists select situations that afford status. Narcissists vigilantly attend to cues related to the status they and others have in these situations and, on the basis of these perceived cues, appraise whether they can elevate their status or reduce the status of others. Narcissists engage in self-promotion (admiration pathway) or other-derogation (rivalry pathway) in accordance with these appraisals. Each pathway has unique consequences for how narcissists are perceived by others, thus shaping their social status over time. The model we offer demonstrates how narcissism manifests itself as a stable and consistent cluster of behaviors in pursuit of social status and how it develops and maintains itself over time. More broadly, the model might offer useful insights for future process models of other personality traits.

Keywords: narcissism, social status, motivation, self-regulation

Grandiose narcissism (hereafter: narcissism) is a personality trait marked by beliefs of personal superiority and a sense of entitlement to special treatment (Krizan & Herlache, 2018; Morf & Rhodewalt, 2001). Narcissists (i.e., individuals with relatively high levels of grandiose narcissism) tend to go out of their way to impress others: They often groom their appearance to grasp others’ attention (Back et al., 2010), brag about themselves (Buss & Chiodo, 1991), and showcase their talents and abilities in front of others (Wallace & Baumeister, 2002). At the same time, narcissists are often combative toward others. In such instances, they are often perceived as confrontational, insulting, belittling, and intimidating (Holtzman et al., 2010; Morf & Rhodewalt, 1993; Reijntjes et al., 2016).

What ties together these distinct manifestations of narcissism? Specifically, what is it that narcissists pursue (the “why” of narcissism) and how do they pursue it (the “how” of narcissism)? In this article, we propose a framework that addresses both the “why” and the “how” of narcissism. Drawing insights from evolutionary and motivational accounts of behavior, we propose that narcissism is rooted in a desire for social status. Drawing from self-regulatory processing models of personality in general and narcissism in particular, we propose that narcissism is manifested in sequences of status-pursuing processes.

Combining both perspectives, we propose a process model of narcissism, the status pursuit in narcissism (SPIN) model. The SPIN model posits that narcissists are driven by a dominant status motive, meaning that it overshadows other motives, such as the motive for affiliation. To fulfil this motive, narcissists engage in a series of status-pursuing processes: situation selection, vigilance, appraisal, and response execution. The model explains when narcissists engage in self-promotion (i.e., increasing their own status) or other-derogation (i.e., decreasing others’ status). The model demonstrates how narcissism manifests itself as a stable and consistent cluster of behaviors in pursuit of social status and how it develops and maintains itself over time.

Status Pursuit

Hierarchies are omnipresent in social settings, and essential for group survival. They establish order and coordination and prevent intragroup conflicts, because they dictate group members’ priority in social influence, access to resources, and mating opportunities (Cheng et al., 2013). Hierarchies emerge in social transactions: Groups compare members’ competence in domains useful for group survival and welfare (e.g., successful amassment of wealth or knowledge, higher intellect, or physical prowess; see Aunger & Curtis, 2013; Berger et al., 1972; Mattan et al., 2017) and bestow differing amounts of *social status* (or simply: *status*) to these members. Status is the amount of prominence, respect, and influence an individual has in a social group. It is indicative of a person’s position within a social hierarchy (Anderson et al., 2015).

Because hierarchies offer higher benefits for individuals closer to their top, people are assumed to be fundamentally motivated to pursue status (Anderson et al., 2015; Barrick et al., 2013; Cheng et al., 2013; Mattan et al., 2017). Fundamental motives are universal, higher-order goals that are nonderivative of other goals, arise early in development, shape longer-term well-being, and can be satisfied across diverse contexts (Anderson et al., 2015; Dweck, 2017).

As status is comparative and relies on the judgments of others, it is never guaranteed, and always potentially malleable. Status pursuit is hence a continuous process rather than a one-off endeavor. Individuals differ markedly in how they tend to pursue status (for an overview of personality traits related to status pursuit and attainment, see Grosz et al., 2020). They differ in the *absolute strength* of their status motive, the *relative strength* of their status motive, and the *rigidity* of their status-pursuing actions. Some individuals are satisfied with having an average level of status, whereas other individuals want ever more (Anderson et al., 2015; McClelland, 1987a). Some individuals want status as long as it does not go against their motive to get along well with others (i.e., affiliation motive; Baumeister & Leary, 1995; McClelland, 1987), whereas other individuals want status even at the cost of getting along well with others. Some individuals pursue status in context-sensitive ways (e.g., boasting about themselves only in contexts that demand such self-promotion), whereas other individuals pursue status rigidly (e.g., boasting about themselves, even in collaborative, interdependent contexts). We argue, on the basis of the tenet that individual differences in motivation can build the core of individual differences in personality traits (Denissen & Penke, 2008), that individual differences in status pursuit are at the heart of individual differences in narcissism.

Narcissistic Status Pursuit

Narcissism is defined here as an everyday personality trait characterized by a sense of heightened self-importance and entitlement to special treatment (Krizan & Herlache, 2018). Various features of narcissism have been discussed in the literature, ranging from agentic (characterized by assertiveness, beliefs of personal greatness, and feelings of superiority) and antagonistic features (characterized by arrogance, quarrelsomeness, exploitativeness) to neurotic (characterized by shyness, distrust, shame; Back, 2018; Back et al., 2013; Crowe et al., 2019; Grijalva & Zhang, 2016; Krizan & Herlache, 2017; Miller et al., 2017). In this article, we focus on grandiose narcissism, a manifestation of narcissism characterized as a blend of agentic and antagonistic features (Back et al., 2013; Crowe et al., 2019; Grijalva & Zhang, 2016; Krizan & Herlache, 2018; Miller et al., 2017). By contrast, we do not focus on vulnerable narcissism, which is a manifestation of narcissism characterized by a blend of neurotic and antagonistic features (Krizan & Herlache, 2018; Miller et al., 2017). We also do not focus on narcissistic personality disorder, defined in the fifth edition of the *Diagnostic*

and *Statistical Manual of Mental Disorders* as a “pervasive pattern of grandiosity (in fantasy or behavior), a constant need for admiration, and a lack of empathy” (American Psychiatric Association, 2013, p. 669). This disorder can represent extreme levels of grandiose narcissism, vulnerable narcissism, or both (Krizan & Herlache, 2018; Miller et al., 2017; Miller & Campbell, 2008). When we refer to narcissism or narcissists in this manuscript, we respectively refer to grandiose narcissism or grandiose narcissists (i.e., individuals with relatively high levels of grandiose narcissism), unless otherwise specified.

Like others who have recently studied the narcissistic pursuit of status (Zeigler-Hill, McCabe, et al., 2018; Zeigler-Hill, Vrabel, et al., 2018), we argue that at the core of grandiose narcissism lies the hierarchical and comparative perspective that is characteristic of status hierarchies: Viewing oneself as superior implies viewing others as inferior; viewing oneself as entitled to special privileges implies viewing others as not. This hierarchical view of the self in relation to others is what also distinguishes narcissism from self-esteem. Whereas narcissism and self-esteem both entail positive self-views, narcissism and self-esteem differ in the quality of these self-views (Brummelman et al., 2016a). Self-esteem captures self-views of adequacy and worth, not self-views of superiority (Rosenberg, 1965). Unlike narcissism, self-esteem reflects a nonhierarchical way of viewing the self in relation to others (Brummelman et al., 2016a; Harris et al., 2018). Narcissism and self-esteem are usually only weakly or modestly correlated (Brummelman et al., 2016a; Brummelman, Gürel, et al., 2018), with stronger relations for agentic features of narcissism and even negative relations for antagonistic features of narcissism (Back et al., 2013; Geukes, Nestler, et al., 2017). Narcissism and self-esteem also have distinct nomological networks. Higher self-esteem is generally associated with lower levels of internalizing psychopathology and interpersonal aggression, whereas higher narcissism is generally not associated with symptoms of internalizing psychopathology, but associated with higher levels interpersonal aggression, as well as interpersonal problems (Hyatt et al., 2018).

We argue that narcissists pursue status more strongly, more narrowly (i.e., at the cost of other fundamental motives), and more rigidly (i.e., even in contexts in which status pursuit is considered inappropriate) than nonnarcissists. Regarding the strength of the status motive, studies on implicit motivation (Carroll, 1987; Joubert, 1998) have found that narcissists often construct projective narratives indicative of power motivation (i.e., the need to influence others; McClelland, 1987). Narcissists also attribute higher importance to acquiring leadership, fame, and wealth than nonnarcissists (Abeyta et al., 2017). Both children and adults with narcissistic traits tend to set status-relevant goals, such as increasing in social rank, garnering respect, protecting their reputation, and influencing others (Bradlee & Emmons, 1992; Jonason & Zeigler-Hill, 2018; Thomaes, Stegge, et al., 2008; Zeigler-Hill, Vrabel, et al., 2018). This concern with acquiring status also permeates imaginary life: Narcissists have been found more likely than nonnarcissists to have fantasies and regular daydreams of heroism, glory,

power, and success (Raskin & Novacek, 1991). Because narcissists display a stronger motive for status compared with nonnarcissists, they may also pursue status more intensely than nonnarcissists do. For example, compared to nonnarcissists, narcissists have been shown to be more autocratic and assertive (Raskin & Terry, 1988), to brag more (Paulhus et al., 2013), and to publicize their accomplishments more often (McCain & Campbell, 2016).

Regarding the narrowness of the status motive, narcissists' strong motive for status seems contrasted by a comparatively weak motive for affiliation. Indeed, studies on implicit motivation suggest a weak but negative association between narcissism and the construction of narratives indicative of affiliation and intimacy (Carroll, 1987; Joubert, 1998). Likewise, narcissists are less likely to set goals related to affiliation, such as catering for the welfare of their social environments, or forming close interpersonal bonds (Bradlee & Emmons, 1992; Jonason & Zeigler-Hill, 2018; Thomaes, Stegge, et al., 2008; Zeigler-Hill, Vrabel, et al., 2018). The relative asymmetry between narcissists' status and affiliation motives is also reflected in imaginary life, as narcissism is not associated with fantasies of love and closeness (Raskin & Novacek, 1991). This narrow orientation on status might be backed up by narcissists' relatively lesser motivation and capacity to show empathy for others (Hepper et al., 2014; Mota et al., 2019). Because narcissists' motive for status can often trump their motive for affiliation, they may pursue status at the cost of their emotional bonds (akin to a behavioral profile of unmitigated agency; Bradlee & Emmons, 1992). For example, narcissists have been found more likely than nonnarcissists to see themselves as superior to others -even to their significant others- (Campbell et al., 2002; Krizan & Bushman, 2011), and more likely to be intimidating and aggressive (Raskin & Terry, 1988).

Finally, regarding the rigidity of the status motive, research shows that narcissists have an increased tendency to orient behaviors toward pursuing desirable outcomes and a decreased tendency to inhibit behaviors that might lead to undesirable outcomes (Foster & Trimm, 2008). As a result, narcissists tend to pursue status more rigidly than nonnarcissists do. For example, narcissists have been shown to be more likely to exaggerate their competences or lie to get ahead (K. Lee & Ashton, 2005), even when they know that the truth can be unveiled (Collins & Stukas, 2008). They are more likely to make high-risk investments (Foster et al., 2011), and will less hesitantly attempt to maximize short-term profits at the cost of long-term losses (Campbell et al., 2005).

Together, these findings suggest that the narcissistic status motive is manifested in a behavioral profile of pervasive status pursuit. This observation builds on early theoretical accounts of narcissistic behavior. Early psychoanalytic writings profiled narcissists as agentic and antagonistic individuals: Regarding the former, they have been depicted as adept at leading, impressing, and demonstrating their superiority but, regarding the latter, they have been depicted as aggressive, confrontational, and arrogant (Freud; 1931/1955; Reich, 1933/1949).

More recent theoretical perspectives have similarly highlighted narcissists’ agentic and antagonistic interpersonal behaviors, which may result in the acquisition of a high status (Back et al., 2013; Campbell & Campbell, 2009; Campbell & Foster, 2007; Krizan & Herlache, 2018; Sedikides & Campbell, 2017; Weiss et al., 2019). To explain the motivational roots of narcissistic behaviors, theoretical perspectives have underlined narcissists’ craving for respect (Baumeister & Vohs, 2001) or need for admiration (Back et al., 2013; Morf & Rhodewalt, 2001) and thus indirectly hinted at a strong status motive. Tracing narcissists’ need for admiration to fundamental social motivations and similar to our approach, a recent theoretical account posited that narcissism is characterized by a strong status motive, contrasted by a relatively weaker affiliation motive (Zeigler-Hill, McCabe, et al., 2018). Building on this knowledge, we contend that a constellation of intrapersonal processes translates the narcissistic motive for status into status-pursuing behaviors. In the following section, we further outline a model that describes these processes and their temporal unfolding.

The SPIN Model

How does narcissists’ status motivation translate into status-pursuing behaviors? To address this matter, we present the SPIN model. The SPIN model zooms in on the moment-by-moment regulatory processes involved in narcissistic status pursuit. Regulatory processes are manifestations of motivation because they aim to reduce the negative discrepancy between people’s current state and their desired end state, such that these processes trigger one another in the service of optimal motive fulfillment (Denissen et al., 2013). The output of each regulatory process can serve as the input of the next one (Carver & Scheier, 1982; Denissen et al., 2013; Gross, 1998). From this process-oriented perspective, personality traits reflect the consistent and relatively stable ways in which people engage in regulatory processes (Denissen et al., 2013; Winter et al., 1998).

We posit that narcissism pertains to individual differences in a sequence of regulatory processes aimed at acquiring social status. In so doing, we build on core self-regulation processes (e.g., Baumeister et al., 2007; Denissen et al., 2013; Geukes, van Zalk, et al., 2017; Gross, 1998): situation selection¹, attention (which we term vigilance for reasons outlined below), appraisal, and response execution. According to our model, narcissists tend to select social situations that appear to have the potential of affording a higher status. In these situations, narcissists are more likely to pay vigilant attention to cues that reveal their own and others’ status. These cues can indicate the extent to which narcissists’ status pursuit is facilitated or hindered. When assessing these cues, narcissists form appraisals about the

1 Some researchers suggest a process that follows situation selection, termed “situation modification.” Situation modification is the process of altering a situation to align with one’s goals. Since situation modification refers to actions taken within a situation, we discuss its associated behaviors under the “response execution” umbrella.

relevant situational characteristics that determine how to obtain status: Can status be acquired through self-promotion (i.e., by increasing narcissists’ own status) or other-derogation (i.e., by decreasing others’ status)? These appraisals inform the respective behavioral responses aimed at status attainment. Because social hierarchies are dynamic and hence potentially susceptible to change, narcissists may be inclined to monitor their status and repeatedly resort to these status-pursuing processes. Through repetition and habit formation, the processes we describe might over time form a consistent, self-sustaining, and relatively stable system (i.e., a trait) that manifests itself within person-environment transactions (Figure 1).

Like other models of narcissism (e.g., Back et al., 2013; Campbell et al., 2006; Morf & Rhodewalt, 2001), the SPIN model conceptualizes narcissism as a dynamic system of regulatory processes. We extend these models in several ways. For the most part, existing models of narcissism have outlined its motivational nature (Baumeister & Vohs, 2001; Zeigler-Hill, McCabe, et al., 2018), its factor structure (Krizan & Herlache, 2018; Miller et al., 2017; Weiss et al., 2019), its self-regulatory strategies (Campbell & Foster, 2007; Morf & Rhodewalt, 2001), or its social consequences over time (Campbell & Campbell, 2009; Sedikides & Campbell, 2017). Our model bridges these perspectives, showing how narcissism

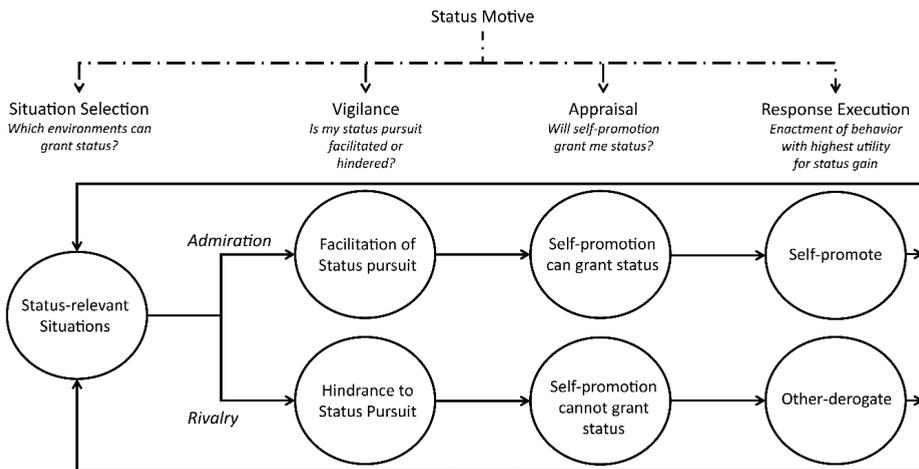


Figure 1
Hypothesized self-regulation model of narcissistic status pursuit

Note. Once narcissists select or otherwise encounter a status-relevant situation, they are more likely to attend to cues that indicate whether the environment facilitates or hinders status pursuit. Perceived facilitation of status pursuit might activate appraisals about the heightened utility of self-promoting behaviors in granting status, leading to the enactment of self-promoting behaviors (admiration pathway). By contrast, perceived hindrance of status pursuit might activate appraisals about the heightened utility of other-derogating behaviors in granting status, leading to the enactment of other-derogating behaviors (rivalry pathway). Self-promoting and other-derogating behaviors might in turn elicit status-relevant reactions from others, thus triggering the processes anew.

can be broken down into a sequence of self-regulation processes aimed at obtaining social status. Furthermore, our model builds on the Narcissistic Admiration and Rivalry Concept (Back, 2018; Back et al., 2013), which describes the self-aggrandizing (narcissistic *admiration*) and other-derogating (narcissistic *rivalry*) manifestations of grandiose narcissism. As such, our model makes predictions about when and why narcissistic status pursuit takes on an assertive, self-aggrandizing flavor or an antagonistic, other-derogating one.

Existing models (e.g., Back et al., 2013; Morf & Rhodewalt, 2001) often posit that the main motivational driver of narcissism is the desire to create and maintain an overly positive, grandiose self-image (i.e., an intrapsychic motive), which may manifest itself in attempts to garner positive information about the self, including admiration. Extending this notion, we suggest that narcissists’ intrapsychic motive to establish a grandiose self-image serves a higher-order social motive—to obtain social status (for a review of intrapsychic vs. interpersonal motives, see Leary et al., 2015). From an evolutionary perspective, humans have evolved mechanisms to navigate life in a way that maximizes their chances of survival and reproduction—outcomes that are often achieved in interaction with others (Leary et al., 2015). Thus, intrapsychic means typically serve interpersonal ends. Indeed, evolutionary models and research findings suggest that a grandiose self-image helps people accrue social benefits by convincing others of their superior skills (Anderson et al., 2012; Dufner, Gebauer, et al., 2018; Kennedy et al., 2013; von Hippel & Trivers, 2011). In that sense, narcissists’ positive views of themselves may serve their overarching goal of obtaining social status.

An additional contribution of the SPIN model is that it specifies the moment-to-moment processes through which narcissists pursue status. As these processes are temporally linked, our model can be tested in field experiments aiming to investigate how narcissistic status pursuit might be modified. An implication of our model is that targeting earlier steps in the chain of self-regulation processes may be more effective in modifying status pursuit than targeting later ones. Finally, our model provides a unique window on the development of narcissism. Building on knowledge of when the motive for status becomes salient during development, our model outlines possibilities regarding when individual differences in narcissism can emerge, become socialized, and maintained over time. Before we describe these contributions in more detail, in the following section we will review each of the processes that are outlined in our model.

Situation Selection

Situation selection refers to approaching or avoiding social environments that help or hinder goal pursuit (Gross, 1998). Such environments are selected on the basis of prior experiences in these or similar environments. We argue that narcissists prefer, and thus tend to select, public and hierarchical social environments because these environments have a higher likelihood of affording status. Three strands of empirical evidence back up this claim.

First, narcissists tend to select public over private social settings, because in such settings they can place themselves in the limelight of social activity and earn the status they pursue. For example, narcissists often select environments rich in social interactions, wherein opportunities for elevating their social image are abundant (Bradlee & Emmons, 1992; Morf & Rhodewalt, 2001). Perhaps for this reason, narcissists on average prefer (Jonason et al., 2014; Kowalski et al., 2017) and often pursue careers that enable them to be at the center of attention and rise through societal ranks. Consistent with these findings, narcissism levels are indeed elevated among actors (Dufner, Egloff, et al., 2015) and celebrities (Young & Pinsky, 2006).

Second, narcissists have been shown to choose hierarchical over egalitarian settings, provided they can gain status in these settings (Alba et al., 2014; Zitek & Jordan, 2016). As hierarchical settings promote competition and reward superior competences, they are the natural habitats in which status can be obtained. Consistent with this idea, narcissism levels are elevated in wealthy individuals (Leckelt et al., 2019) and chief executive officers (CEOs; Rosenthal & Pittinsky, 2006).

A third strand of evidence concerns narcissists' relationship choices. Because humans are a social species, relationship choices are an important feature of situation selection. Narcissists are more likely to choose relationships that elevate their status over relationships that cultivate affiliation. For example, narcissists are keener on gaining new partners than on establishing close relationships with existing ones (Wurst et al., 2017). They often demonstrate an increased preference for high-status friends (Jonason & Schmitt, 2012) and trophy partners (Campbell, 1999), perhaps because they can bask in the reflected glory of these people.

In sum, narcissists are more likely to select social environments that allow them to display their performances publicly, ideally in competition with others. These settings are potentially more accepting and reinforcing of narcissistic status strivings.

Vigilance

Vigilance refers to a chronic state of biased attention toward specific classes of environmental cues, which are often related to goal pursuit. Individuals are assumed to be especially vigilant toward environmental cues that convey information about how much environments facilitate or hinder their goal pursuit (Crick & Dodge, 1994). Vigilance can aid goal pursuit because it enables heightened processing of and responsiveness to goal-relevant cues (Schultheiss, 2001). Because vigilance requires prior knowledge of the extent to which cues can be relevant to goal pursuit, vigilance also encompasses the automatic encoding of cues' relevance or irrelevance to goal pursuit (Pratto & John, 1991).

Individuals who pursue status tend to be more vigilant toward observable cues of their own and others' status (Anderson et al., 2015). We assume that the same applies to narcissists, who tend to closely monitor the social image they convey and wish to be perceived as admirable figures (Kowalski et al., 2018; Zeigler-Hill, Vrbel, et al., 2018). To monitor how their pursuit of status is faring in their social environments, narcissists may vigilantly attend to cues that reflect how much status they earn through their behaviors. They might, for example, vigilantly observe the amount of attention (e.g., holding others' visual attention) and admiration (e.g., receiving praise or eliciting expressions of awe) they earn, as well as the direct influence (e.g., others following their guidance) they exert, compared with their competitors in the social hierarchy. After all, these cues can reveal the extent to which individuals gain, maintain, or lose the status they pursue (Anderson & Kilduff, 2009b; Cheng et al., 2013).

We also suggest that narcissists vigilantly attend to other people's efforts at status pursuit, because these efforts can hinder narcissists' own status goals. For example, we expect that narcissists are more likely to deploy their attention to luxurious items others might possess, to external features such as physical attractiveness, or to others' expressions of pride and social aloofness. These observable cues are more likely to capture narcissists' attention because they are indicative of social status (Mattan et al., 2017). Likewise, narcissists may be more vigilantly observant of others' self-promoting or other-derogating behaviors, as these behaviors often reflect attempts to increase in status (Anderson et al., 2015; Cheng et al., 2013) and can thus signal a hindrance to narcissists' own status pursuit.

For the same reasons, narcissists may also be particularly sensitive to cues that convey hindrances to their own status pursuit. Such cues can range from those directly indicating a loss of status (i.e., being derogated by others) to subtler behavioral or lexical cues that reveal possible threats to status. Attesting to this, when primed with failure, narcissists tend to be faster than nonnarcissists in recognizing words associated with worthlessness—a finding suggestive of higher vigilance in encoding cues related to the loss of status (Horvath & Morf, 2009).

In sum, narcissists are more likely to pay vigilant attention to external cues of their own and others' social status. These cues can signal that a situation affords status and indicate the extent to which one's social environment facilitates or hinders status pursuit.

Appraisal

Goal-relevant cues can set in motion individuals' *appraisal* of the situation. We define *appraisal* as the assessment of situational affordances toward goal-fulfilling behaviors. Appraisals therefore direct the selection of goal-fulfilling behaviors (Crick & Dodge, 1994; Lazarus, 1993) in response to cues indicating that a situation is relevant to goal fulfillment.

Evidence suggests that there are two fundamental pathways by which individuals can gain status. The first pathway concerns elevating one's status by constructing a positive reputation of oneself. This is usually achieved through convincing audiences of one's superior competence and worth (self-promotion, or prestige; Anderson & Kilduff, 2009a; Back et al., 2013; Cheng & Tracy, 2014). The second pathway concerns decreasing competitors' status by constructing a negative reputation of competitors. This is usually achieved through convincing audiences of competitors' inferior competence and worth (other-derogation, or dominance; Back et al., 2013; Cheng & Tracy, 2014). Narcissism is associated with the use of both behavioral strategies for status attainment (Zeigler-Hill, Vrabel, et al, 2018). We posit that, once narcissists find themselves in a situation that affords status (i.e., when their attention grasps status-relevant cues), they assess whether self-promotion or other-derogation is most likely to succeed in securing status. Situational cues indicating facilitation of status pursuit can trigger appraisals about the heightened utility of self-promotion, whereas situational cues indicating hindrance of status pursuit can trigger appraisals about the heightened utility of other-derogation.

We argue that, by default, narcissists tend to appraise situations as facilitating status pursuit, and hence appraise them as affording self-promotion (Back, 2018; Wetzel et al., 2016). We attribute this tendency to narcissists' unrealistically positive, inflated self-views in status-relevant domains. For example, narcissists often believe that they are incredibly attractive (Gabriel et al., 1994), even when others might think that they are not. Furthermore, narcissists often believe that they possess superior intellect, even when their actual IQ scores are not on par (Campbell et al., 2002; Dufner, Denissen, et al., 2013). Likewise, narcissists may think that they are exceptionally good at understanding others' intentions and emotions, despite often being less capable of doing so (Ames & Kammrath, 2004; Mota et al., 2019). In addition, narcissists may think that they are highly creative, even when objective assessments might dispute it (Goncalo et al., 2010). Finally, narcissists often see themselves as charismatic leaders, even when they might disrupt group performance (Judge et al., 2006; Nevicka et al., 2011). As a result of these broad, inflated self-perceptions, narcissists may be more inclined to appraise situations as affording self-promotion rather than other-derogation.

If narcissists are so strongly inclined to appraise that environments afford self-promotion, when might they attempt to derogate others? We argue that narcissists will be inclined to derogate others when they appraise that situational status demands exceed their resources for self-promotion. For example, when confronted by a formidable status competitor, narcissists might be more inclined to exert effort into defaming the competitor, because doing so can potentially damage that person's reputation and thus decrease that person's status. The gravitation toward other-derogation is especially salient in situations in which cues signal a strong hindrance of narcissists' own status pursuit. A large body of research suggests that when narcissists are criticized, humiliated, or outperformed by others, they seek to derogate them (Bushman & Baumeister, 1998; Horton & Sedikides, 2009; Kernis & Sun, 1994; Stucke

& Sporer, 2002; Thomaes, Bushman, et al., 2008). In such instances, a strategy for reclaiming at least some status can therefore be to derogate or be aggressive toward the evaluator, with the purpose of punishing him or her or defaming him or her in the eyes of others.

It should be underscored that other-derogation is often viewed as less socially desirable because it is a strategy that establishes status through conflict (Cheng & Tracy, 2014). Narcissists, however, might be more inclined than nonnarcissists to view it as an acceptable avenue toward status attainment (Carlson & Lawless DesJardins, 2015), for a number of reasons. First, because narcissists tend to value status over affiliation, they might be less averse to the possibility of becoming disliked as long as other-derogation can grant them the status they pursue.

Second, because of their heightened sense of entitlement (i.e., their sense of inherent deservedness), narcissists might form exaggerated expectations of status acquisition (Grubbs & Exline, 2016). These expectations might eventually lead narcissists to underestimate the effort required to prove that they deserve to gain status. Research suggests that this might be the case, as entitled self-views are associated with an overestimation of the competence—and underestimation of the combativeness—that individuals display when pursuing status (Lange et al., 2018; Scopelliti et al., 2015). As a result of their heightened sense of entitlement, narcissists might be inclined to view the hindrances to self-promotion as unjust, which could lead them to retaliate when they are not granted their desired status.

Third, narcissists’ beliefs regarding their own superiority tend to go hand in hand with beliefs of others’ inferiority (Back et al., 2013; Campbell et al., 2002; Kong, 2015; Krizan & Bushman, 2011; Park et al., 2013). These beliefs about others’ inferiority might be triggered by narcissists’ perceived hindrances to their own self-promotional efforts. Indeed, whereas narcissists have been found to attribute successes to internal ability more so than nonnarcissists, they have also been found to attribute their failures to the incompetence of their evaluators (Horton & Sedikides, 2009) or collaborators (Campbell et al., 2000; Kernis & Sun, 1994). For the above reasons, narcissists might view their own derogating behaviors as justified attempts to claim or reclaim their rightful place in the social hierarchy, and engage in such behaviors when situational cues indicate that self-promotion is unlikely to grant status.

In sum, after determining that a situation affords status, narcissists can appraise whether the situation calls for self-promotion or other-derogation as a means of status acquisition. Because of their beliefs in their own inherent superiority, narcissists typically prefer self-promotion over other-derogation. However, when narcissists are unlikely to meet the status demands by self-promoting, they may derogate others (e.g., belittle them, lashing out against them). Narcissists may view other-derogation as permissible and sometimes necessary,

because they tend to downplay its social consequences and often view hindrances to their self-promotion as unjust.

Response execution

Response execution refers to enacting behaviors that facilitate goal pursuit within a given situation. Responses are thus the behavioral outcomes of appraisals. We propose that narcissists are more likely to appraise situations as affording self-promotion, and consequently more likely to behave in a more self-promotional, assertive attitude that aims to earn admiration, attention, and social influence (*admiration* pathway). However, when narcissists believe that self-promotion is less likely to grant status, they might follow a combative behavior that aims to devalue social competitors (*rivalry* pathway; Back, 2018; Back et al., 2013).

Admiration Pathway

We propose that when narcissists appraise self-promotion to be a feasible route to status attainment, they use behaviors aimed at standing out. For example, narcissists might groom their appearance; they tend to prefer stylish clothing, luxurious brands, and belongings that they can publicly display in order to signal their high status (Back et al., 2013; Cisek et al., 2014). Narcissists might also try to stand out through their communication style, which often involves charming facial expressions, humor, as well as expressive and confident gestures that reflect their extraversion and self-confidence (Back et al., 2013; Paulhus et al., 2013; Tracy et al., 2011; Zeigler-Hill, Vrabel, et al., 2018). To draw attention to their superiority, narcissists often brag (Buss & Chiodo, 1991) and exaggerate their positive attributes (Collins & Stukas, 2008). In their offline interactions, narcissists might try to stand out by dominating social interactions, for example by interrupting or stirring the direction of conversations toward their accomplishments (Vangelisti et al., 1990). In their online interactions, narcissists might similarly try to stand out by dominating social media newsfeeds with frequent posts of their exercise habits, diets, and personal achievements (Marshall et al., 2015; McCain & Campbell, 2016). Finally, narcissists might try to stand out through their acts. They might try to demonstrate their superior competences, for example by showing off in the presence of potentially admiring bystanders (Buss & Chiodo, 1991), by striving to publicly succeed in challenging tasks (Wallace & Baumeister, 2002), or by publicly enacting altruistic behaviors, provided these behaviors increase status (Konrath et al., 2016; Konrath & Tian, 2018). While engaging in these self-promoting behaviors, narcissists may visibly experience a sense of pride, which outsiders may view as arrogance (Tracy et al., 2009).

When self-promoting, narcissists may sometimes trade off their pursuit of affiliation and the welfare of others. In one study, narcissists used a greater proportion of shared environmental resources in their attempt to supersede others in performance, ignoring the fact that their behavior would result in environmental costs and in a long-term depletion of the resources

required to maintain their status (Campbell et al., 2005). Furthermore, narcissists have been found to more lightheartedly excuse their immoral acts (Egan et al., 2015) and to ignore conventional behavioral rules such as following their boss’s instructions in the workplace (Judge et al., 2006). In political positions, narcissists’ tendency for risk-taking may sometimes drive them to initiate bold legislative changes with relative disregard for the negative consequences these changes can bring about, as documented by research on narcissistic U.S. presidents’ political acts (Watts et al., 2013). Such findings indicate that narcissists are more likely to go all-in on their self-promotional efforts to acquire status.

Rivalry Pathway

We suggest that when narcissists determine that self-promotion cannot grant status, they are more likely to attempt to establish status by lowering the status of competitors. Because they tend to value status over affiliation, narcissists may quickly resort to aggression when they feel bossed around, insulted or humiliated, perhaps in an attempt to regain their social status. Narcissists can resort to ethically questionable and coercive behaviors to acquire status (Carlson & Lawless DesJardins, 2015; Zeigler-Hill, Vrabel, et al., 2018). Not only might they sometimes lie (Lee & Ashton, 2005), insult (Holtzman et al., 2010), and bully (Reijntjes et al., 2016), but they can also retaliate with physical aggression toward those that obstructed their status pursuit (for a review, see Denissen et al., 2018). For example, in series of experiments, narcissists were more aggressive than nonnarcissists toward those who criticized or outperformed them (Bushman & Baumeister, 1998; Thomaes, Bushman, et al., 2008). Narcissistic aggression can also translate into direct physical violence outside the lab. A large body of evidence suggests that individuals who do not meet the status expectations they feel entitled to are more likely to engage in aggressive behavior (Baumeister et al., 1996; Denissen et al., 2018; Krizan & Johar, 2015; Rasmussen, 2016). For example, intimate partner violence is more likely when actors fail to meet narcissistic status demands (e.g., male perpetrators who earn less than their wife; Hornung et al., 1981). Additional evidence shows that violent offenders display higher levels of narcissism than nonviolent offenders (Bushman & Baumeister, 2002), and that narcissistic prison inmates are, on average, more violent than nonnarcissistic ones (Lambe et al., 2018). Taken together, these findings indicate that narcissism can act as a catalyst of interpersonal conflict in the process of status pursuit.

While engaging in other-derogating behaviors, narcissists may be fueled by a sense of shame and anger. Indeed, frustration of status motivation tends to elicit shame (Shariff et al., 2012) and anger (Berkowitz, 1989). When narcissists are rejected by popular others, fail in the eyes of others, or do not receive the praise they expect, they might feel embarrassed or ashamed (Brummelman, Nikolić, et al., 2018). In response, narcissists might turn the feeling of shame into anger (Thomaes et al., 2011), a phenomenon described as “humiliated fury” (Lewis, 1971) or “narcissistic rage” (Kohut, 1971).

Summary

When environments afford self-promotion, narcissists may engage in it to increase their status (*admiration* pathway). When self-promotion cannot grant status, narcissists may resort to antagonistic behaviors (*rivalry* pathway) to secure the status they feel entitled to.

Social Consequences of Admiration and Rivalry

Because status pursuit is embedded in social transactions, narcissists' status pursuit can shape the way others relate and behave toward them. Adopting a person-environment fit perspective, we suggest that the consequences of narcissistic behaviors are largely dependent on whether social environments are oriented primarily toward status (e.g., job settings) or affiliation (e.g., friendship settings). In status-oriented settings, narcissistic status pursuit might be especially advantageous for a continuous rise in status. In affiliation-oriented settings, however, narcissistic status pursuit might allow individuals to rise in status initially, but can also lead them to lose status over time (see also Back et al., 2018).

Status-oriented Settings

In status-oriented settings, individuals are often expected to strongly pursue status but less so to pursue strong interpersonal bonds. Because in such settings the formation of strong affiliative bonds is often secondary and interpersonal relationships are often more shallow, narcissistic admiration can allow individuals to rise in status without necessarily becoming disliked. In fact, narcissists are likely to acquire a high-status and become well-liked in short-term acquaintances and self-presentational settings, because in such settings affiliative bonds are more shallow and less intimate (Back et al., 2010; Carlson & Lawless DesJardins, 2015; Dufner, Rauthmann, et al., 2013; Lamkin et al., 2014; Leckelt et al., 2015; Oltmanns et al., 2004; Paulhus, 1998). Narcissists may become liked in such settings in part because their narcissistic traits are often misperceived as self-esteem, which is generally desirable regardless of social setting (Giacomin & Jordan, 2018). This quick boost in likability and status that associated with narcissistic admiration can be especially beneficial for navigating hierarchies. Because of their self-promotion, narcissists tend to be more preferred than nonnarcissists when applying for a job (Paulhus et al., 2013), and they have a relatively high probability of acquiring leadership positions (Brunell et al., 2008; Nevicka et al., 2011), even when they have less experience than their nonnarcissistic competitors (Nevicka et al., 2018). Narcissistic admiration can thus facilitate a rise in social status with minimal (if any) social costs and may render narcissists more likely to occupy pivotal positions in society in the long term. Narcissism levels are higher among successful artists (Zhou, 2017), wealthier individuals (Leckelt et al., 2019), CEOs in general (Chatterjee & Hambrick, 2007) and high-paid CEOs in particular (O'Reilly et al., 2014), and U.S. presidents (Watts et al., 2013). Thus, narcissistic admiration may be advantageous in the environments revolving around status (e.g., personal distinction, public recognition). In these environments, the admiration pathway can eventually

make narcissists stand out in the eyes of others, and render them more likely to get ahead of nonnarcissistic social competitors.

Like the admiration pathway, the rivalry pathway can be advantageous for individuals in status-oriented settings. Given that narcissistic rivalry is often viewed as less socially desirable, we propose that it might be useful in obtaining status when groups are faced with internal or external threats that endanger the group’s hierarchy or survival. It is possible that the combativeness associated with rivalry is viewed as an asset of leaders in such cases: They might convey the impression that they will fight to protect the group from external threats and impose their will to maintain in-group order. Indeed, especially in times of economic or personal uncertainty, groups have been shown to elect more dominant (Kakkar & Sivanathan, 2017) and narcissistic (Nevicka et al., 2013) leaders. Furthermore, groups have been found to elect more dominant individuals as negotiators in zero-sum, intergroup debates (Halevy et al., 2012). These findings suggest that in times of threat, narcissistic rivalry might be a less aversive or even a more desirable feature of the people elected as leaders. In such cases, narcissists, may thus be at a relative advantage of ascending the hierarchy and maintaining a high status.

Affiliation-oriented Settings

In affiliation-oriented settings, such as friendships, individuals are often expected to pursue the formation of interpersonal bonds but less so to pursue status. Consequently, in these settings, the strong and continuous pursuit of status might be met with increasing dislike. Although narcissistic admiration might allow individuals to increase in status and become more liked in early stages of interpersonal transactions in affiliative settings, it might be less effective in maintaining status and likability over time. Narcissists’ rigid self-promotion is assumed to exhaust social interaction partners over time (Campbell & Campbell, 2009; Sedikides & Campbell, 2017). Indeed, narcissists may become disliked for their bragging (Scopelliti et al., 2015). Consequently, interaction partners may withdraw their admiration, or respond to narcissists’ demands for admiration with conflict. Narcissists might perceive such behaviors as hindrances to status pursuit, which may increase their rivalrous behaviors, thus often escalating such interpersonal conflict. The gradual emergence of rivalry in affiliative settings can eventually damage narcissists’ relationships with others (Campbell & Campbell, 2009; Sedikides & Campbell, 2017). Studies focusing on the formation of affiliative bonds among previously unacquainted individuals found that, at early stages of acquaintance, narcissists were more likely to increase in status and likeability. However, as interactions grew more intimate, narcissists were more likely to lose their initially high status and to become less trusted and liked over time, especially because of their antagonistic behaviors (E. N. Carlson & Lawless DesJardins, 2015; Küfner et al., 2013; Leckelt et al., 2015; Paulhus, 1998). Therefore, narcissistic status strivings in affiliative settings might be less successful in garnering a long-term advantage in social status, while often damaging interpersonal bonds.

Summary

Our model is consistent with the possibility that narcissistic admiration and rivalry can be advantageous for status pursuit in hierarchical settings. By contrast, narcissistic admiration, and especially narcissistic rivalry, seems less advantageous in affiliative settings. In such settings, the continuous pursuit of status and the gradual emergence of rivalrous behaviors may be responsible for narcissists' relative decrease in status and likability over time.

Theoretical Implications

According to the model we have introduced, narcissism is expressed as individual differences in a sequence of momentary processes aimed at the attainment of social status. Because of the dynamic nature of social hierarchies, the motive for status can be satisfied only briefly. Consequently, corresponding motivations tend to reemerge throughout daily life, resulting in status-pursuing behaviors that become increasingly consistent and stable over time. As we argue below, our theoretical perspective can be used to identify processes (such as those pertaining to status pursuit) underlying personality traits. Moreover, it sheds light on how narcissism manifests itself across contexts, how it can develop across the life span and between contexts, as well as how its underlying processes can possibly be targeted experimentally.

Individual Differences in Status Pursuit

Humans do not pursue status in uniform ways. Evolutionary models of personality underscore that individual differences in personality traits can reflect individual differences in the strategies toward the attainment of social goals, like status (e.g., Cheng & Tracy, 2014). Narcissism might have evolved as a psychological mechanism that facilitates the pursuit of status (Mahadevan et al., 2016), because findings show that it is consistently associated with the successful navigation of hierarchies.

Our model can provide insight into why narcissism might differ from seemingly similar traits that are also associated with the pursuit of status. Some scholars have proposed that narcissism belongs to a broader group of so-called "dark traits" (including Machiavellianism and psychopathy; (Paulhus & Williams, 2002) that represent a tendency to "maximize one's own utility" while "disregarding, accepting, or malevolently provoking disutility for others" (Moshagen et al., 2018, p. 657). While these personality traits are all linked to a relatively strong status motive, narcissism stands out as the trait most strongly associated with status motivation (Jonason & Ferrell, 2016; Jonason & Zeigler-Hill, 2018; Moshagen et al., 2018). That is, although individuals with psychopathy or Machiavellianism may pursue social status through the same self-regulatory processes as narcissists do, they probably do so with less intensity, pervasiveness, and rigidity. If this is the case, then they may pursue social status in

more context-sensitive ways (e.g., only in settings in which social status can benefit or at least does not hinder their pursuit of other important motives). For example, Machiavellians are also oriented toward status, but they are thought to mainly pursue control over others (K. Lee & Ashton, 2005). Machiavellians might thus engage in similar status-pursuing processes that narcissists do, but perhaps only in situations in which status can enable them to acquire such control (e.g., in their jobs, but not in their intimate relationships). In that sense, antagonistic personality traits may, in part, reflect individual differences in the strength or dominance of the status motive.

A Within-Person Perspective on Narcissistic Admiration and Rivalry

A long-standing challenge in personality research has been to integrate process models of personality (i.e., within-person models) that predict why the same individual behaves differently from context to context with structural models of personality (i.e., between-person models) that predict why individuals tend to behave differently from one another (Baumert et al., 2017). Some researchers (e.g., Geukes, van Zalk, et al., 2017; Hopwood & Back, 2018; Wrzus & Roberts, 2017) have recently proposed broad, generic models of personality that address this matter, decomposing trait concepts into momentary state processes, the recurrence of which can lead to relatively predictable and recurring outcomes that are perceived as stable, dispositional trait differences. We hope that our framework can contribute to this growing body of literature by providing concrete examples of how such processes might operate in the case of narcissism. Our framework assumes that individual differences in narcissism can be conceptualized as individual differences in a sequence of state-like processes that emerge in interactions with the environment when individuals pursue status. Viewing narcissism as a recurring sequence of motivated processes can enhance our understanding of why it tends to present itself differently across contexts, why it tends to present itself in similar ways within similar contexts, and how it potentially develops over time (Denissen et al., 2013). Thus, starting from a sequence of within-person processes of status pursuit, the SPIN model outlines process outcomes whose recurrence can lead to the stabilization and development of between-person differences in narcissism.

This within-person perspective is especially relevant in understanding the distinct manifestations of narcissism. Recent years have witnessed an upsurge in empirical and conceptual attempts to pin down the manifestations, structure, and nomological network of grandiose narcissism. This upsurge has culminated in the distinction between two interrelated trait dimensions: (a) narcissistic grandiosity (or admiration), which is correlated with agentic extraversion and sensitivity to positive rewards (i.e., high approach motivation) and can be manifested in self-promoting behaviors of status pursuit; and (b) entitlement (or rivalry), which is correlated with antagonism (i.e., low agreeableness), and can be manifested in other-derogating behaviors of status pursuit (Back et al., 2013; Crowe et al., 2019; Krizan & Herlache, 2018; Lange et al., 2018; Miller et al., 2017; Weiss et al., 2019; Zeigler-Hill,

Vrabel, et al., 2018). Moving beyond this descriptive level, our model attempts to explain why these outwardly distinctive dimensions nevertheless represent the same construct, in what processes they differ, and how they might develop.

Extending existing theory, our model provides a motivational explanation of *why admiration and rivalry represent the same construct* (i.e., why they are both manifestations of narcissism). Scholars have suggested that admiration and rivalry share a common motive (i.e., the motive to become grandiose; Back et al. 2013). Extending this proposition, we suggest that the common motive underlying admiration and rivalry is the motive for social status. Preliminary evidence supports the idea that status motivation underlies both admiration and rivalry, as it shows that admiration and rivalry are more strongly associated with the status motive than with other social motives, such as the affiliation motive (Zeigler-Hill, Vrabel, et al., 2018).

Furthermore, our model illustrates *why and how admiration and rivalry are distinct* manifestations of narcissism. Our model holds that narcissists, after determining that a situation affords status, are more likely to appraise whether the situation calls for self-promotion or other-derogation as a means of status acquisition. Some situations might be perceived as facilitating the pursuit of status, possibly activating appraisals about the heightened utility of self-promotion and triggering self-promoting behaviors (admiration pathway). Other situations might be perceived as hindering the pursuit of status, possibly activating appraisals about the heightened utility of other-derogation and triggering other-derogating behaviors (rivalry pathway). Thus, moving beyond prior work on between-person differences in admiration and rivalry, our model illustrates why admiration and rivalry might reflect two distinct process outcome chains that fluctuate within individuals, depending on their appraisals of the social contexts.

Moreover, our model illustrates *how individual differences in admiration and rivalry might develop* through interpersonal transactions. Over time, the frequency with which individuals pursue status through admiration or rivalry may crystallize into more stable, trait-like patterns that represent between-person differences in admiration and rivalry (Back, 2018). If individuals primarily feel they can keep on earning status through self-promotion, they might be more inclined to behave in an increasingly self-aggrandizing manner (i.e., they might develop higher levels of admiration over time). Evidence in support of this hypothesis shows that narcissistic self-views are momentarily increased when individuals rise in status (Mahadevan et al., 2018). Likewise, if individuals primarily feel that their status pursuit is hindered and the main avenue to status is through derogating others, they might be more inclined to behave in an increasingly other-derogating manner (i.e., they might develop higher levels of rivalry over time). Confirming the basis of these assumptions, daily perceptions of status gain have been related to admiration, whereas daily perceptions of status loss have been related to rivalry (Zeigler-Hill, Vrabel, et al., 2018). Our model hence offers an integrative

perspective into how intraindividual differences in status pursuit can stabilize and intensify interindividual differences in admiration and rivalry.

We propose that admiration represents the “default mode” of narcissists, such that narcissists display rivalry mainly when their self-promoting efforts have been frustrated. This suggests that antagonistic strivings (which we label rivalry) are essential in understanding the spectrum of narcissistic behaviors, but that their emergence might be more situational, such that they characterize some narcissists more so than others. Indeed, although dark personality traits (e.g., Machiavellianism, psychopathy, and narcissism) share a common feature of antagonism, this feature seems to explain a relatively low proportion of variance in narcissism (Moshagen et al., 2018). Moreover, latent class analyses identified two subgroups of narcissists: (a) those characterized by moderate levels of admiration and low levels of rivalry, and (b) those characterized by moderate to high levels of both admiration and rivalry. They did not, however, identify subgroups of narcissists characterized by moderate or high levels of rivalry and low levels of admiration (Wetzel et al., 2016). These findings tentatively suggest that, without exhibiting high levels of admiration, people are unlikely to exhibit high levels of rivalry. Drawing from these findings, we suggest that narcissistic admiration is the most salient manifestation of narcissism, with rivalry primarily emerging when admiration is not sufficient to establish status.

Development of Narcissism Across the Life Span

Our model proposes that the strength of people’s status motive underlies their narcissism levels. Some models of personality development suggest that developmental patterns of personality traits are guided by changes in motivation (e.g., Denissen et al., 2013). Thus, as the importance of status waxes and wanes across the lifespan, so might narcissism.

Current findings provide preliminary support for this hypothesis. Already from a preschool age, children start to reflect on their competences (Dweck, 2017) and compete with others for tangible resources (e.g., toys; Hawley, 1999). At this age, attention-seeking and interpersonal antagonism have been found to be precursors of later narcissism (Carlson & Gjerde, 2009). Narcissism first emerges as relatively stable individual differences in self-views around the age of 7 (Thomaes & Brummelman, 2016), a time when self-promotion gains ground as the primary route toward status attainment (Hawley, 1999), and children start to reflect on their social status through more realistic social comparisons (Ruble & Frey, 1991). Moving on to adolescence, mean levels of narcissism increase (Klimstra et al., 2020). This increase might be facilitated by physical changes such as rising testosterone levels (Braams et al., 2015), which might strengthen the motive for status during adolescence (see Terburg & van Honk, 2013; Yeager et al., 2018). Social status indeed becomes highly important during this period (LaFontana & Cillessen, 2010) and is salient in adolescents’ fantasies: Adolescents seem preoccupied with their social image and appear to believe that others are constantly

evaluating them (Elkind, 1967). Given the high competition for status in adolescence, adolescents may be susceptible to resort to both self-promotion and other-derogation in their efforts to establish their rank in the peer group (Olthof et al., 2011).

Mean levels of narcissism continue to increase (Klimstra et al., 2020), or at least do not decrease (Grosz et al., 2017), during young adulthood. Narcissism might be not only beneficial for young adults' amassment of sexual experiences (because narcissists are perceived as attractive; Dufner, Rauthmann, et al., 2013) but also for job acquisition. As unemployment rates in young adulthood are much higher than for other age groups (e.g., Eurostat, 2018), the competition for jobs may be fierce at this age. To land a job, young adults are often required to convince a potential employer—usually during a brief, self-presentational interview—that they are confident, ambitious, and talented, so as to land a job. This sort of self-promotion often makes narcissists, who tend to thrive in self-presentational settings, the most appealing job candidates (Paulhus et al., 2013).

Cross-sectional evidence suggests that from young adulthood onward, narcissism tends to decline gradually (Foster et al., 2003; Klimstra et al., 2020; Trzesniewski et al., 2008). After young adulthood, individuals might have acquired a more consolidated status in their social environments (e.g., they usually have finished their academic development and have found permanent employment), whereas goals pertaining to affiliation and intimacy (e.g., finding a long-term partner, procreating, spending more time with loved ones) might become more salient (Carstensen et al., 1999; Erikson, 1959). Such a motivational shift from status to affiliation goals may also explain why narcissism tends to be on average less and less desirable as adults grow older (Berenson et al., 2017).

Consistent with our model, these findings suggest that mean-level changes in narcissism across the life span may reflect developmental changes in the motivation to obtain social status. Narcissism seems to rise when status goals become more important, but to fall when status goals become less important. Future research could examine this possibility directly, for example by examining whether mean-level changes in narcissism are mediated by mean-level changes in the salience of status goals across the life span.

Development of Individual Differences in Narcissism

Because our model argues that status motivation underlies the development of narcissism, our theoretical framework can also contribute to the understanding of how individual differences in narcissism might develop through the reinforcement of status pursuit across social environments. Narcissism is partly heritable (for a review, see Luo & Cai, 2018)). At the same time, the development of narcissism is also thought to be shaped by socialization experiences (Kernberg, 1975; Kohut, 1971; Millon, 1969). Parents may reinforce narcissism by reinforcing the pursuit of status, and initial evidence supports this assumption. Narcissism

seems to be cultivated, in part, by parental overvaluation, which is defined as parents seeing their child as more special and more entitled than others (Brummelman, Thomaes, Nelemans, Orobio de Castro, & Bushman, 2015). Overvaluing parents on average overestimate children’s IQ scores, overclaim children’s knowledge, and overpraise children’s mathematics performances, while pressuring their child to stand out from others (e.g., by giving them a unique, uncommon first name; Brummelman, Thomaes, Nelemans, Orobio de Castro, & Bushman, 2015). Thus, overvaluing parents seem more concerned with their children’s social status. Parental overvaluation predicts narcissism in children over time, even when parents’ own narcissism, which is associated with parental overvaluation, is taken into account. This finding suggests that overvaluation might indeed influence the development of narcissism above and beyond genetic transmission (Brummelman, Thomaes, Nelemans, Orobio de Castro, Overbeek, et al., 2015). Genetically informed studies should corroborate this.

Consistent with our model’s suggestion that status goals can direct the development of narcissism, some theories suggest that narcissism represents a sense of self defined primarily by external validation (Kohut, 1971; Winnicott, 1960). It is possible that parents of narcissistic children explicitly encourage them to value and pursue status, for example by pushing their children to stand out from others, by emphasizing the status-enhancing nature of their children’s accomplishments, or by making their approval of children conditional on children’s attainment of a high status. When children gain status, parents may lavish them with praise (Brummelman, Nelemans, Thomaes, & Orobio de Castro, 2017), but when children lose status, parents may become cold (Otway & Vignoles, 2016) or even hostile toward them (Wetzel & Robins, 2016). Indeed, the experience that parents’ regard is conditional might be an important factor in the early development of narcissism (Assor & Tal, 2012; Brummelman, 2018), and future studies could explore this possibility directly by zeroing in on parent-child transactions.

Research on the development of individual differences in narcissism is still in its infancy. By proposing that the reinforcement of status motivation in the family might contribute to narcissism, our model creates an overarching framework that abridges theoretical suggestions and findings from socialization research on narcissism. In addition, our model generates novel hypotheses for future research, such as that narcissism may be reinforced across the life span by settings that reinforce status pursuit, even outside of the family. Narcissists might compete for status in their peer groups (Poorthuis et al., 2021), sports teams (Roberts et al., 2018), and occupational settings (Grijalva et al., 2015). As they move to increasingly high-status positions, their narcissism levels may further rise (Mahadevan et al., 2018). Combined with genetically informed studies, studies that address the lifelong socialization of status motivation might advance our knowledge of why and how some individuals might become more narcissistic than others.

Future Directions: Toward a Systematic Validation of the Model

The central premise of the SPIN model is that narcissism becomes manifested as individual differences in how people pursue status. These differences manifest themselves in core self-regulation processes: situation selection, vigilance, appraisal, and response execution, driven by an underlying status motive. Not all of these processes have received the same amount of empirically scrutiny in relation to narcissism, however. There is considerable evidence for the associations between narcissism and status motivation, situation selection, and response execution (e.g., self-promoting and other-derogating behaviors). By contrast, despite theoretical propositions (e.g., Cisek et al., 2014) and indirect evidence (e.g., Horvath & Morf, 2009), vigilance has not been studied in relation to narcissism. Likewise, despite theoretical propositions (e.g., Coleman et al., 2019) and indirect evidence (e.g., Birkás et al., 2016), appraisals have not been studied in relation to narcissism. Future research should examine these proposed processes in narcissistic status pursuit. Although it will be important to isolate these processes in laboratory experiments, perhaps the most exciting prospect will be to examine how all proposed processes unfold over time in people's lives. We propose both longitudinal and experimental tests of these processes.

Longitudinal Tests of the Model

Given that the SPIN model focuses on the moment-by-moment processes through which narcissists pursue status, we believe intensive longitudinal designs are well suited to test it. In such designs, researchers should assess the self-regulatory processes that our model proposes in real life, as they unfold in narcissists' actual social interactions. This would allow researchers to test core assumptions of the model simultaneously.

One core assumption of our model is that narcissism is reflected in distinct self-regulation processes of status pursuit. According to the model, these processes can explain when individuals might engage in admiration and when individuals might engage in rivalry in their daily status pursuits. A challenge for the field will be to develop precise and sensitive measures for the self-regulation processes that underlie narcissistic status pursuit. To address this issue, future studies could use multiple sources of information in conjunction with self-reports to measure each process in the moment. Experience sampling designs allow researchers to track these moment-by-moment processes in real-time. Smartphones have allowed researchers to directly notify participants to fill out self-reports of their momentary experiences (Harari et al., 2016; Wrzus & Mehl, 2015), which may be particularly useful in tracking individuals' vigilance and appraisals of their social contexts. To examine vigilance, researchers could measure how much individuals report being on the lookout for cues of status facilitation and status hindrance. To examine status-relevant appraisals, researchers could measure how much individuals appraise the situation as facilitating or hindering status pursuit. In

addition to gathering such self-report data, studies could also benefit from using additional smartphone data, such as participants' phone calls, text messages, location information, and Bluetooth connections, and they may use smartphones to record snippets of participants' everyday conversations (Mehl, 2017). These valuable data can allow researchers to examine, for example, situation selection (e.g., where, or with whom a person was) or interpersonal status-pursuing behaviors (e.g., whether they were bragging about themselves or spreading gossip about others; Harari et al., 2016). Combined with peer-reports and direct observations, these data could add another layer of information regarding when individuals engage in admiration and when individuals engage in rivalry, as well as on the social consequences of these behaviors.

Our model also suggests that if individuals engage in these status-pursuing processes repeatedly, then these processes might crystallize into traits over time. Thus, the more individuals engage in the processes associated with admiration, the more likely they might be to develop higher levels of trait admiration over time. Likewise, the more individuals engage in the processes associated with rivalry, the more likely they might be to develop higher levels of trait rivalry over time. To test the long-term development of individual differences in admiration and rivalry, researchers should examine whether the proposed self-regulatory processes (as assessed through intensive longitudinal measurements) mediate long-term changes in admiration and rivalry over weeks, months, or even years. Ideally, such studies should start from early adolescence, when status becomes increasingly important and the transition to high-school enables the formation of new social hierarchies (Brown, 2011), and extend to adulthood, when individual differences in personality tend to become more stable (Roberts & DelVecchio, 2000). This might allow researchers to uncover how individuals might change over time in the way that they pursue status through admiration and rivalry.

Experimental Tests of the Model

The predictive power of the SPIN model can also be tested through intervention. As the model proposes a sequence of momentary processes underlying status pursuit, experimental interventions (i.e., field experiments) can attempt to change each of those processes to examine their downstream effects on status pursuit. To be sure, the interventions we refer to are not therapeutic plans or ready-to-implement psychological intervention programs. Our model needs more empirical scrutiny before it can be translated to such plans and programs. Rather, we regard these interventions as tests of the processing steps that our model proposes. For example, if changing narcissistic appraisals affects the way individuals pursue social status (e.g., adopting the admiration pathway instead of the rivalry pathway) in their everyday lives, this would constitute evidence for our model. Researchers should be cautious when designing such interventions. Because status is a fundamental human motive (Anderson et al., 2015) and because narcissists often fulfill their motive for status,

such interventions might be ineffective or even backfire if they are designed in a way that frustrates status pursuit altogether.

Situation Selection

Interventions on situation selection rely on the principle that environments, objects, or peers associated with an undesired behavior (e.g., drug use) automatically trigger the motivation to enact it and should thus be avoided (Anker & Crowley, 1982; Farabee et al., 2002; Ingjaldsson et al., 2003; Mahoney & Thoresen, 1972). We have proposed that narcissists tend to select public and hierarchical settings, because such settings can more easily facilitate status pursuit. In line with existing paradigms, future interventions on situation selection could test whether nudging individuals to select more affiliation-oriented over status-oriented settings in daily life can scale down undesirable instances of status pursuit.

Vigilance

Interventions on vigilance rely on the principle that withdrawing one's attention from cues that elicit specific responses can scale down those responses. For example, training individuals to withdraw their attention from stress-triggering social cues (e.g., pictures of frowning faces) and to orient it toward emotionally comforting social cues (e.g., pictures of smiling faces) was found to scale down physiological and self-reported stress levels (Dandeneau et al., 2007). We have proposed that narcissists tend to pay vigilant attention to cues that indicate whether environments facilitate or hinder their status pursuit. In line with existing paradigms, interventions on narcissistic vigilance could examine whether nudging individuals to withdraw their attention from environmental cues indicating the hindrance of status pursuit can make them less inclined to pursue status via the rivalry pathway.

Appraisal

Appraisals are especially suitable targets for psychological intervention, as they are the most direct precursors of behavior (Walton & Wilson, 2018). Relevant findings support this assumption. For example, encouraging individuals to appraise their elevated arousal during public speaking as a sign of coping rather than as a sign of stress was found to lower physiological and self-reported stress responses (Jamieson et al., 2012, 2013). We have proposed that when narcissists infer that situational demands exceed their perceived resources to self-promote, narcissists may resort to other-derogating behaviors. Following existing paradigms, future interventions on narcissistic appraisals could teach individuals to reappraise status-related setbacks as learning experiences that will strengthen their future status pursuits. For example, interventions could teach individuals to reappraise critical feedback not as a sign of their incompetence, but as a set of suggestions that indicate how to improve their competence (for a similar rationale, see (Dweck & Leggett, 1988; Yeager et al., 2013). Such interventions might eventually lead individuals to reappraise demanding

situations as facilitating (rather than hindering) status pursuit, scaling down the appraisals leading to other-derogating behaviors.

Response Execution

Interventions targeting response execution (i.e., focusing on direct behavioral change) are usually aimed at rewarding desirable behaviors and at ignoring or punishing undesirable behaviors (Anker & Crowley, 1982). Because social settings usually provide these rewards and punishments, we suggest that interventions on narcissistic response execution might be more effective if they target the social settings rather than the individuals within those settings. Individuals might be reluctant to abandon behaviors if these behaviors are still rewarded by their social setting. Interventions could alter the means through which individuals pursue social status, such as by affording status through prosocial acts. For example, school-wide interventions in which groups of students took a public stance against conflict (e.g., by giving public rewards, such as wristbands, to peers who engaged in friendly or conflict-mitigating behaviors) were found to reduce conflict behavior at the school level (Paluck & Shepherd, 2012; Paluck et al., 2016). Similar interventions can also be developed for other settings, such as organizational ones (e.g., through organizational campaigns that afford status on the basis of collaboration rather than competition). Another way of promoting behavioral change is by altering institutional policies to promote collaborative over competitive activities (cf. Tankard & Paluck, 2016). As a result, individuals may become more oriented toward “getting along” than “getting ahead”, thus toning down their pursuit of social status.

Summary

We proposed longitudinal and experimental methods to validate our model. Intensive longitudinal studies should repeatedly measure each self-regulatory process of the model to uncover when and why individuals engage in admiration or rivalry in their daily lives, and how individual differences in such status pursuit might, over time, crystallize into relatively stable individual differences changes in narcissism. Experimental interventions should examine whether experimentally manipulating one of the model processes can change narcissistic status pursuit.

Conclusion

Combining evolutionary accounts of social behavior with existing accounts of narcissism, we illustrated why and how narcissism is a system of psychological processes and behaviors aimed at fulfilling individuals’ fundamental motive for social status. Placing a social motive at the center of narcissism allows for a better understanding of why narcissistic beliefs and behaviors have a social orientation, improving our understanding of why social relationships can be central in the development and reinforcement of narcissism. By pinpointing the

self-regulatory processes of status pursuit and how narcissists engage in these processes, our model connects the literature on narcissism with the broader literature on personality development. The model provides a theoretical framework for studies into the similarities and dissimilarities of narcissism with other personality traits and for the development of precise interventions to curb socially undesirable aspects of narcissism.



Chapter 3

Affective Contingencies of Narcissism

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Affective Contingencies of Narcissism.

Abstract

Several theories propose that narcissism is rooted in affective contingencies. Given narcissists' focus on power, these contingencies should be strong in the power domain (e.g., "If I have power, then I feel great") but not in the affiliation domain. We systematically investigated narcissists' contingencies and explored whether these contingencies might link narcissism to social behavior. In a multimethod longitudinal study, we assessed unidimensional narcissism levels as well as two main narcissistic strategies: admiration and rivalry. We measured participants' affective contingencies (i.e., affective responses to satisfying and frustrating experiences of power and affiliation) via self-reports and facial electromyography (fEMG). In a one-year follow up, we observed participants' actual power- and affiliation-related behaviors in the laboratory. Results indicated that narcissism scores were linked to increased affective reactivity to power, and this pattern was present for both admiration and rivalry. Narcissism was unrelated to affective reactivity to affiliation, with an important exception: Individuals with higher levels of narcissistic rivalry exhibited decreased reactivity toward satisfactions and increased reactivity toward frustrations of affiliation. Contrary to our hypothesis, affective contingencies did not generally account for any link between narcissism and social behavior. The results inform why narcissists pursue power and why some narcissists—especially those high in rivalry—pursue power at the cost of affiliation.

Keywords: narcissism, social power, affiliation, affect, facial electromyography

Narcissism is a personality trait marked by grandiosity, superiority, and entitlement to special treatment (Miller & Campbell, 2008). Several prominent theoretical approaches have proposed that narcissism is rooted in affective contingencies that have a motivational function (Back et al., 2013; Baumeister & Vohs, 2001; Grapsas, Brummelman, et al., 2020; Morf & Rhodewalt, 2001). This idea is consistent with broader theories proposing that individual differences in personality traits are rooted in individual differences in people's underlying motivational systems (Denissen & Penke, 2008; Dweck, 2017; Fleenon & Jayawickreme, 2015; Freud, 1927; Geukes, van Zalk, et al., 2017; Mischel & Shoda, 1995; Wrzus & Roberts, 2017). However, the affective contingencies of narcissism have not been systematically investigated. This is unfortunate, because this limits our understanding of the building blocks of narcissism and personality more broadly.

The aim of the current research was to address this issue. We focused on grandiose narcissism (hereafter: narcissism), a prototypical manifestation of narcissism characterized by agentic (e.g., extraversion, assertiveness, sense of grandeur) and antagonistic (e.g., arrogance, exploitativeness, disdain for others) tendencies (Back et al., 2013; Crowe et al., 2019; Miller et al., 2017). We tested the core hypothesis that narcissism is rooted in an affective system that is especially reactive to situations involving social power, but not to situations involving affiliation (Grapsas, Brummelman, et al., 2020; Johnson et al., 2012; Mahadevan et al., 2016; Morf & Rhodewalt, 2001; Zeigler-Hill, McCabe, et al., 2018). We measured affective responses to power and affiliation using both self-reports and facial EMG indicators of reactivity to power- and affiliation-related experiences. We also explored whether these affective contingencies might explain previously established links between narcissism and social behavior.

Theoretical Background

Several personality theories suggest that personality is rooted in fundamental psychological motives (i.e., higher-order goals that are non-derivative of other goals; Denissen & Penke, 2008; Dweck, 2017; Fleenon & Jayawickreme, 2015; Freud, 1927; Geukes et al., 2017; Wrzus & Roberts, 2017). Motives, in turn, are closely connected with affective experience. People tend to experience pleasure when they fulfill their motives and displeasure when they fail to do so (Depue & Morrone-Strupinsky, 2005). Motive disposition theory posits that people differ in how much pleasure and displeasure they are predisposed to experience from diverse motive-satisfying or motive-frustrating experiences (Brunstein et al., 1998; McClelland, 1987b). That is, individuals differ in motive-specific *affective contingencies* (i.e., positive or negative affective reaction tendencies to motive-specific experiences). These differences can explain why some people are generally more motivated than others to strive toward motive-specific satisfying experiences, or to avoid frustrating ones. For example, people with a strong affiliation motive have pronounced affective contingencies in the domain of affiliation and are therefore more likely to prefer watching comedy and romance movies, as well as to be

interpersonally warm and friendly (Dufner, Arslan, et al., 2015). As people attempt to fulfill their motives, they form increasingly consistent and frequently recurring patterns of thinking and acting that serve motive fulfillment, which comprise their personality traits (Denissen & Penke, 2008; Dweck, 2017; Fleeson & Jayawickreme, 2015; Freud, 1927; Geukes, van Zalk, et al., 2017; Wrzus & Roberts, 2017). To understand the roots of personality traits and their associated behaviors, one may thus start from their underlying affective contingencies.

What could be the affective contingencies underlying narcissism? Several theories of narcissism have emphasized that narcissists (i.e., individuals with relatively high levels of narcissism, not individuals with a clinical diagnosis) are more oriented toward goals associated with self-assertion and personal advancement (such as power) than toward goals associated with caring for the welfare of others or creating strong relational bonds with them (such as affiliation). For example, the addiction model of narcissism (Baumeister & Vohs, 2001) posits that narcissists are individuals “addicted to esteem” and might experience severe distress and even bouts of depression when deprived of the power they crave. Likewise, the agency model (Campbell et al., 2006b), the extended agency model (Campbell & Green, 2008), and the self-regulatory processing model (Morf & Rhodewalt, 2001) of narcissism suggest that narcissists experience positive affect only insofar as they garner social power. In some cases, narcissists’ motivation to pursue power can come at the cost of affiliation. For example, narcissists are often inclined to exploit or manipulate others, humiliate them to succeed, or lash out aggressively when they fail (Back et al., 2013; Morf & Rhodewalt, 2001). Building on such observations, the dominance behavioral system theory (Johnson et al., 2012), hierometer theory (Mahadevan et al., 2016), the narcissistic pursuit of status theory (Zeigler-Hill, McCabe, et al., 2018), and the status pursuit in narcissism model (Grapsas, Brummelman, et al., 2020) propose that narcissism is a personality trait that serves the fulfillment of a relatively strong motive for power. According to these theories, the motive for power might be dominant in narcissists, such that they might sometimes sacrifice fulfilling their comparatively weaker motive for affiliation if doing so would serve the pursuit of power (Grapsas, Brummelman, et al., 2020; Zeigler-Hill, Vrabel, et al., 2018). If such motive dynamics underlie narcissism, they should be evident in the strength of narcissists’ affective contingencies in the domains of power and affiliation motivation.

Preliminary Evidence

Several lines of evidence suggest that narcissists have a relatively strong power motive. Narcissists tend to construct projective narratives revolving around social power (Carroll, 1987; Joubert, 1998) and to regularly fantasize about having power (Raskin & Novacek, 1991). They also often seek to direct the actions of others (Bradlee & Emmons, 1992; Grove et al., 2019; Jonason & Zeigler-Hill, 2018; Sturman, 2000; Thomaes, Stegge, et al., 2008; Zeigler-Hill, Vrabel, et al., 2018). Narcissists are more likely to be politically ambitious (Fulford et al., 2008; Peterson & Palmer, 2019) and tend to especially value leadership, fame, and wealth, which

are indicators of power (Abeyta et al., 2017; Fulford et al., 2008). To gain power, narcissists may publicly brag about their accomplishments and showcase their talents (Buss & Chiodo, 1991; Wallace & Baumeister, 2002). Narcissists often succeed in securing power, for example by occupying leadership positions (Barbara Nevicka et al., 2011). Narcissistic children often succeed in obtaining leadership positions in their classrooms (Brummelman et al., 2021), and narcissistic adults often succeed in obtaining positions of power in the workplace (Chatterjee & Hambrick, 2007; Barbara Nevicka & Sedikides, 2021; Watts et al., 2013).

Narcissists' relatively strong motive for power may be reflected by an increased affective contingency with regard to experiences of power and powerlessness. Narcissists tend to like themselves more when they garner power, with evidence at the trait level (Thomaes, Stegge, et al., 2008; Zeigler-Hill et al., 2008) and at the state level (Thomaes et al., 2010; Zeigler-Hill, Vrabel, et al., 2018). This enjoyment of power is evident from a young age. In one study, narcissistic children were found to smile, more so than children lower in narcissism, in response to rising up the ranks of popularity (Grapsas et al., 2020). By contrast, narcissists are often frustrated when they are powerless. For example, narcissists tend to become especially angry and aggressive in response to failure (Bushman & Baumeister, 1998; Denissen et al., 2018; Rhodewalt & Morf, 1998; Stucke, 2003; Stucke & Sporer, 2002; Thomaes, Bushman, et al., 2008). Likewise, when others attempt to exert power over them, narcissists tend to exhibit increased levels of negative affect and aggression (Alexander et al., 2020; Benson et al., 2016; Wright et al., 2017). These findings tentatively suggest that narcissists have relatively strong affective contingencies in the power domain (e.g., "if I have power, then I feel great"; Mischel & Shoda, 1995).

Whereas there is consistent evidence that narcissists' affiliation motive is comparatively weaker than their motive for power, there is no consistent evidence suggesting that it is weak in absolute terms. Some studies have found evidence for a weakened affiliation motive. In these studies, narcissists were *less* likely to construct projective narratives revolving around intimacy (Carroll, 1987) and also less likely to set intimacy goals, such as catering for others' well-being or developing close relationships (Ojanen et al., 2012; Thomaes, Stegge, et al., 2008). Other studies, however, have found evidence for a slightly strengthened affiliation motive. In those studies, narcissists were found slightly *more* likely to set group affiliation goals (Jonason & Zeigler-Hill, 2018; Ojanen et al., 2012; Zeigler-Hill, Vrabel, et al., 2018). And yet other studies have found no link between narcissism and affiliation. In those studies, narcissists were neither more nor less likely to set group affiliation goals (Bradlee & Emmons, 1992; Findley & Ojanen, 2013). Thus, findings on narcissism and affective contingencies in the affiliative domain are inconsistent.

A possible reason for the mixed nature of this evidence might be that some narcissists have stronger affiliation motives than others. According to the narcissistic admiration and

rivalry concept (Back et al., 2013) and the status pursuit in narcissism model (Grapsas, Brummelman, et al., 2020), narcissism encompasses agentic tendencies (also labelled “narcissistic admiration”) and antagonistic tendencies (also labelled “narcissistic rivalry”). Narcissistic admiration and rivalry are theorized to represent two distinct strategies through which narcissists maintain their grandiosity and sense of power (Back et al., 2013; Grapsas, Brummelman, et al., 2020). Narcissistic admiration encompasses agentic self-promoting thoughts and behaviors. Thus, individuals with high levels of narcissistic admiration might strive for power, but they might not necessarily be indifferent to affiliation. By contrast, narcissistic rivalry encompasses other-derogatory thoughts and behaviors, including interpersonal behaviors of social conflict and aggression. Individuals with high levels of narcissistic rivalry set hostile interpersonal goals and tend to be interpersonally mistrustful (Grove et al., 2019). Thus, individuals with high levels of narcissistic rivalry might strive for power, but unlike individuals with high levels of admiration, they might strive less for affiliation (Back, 2018; Brummelman, Gürel, et al., 2018; Grapsas, Brummelman, et al., 2020; Ten Brinke & Keltner, 2020). Thus, individuals with higher levels of narcissistic rivalry might exhibit weaker affective contingencies in the domain of affiliation.

Methods to Capture the Affective Contingencies of Narcissism

Affective contingencies can be measured via self-reports of overall affective reactivity, as well as via physiological reactions that capture real-time affective reactivity. In the current research, we used physiology in addition to self-reports, because people are at times not able or willing to report their motives or affect, and it is often their unreported motives and spontaneous affective reactions toward motive-relevant experiences that guide behavior (for a review, see McClelland et al., 1989).

Physiological assessments of contingencies might be especially relevant in the case of narcissism. Narcissists tend to be invested in radiating a grandiose image to others (Morf & Rhodewalt, 2001), which might lead them to suppress or deny negative affective experiences that reflect fragility or insecurity. For example, when they receive disappointing feedback, narcissistic children may blush—an involuntary reddening of the face that signals embarrassment—even though they may deny their blushing in self-reports (Brummelman, Nikolić, et al., 2018). Similar observations have been made in adults. One study found that when adult narcissists were ostracized, they showed increased activity in an area of the brain that is associated with social pain, although they claimed not feeling distressed (Cascio et al., 2015). Another study found that narcissistic males exhibited high basal cortisol levels—a sign of chronic stress—even though they did not report higher levels of stress (Reinhard et al., 2012). Thus, physiological measures seem necessary to capture narcissists’ affective contingencies.

As a physiological indicator of narcissists' real-time affective reactions, we used facial electromyography (fEMG), a method that can unobtrusively detect subtle facial muscle contractions of the zygomaticus major (contracted when smiling, suggesting positive affect) and the corrugator supercilii (contracted when frowning, suggesting negative affect). Facial electromyography has been shown to be a reliable method to assess the intensity of positive and negative affect in real-time (Barrett et al., 2019; Cacioppo et al., 1986, 2000; Hess et al., 2017). In some cases, fEMG responses are more revealing than self-reports. For example, more prejudiced Whites were found to frown more when viewing images of Blacks, despite reporting that they perceived Blacks as friendly as non-prejudiced Whites did (Vanman et al., 1997). Also, people who smiled more in response to pictures of their romantic partner showed more positive behavior toward them, even controlling for self-reported relationship satisfaction (Krause & Dufner, 2020). Likewise, individuals who smiled more and frowned less in response to affiliation images were found to be more interpersonally affiliative, even after controlling for self-reported affiliation motive levels (Dufner, Arslan, et al., 2015, 2018). These findings suggest that physiological reactions captured by fEMG measures have incremental validity in predicting behavior. Most such studies, however, are limited by the use of fEMG in single tasks, which limits understanding about the extent to which affective reactions might be generalizable across contexts. To address this issue, we used fEMG in an array of motive-relevant tasks with different modality. In this manner, our study is the first systematic, broadband investigation of the affective contingencies of narcissism.

The Present Study

In this multi-method study, we systematically examined, for the first time, the affective contingencies of narcissism in the content domains of power and affiliation. We assessed overall narcissism, as well as narcissistic admiration and narcissistic rivalry. To capture affective contingencies, we measured participants' (a) subjective affective reactivity toward satisfying and frustrating experiences of power and affiliation using self-report and (b) their objective, real-time affective responses to satisfying and frustrating experiences of power and affiliation using facial electromyography. One year later, we video-observed participants' power and affiliation behaviors during a structured interaction in the lab. We hypothesized that overall narcissism, as well as narcissistic admiration, would be related to stronger affective responses (i.e., higher positive and/or lower negative responses toward satisfaction and vice versa to frustration) to experiences of power, but not to experiences of affiliation. In addition, we hypothesized that narcissistic rivalry would be related to *stronger* affective responses to experiences of power and *weaker* affective responses to affiliation. Given that affective contingencies can underlie motivated behavior, we hypothesized that these contingencies would mediate the previously documented (Back et al., 2013; Nevicka & Sedikides, 2021) association between narcissism and power- and affiliation-related behaviors.

Method

Participants

Participants were 209 university students aged 22–41 years ($M = 27.48$, $SD = 3.07$; 66% women, 34% men; 88% German, 9% other, 3% missing) recruited from German universities in Berlin and nearby cities. We recruited participants from various study programs but excluded psychology students, because they could be potentially familiar with the study content and procedures. The data were collected as part of a study on motivation and personality. The study was approved by the ethics committee of Humboldt University of Berlin, protocol 2010-03. A small portion of the lab data used in this study has been used in prior studies on distinct research topics (e.g., Dufner et al., 2015, 2018; Hess et al., 2017). None of the results pertaining to narcissism have been published before. A list of the measures we used and the studies in which they have been included is presented in the Supplement (Table S1).

Procedure

Narcissism

To derive an index of overall narcissism, participants completed the 15-item version of the Narcissistic Personality Inventory (NPI; Schütz et al., 2004). The NPI consists of pairs of statements. Each pair contains one narcissistic (e.g., “I think I am a special person”), and one non-narcissistic statement (e.g., “I am no better or worse than most people”). Participants chose the statement that best described them. The total score is the proportion of endorsed narcissistic statements ($M = .34$, $SD = .23$, $\alpha = .79$). To derive indexes of narcissistic admiration and rivalry, participants completed the 18-item Narcissistic Admiration and Rivalry Questionnaire (NARQ; Back et al., 2013), with 9 items assessing narcissistic admiration (e.g., “I enjoy thinking about how special I am”) and 9 items assessing narcissistic rivalry (e.g., “I want my rivals to fail”), all rated on a 6-point scale (1 = *not agree at all*, to 6 = *agree completely*). Responses were averaged for admiration ($M = 3.43$, $SD = .84$, $\alpha = .85$) and rivalry ($M = 2.35$, $SD = .84$, $\alpha = .83$).

Self-reported Affective Contingencies

Power. Participants responded to 5 items assessing positive affect in response to power satisfaction (e.g., “When I can influence a whole group of people, I feel good”, and “When I am given an influential role, I enjoy it very much”) and to 5 items assessing negative affect in response to power frustration (e.g., “When I have no influence, I feel uncomfortable”, and “When someone does not listen to my opinion, this annoys me”). Items were rated on 5-point Likert scales (1 = *not agree at all*, to 5 = *agree extremely*). Responses were averaged across items for power satisfaction ($M = 3.34$, $SD = .78$, $\alpha = .83$) and frustration ($M = 3.10$, $SD = .74$, $\alpha = .80$).

Affiliation. Participants responded to 5 items assessing positive affect in response to affiliation satisfaction (e.g., “When I make new friendships, I feel good”, and “When others show that they like to be around me, that makes me happy”) and to 5 items assessing negative affect in response to affiliation frustration (e.g., “When others do not like me, that makes me unhappy”, and “When I have no one to trust, I feel lost”). Items were rated on 5-point Likert scales (1 = *not agree at all*, to 5 = *agree extremely*). Responses were averaged across items for affiliation satisfaction ($M = 4.39$, $SD = .51$, $\alpha = .80$) and frustration ($M = 3.37$, $SD = .79$, $\alpha = .79$).

fEMG Indexed Affective Contingencies

During a laboratory session, we assessed participants’ affective responses to satisfying and frustrating experiences of power and affiliation via facial electromyography (fEMG). We recorded muscle activity of the zygomaticus major (contracted when smiling) and the corrugator supercilii (contracted when frowning) on the left side of the face. We placed two bipolar, 4-mm standard nonpolarizing silver/silver chloride surface electrodes on each muscle and a common reference electrode on the forehead (Fridlund & Cacioppo, 1986). The fEMG signal was recorded with a digital Psychlab amplifier at a sampling frequency of 1,000 Hz amplified by 10,000. The recorded raw EMG signal of each muscle was bandpass filtered to include signals from 30 to 300 Hz. After filtering, the fEMG signal was rectified (such that higher absolute values reflected stronger muscle activity) and then within-person z-standardized (to control for between-person differences, for example related to muscle anatomy; Hess et al., 2017).

Lab Tasks. Given that this is the first study to measure affective contingencies of power and affiliation in narcissism, we used a multimethod approach to examine affective reactions in a broad range of tasks tapping three levels of experience: first-person immersive experiences evoked via computer games, first-person imaginative experiences evoked via imagination exercises, and third-person observer experiences evoked via viewing of images. Task order was randomized across participants.

Power Experiences. To induce power experiences, we used three tasks that had participants experience power satisfaction and frustration.

First, participants *played a single-player computer game* that was designed specifically for the purpose of this study wherein they took the role of a politician and received 10 requests to make political decisions. Per decision, participants could select from two options equally strong in power content (e.g., choice to resolve political party disagreements by either planning a meeting or by trying to persuade dissenting party members). Five choices were programmed to be successful (power satisfaction) and five were programmed to be unsuccessful (power frustration). When successful, participants’ decision was followed by a

triumphant sound. When unsuccessful, participants' decision was followed by a reprimand by a superior.

Second, participants did an *imagination exercise*. With their eyes closed, they listened to a narrative that described them being powerless against a rival in the past (power frustration) but powerful against them in the present (power satisfaction). Specifically, participants were asked to imagine that they worked as a higher officer in a company's HR department, where they would be responsible for interviewing and hiring candidates for a vacancy. The narrative then focused on one candidate, a former university rival who in the past was braggy and belittling toward the participant, and who had used personal contacts to land a job the participant had also applied for (power frustration). Thereafter, the narrative stated that the participant had the power to reject the rival's application because he was underqualified, his CV contained false information, and his contacts were unable to secure him the job (power satisfaction).

Third, participants were presented with *images* representing power (Hess et al., 2017). Four images depicted powerful people (e.g., a politician waving at a crowd; power satisfaction) and four images powerless people (e.g., a sitting protestor being gagged; power frustration).

Affiliation Experiences. To induce affiliation experiences, we used three tasks that had participants experience affiliation satisfaction and frustration. These tasks were structured in a similar way as those that were used to assess power.

First, participants played the *Cyberball game* (William & Jarvis, 2006), a validated task that induces social inclusion and exclusion. In this game, participants play a virtual toss-ball game with two fictitious others (programmed as little avatars). Participants began the game with a period wherein they were included in the ball toss (affiliation satisfaction), followed by a period wherein participants were excluded from the ball toss (affiliation frustration).

Second, participants engaged in an *imagination exercise*. With their eyes closed, they listened to a narrative that described first feeling rejected by a friend (affiliation frustration), but then finding out that this was a misunderstanding (affiliation satisfaction). Specifically, participants were asked to imagine that they were on a long flight to a foreign country, visiting their best same-sex friend, who would pick them up from the airport. The friend was not at the airport, and the narrative focused on the participants' feelings of social rejection (affiliation frustration). The friend eventually arrived, apologized for being late, and showed great joy for reuniting (affiliation satisfaction).

Third, participants were presented with *images* representing affiliation (Dufner et al., 2015). Four images depicted inclusion (e.g., a hiking group on a grass field, holding hands; affiliation

satisfaction) and four images depicted exclusion (e.g., a sad girl sitting marginalized on the playground; affiliation frustration).

Data Reduction. Before each task, participants were presented with neutral content to reach a neutral affective state (Table 1 for details). fEMG activity during this period served as baseline. We baseline-corrected muscle activity by partialling out muscle activity during each baseline from muscle activity during each task. We computed the reliability of baseline-corrected fEMG signals per task, muscle, and separately for satisfactory and frustrating events/periods. fEMG reliabilites were overall acceptable, but varied across tasks from low (e.g., power images) to high (e.g., power imagination exercise; Table 1). Finally, we computed affective reactivity indices by aggregating baseline-corrected muscle activity scores, separately for events/periods of satisfaction and frustration in each task.

As a validity check, we correlated the EMG indices to measures of self-reported affect, which were also available. After each task, participants rated how much positive and negative affect they experienced during the task (1 = *not at all*, to 5 = *very much*; for more details, see Supplement). As partial evidence for convergent validity between real-time physiological reactions and self-reports, zygomaticus reactivity was generally significantly positively associated with higher self-reported positive affect, whereas corrugator reactivity was generally significantly associated with lower self-reported positive affect (Supplement, Table S2). These results strengthen the convergent validity of many of our lab tasks.

Observed Behavior

One year after the first laboratory session, participants were invited again to the lab (191 participants participated again). At the end of the session, they engaged in a semi-structured interaction with an experimenter. The experimenter asked four questions: (1) “How did you like the experiment?”, (2) “Do you feel like you have gained something out of participating here?”, (3) “Have you found a job yet?” Then, if the answer was “yes”: “How is it in your new job?” If the answer was “no”: “What have you been doing lately?”, and (4) “What are your plans for the future?”. The experimenter asked one question at a time and gave participants time to speak as long as they wanted to. Participants’ behavior during this interaction was filmed and coded by three independent coders who were blind to participants’ narcissism scores. Ratings were made on 5-point scales (1 = *never occurs/do not agree at all*, 5 = *occurs very often/strongly agree*). Due to a partial malfunction of the video recording equipment, only data from 123 participants could be retrieved.

We selected several coded behaviors that reflected power and affiliation. We first ran a parallel analysis which indicated the existence of two factors, and then conducted a factor analysis with Maximum Likelihood Estimation and Oblimin Rotation. Two uncorrelated ($r = .03$) factors emerged and accounted for 51% of the variance in behavior. Consistent

Table 1
Lab Tasks and Corresponding Reliability Coefficients of Zygomaticus and Corrugator Activity

Task	Baseline (duration)	Task fEMG Measurement	Events (N)	fEMG Reliability Coefficients	
				Zygomaticus	Corrugator
Power Game (Politician)	Video of an unpopulated beach at sunset (30 seconds)	5 Seconds after each satisfying and frustrating event	Frustration events (5):	$\alpha = .47$	$\alpha = .73$
			Unsuccessful political decisions, indicated by a reprimand		
			Satisfaction events (5):	$\alpha = .41$	$\alpha = .74$
			Successful political decisions, indicated by a triumphant sound		
Power Imagination Exercise	Instructions for progressive relaxation (30 seconds)	Throughout the narrative	Frustration period (8 sub-periods):	$\alpha = .86$	$\alpha = .93$
			Participant's past powerlessness against a rival		
			Satisfaction period (7 sub-periods):	$\alpha = .86$	$\alpha = .95$
			Participant's current power over a rival		
Power Images	Fixation cross preceding each image (1 second)	3 seconds after image presentation	Frustration Pictures (4):	$\alpha = .26$	$\alpha = .38$
			Images depicting people in positions of low power		
			Satisfaction Pictures (4):	$\alpha = .21$	$\alpha = .40$
			Images depicting people in positions of high power		
Affiliation Game (Cyberball)	Video of an unpopulated beach at sunset (30 seconds)	Throughout the game	Frustration Period (split into 2 sub-periods):	Average split-half reliability (10000 bootstraps) = .84	Average split-half reliability (10000 bootstraps) = .85
			Participant is completely excluded from a ball toss game		
			Satisfaction Period (split into 2 sub-periods):	Average split-half reliability (10000 bootstraps) = .84	Average split-half reliability (10000 bootstraps) = .90
			Participant is the most frequent recipient of the ball in a ball toss game	$\alpha = .85$	$\alpha = .88$
Affiliation Imagination Exercise	Instructions for progressive relaxation (30 seconds)	Throughout the narrative	Frustration Period (8 sub-periods):	$\alpha = .97$	$\alpha = .95$
			Participant's sense of abandonment and rejection by their best friend		
			Satisfaction Period (7 sub-periods):	$\alpha = .27$	$\alpha = .32$
			Participant's reunion with their best friend		
Affiliation Images	Fixation cross preceding each image (1 second)	3 seconds after image presentation	Frustration Pictures (4):	$\alpha = .61$	$\alpha = .65$
			Images depicting social exclusion		
			Satisfaction Pictures (4):		
			Images depicting social inclusion		

with prior research that has identified two broad factors of agency and communion in social behavior (e.g., Acton & Revelle, 2002; Markey & Markey, 2009), we identified one factor (22% of variance explained) reflecting power-related behaviors (*brash gestures, loud voice, interrupting experimenter, attempts to dominate the conversation, boasting*), and another factor (29% of variance explained) reflecting affiliation-related behaviors (*smiling, relaxed laughter, social warmth, is friendly, aims to create pleasant atmosphere, angry or disgusted facial expressions-reverse coded*). Power-related behaviors loaded more strongly on the power behavior factor (loadings range: 0.417 to 0.982) but were relatively independent of the affiliation behavior factor (loadings range: -.043 to .223). Affiliation-related behaviors loaded more strongly on the affiliation behavior factor (loadings range: 0.386 to 0.956) but were relatively independent of the power behavior factor (loadings range: -.227 to .121). Average inter-rater reliability was acceptable for both power ($\alpha = .74$) and affiliation ($\alpha = .69$) behaviors. Ratings were subsequently averaged for power ($M = 2.04$, $SD = 0.53$, $\alpha = .77$) and affiliation ($M = 3.42$, $SD = 0.53$, $\alpha = .85$) behaviors.

Analytic Procedure

To examine the affective contingencies of narcissism in the domains of power and affiliation, we computed correlations of narcissism with self-reported and fEMG assessments of affective reactivity. To examine whether narcissism was directly associated with power and affiliation behaviors, we computed correlations of narcissism with those behaviors. Finally, to examine whether narcissism was indirectly associated with power- and affiliation-related behaviors via affective contingencies, we conducted mediation analyses (single mediator) with 5000 bootstraps, in which affective reactivity toward power or affiliation mediated the respective associations between narcissism and power or affiliation behaviors. In the mediation models, we exclusively focused on those affective reactivity indices that were simultaneously related to narcissism and behavior (MacKinnon et al., 2007). All analyses were carried out in R (Version 3.5.0; R Core Team, 2019), using the Hmisc package (Version 4.4.0; Harrell, 2020) for correlation analyses and the psych package (Version 2.0.9; Revelle, 2020) for mediation analyses. Data and code for analyses are provided on https://osf.io/qw6rx/?view_only=095e1ab87d2b42e792ce57930bad55fd.

Results

Preliminary Analyses

Consistent with prior research (Back et al., 2013), overall narcissism as assessed with the NPI was positively related to both narcissistic admiration, $r = .67$, $p < .001$, and narcissistic rivalry, $r = .29$, $p < .001$. Narcissistic admiration and rivalry were modestly positively correlated, $r = .36$, $p < .001$. Self-reported positive and negative affective reactivity were moderately positively correlated in both the case of power, $r = .42$, $p < .001$, and affiliation, $r = .47$,

$p < .001$, suggesting that if individuals are affectively reactive in terms positive affect, they also tend to be reactive in terms of negative affect in each motive domain. Finally, correlations between self-reported affective reactivity and fEMG assessments of affective reactivity were relatively weak (Supplement, Table S3). This indicates that self-report and fEMG might tap partly independent dimensions of affective reactivity.

Primary Analyses

Narcissism and its Relation to Affective Contingencies

Results are presented in Table 2.

Power Satisfaction. We hypothesized that narcissism would be related to higher positive and lower negative affective reactivity in response to power satisfaction. We found that overall narcissism, narcissistic admiration, and narcissistic rivalry were indeed all positively related to self-reported positive reactivity in response to power satisfaction. However, we also found that overall narcissism, narcissistic admiration, and narcissistic rivalry were unrelated to positive (i.e., zygomaticus activity) or negative (i.e., corrugator activity) muscle reactivity in response to power satisfaction across tasks. Thus, individuals with higher narcissism levels reported higher positive reactivity to power satisfaction, but such reactivity was not evident from their facial muscle activity.

Power Frustration. We hypothesized that narcissism would be related to higher negative and lower positive affective reactivity in response to power frustration. We found that narcissistic rivalry was positively related to self-reported negative reactivity in response to power frustration, whereas overall narcissism and narcissistic admiration were not. Furthermore, we found that overall narcissism, narcissistic admiration, and narcissistic rivalry were all significantly related to lower positive muscle reactivity in response to power frustration in the game, but unrelated to such reactivity in the imagination exercise and in image presentation. Overall narcissism, narcissistic admiration, and narcissistic rivalry were also unrelated to negative muscle reactivity (i.e., frowning) in response to power frustration across tasks. Thus, individuals with higher narcissism levels exhibited lower positive muscle reactivity in response to power frustration in the game, yet only individuals with higher narcissistic rivalry levels reported higher negative reactivity to power frustration.

Affiliation Satisfaction. We hypothesized that overall narcissism and narcissistic admiration would be unrelated to positive affective reactivity in response to affiliation satisfaction, but that narcissistic rivalry would be related to lower positive and higher negative affective reactivity in response to affiliation satisfaction. We found that overall narcissism and narcissistic admiration were unrelated to self-reported positive reactivity to affiliation satisfaction and were also unrelated to positive or negative muscle reactivity in response to affiliation satisfaction across tasks. Narcissistic rivalry was also unrelated to self-reported

Table 2

Correlations of Overall Narcissism, Narcissistic Admiration, and Narcissistic Rivalry with Self-reported and fEMG Indexed Contingencies

	Overall Narcissism	Narcissistic Admiration	Narcissistic Rivalry
Self-reported Contingencies			
Power			
Satisfaction	.49**	.52**	.45**
Frustration	.13	.10	.31**
Affiliation			
Satisfaction	.00	.08	.02
Frustration	.04	.04	.19**
fEMG Indexed Contingencies			
Power Game			
Satisfaction, Zygomaticus	.01	-.01	-.04
Satisfaction, Corrugator	-.01	.00	-.08
Frustration, Zygomaticus	-.16*	-.20**	-.17*
Frustration, Corrugator	.09	.03	.04
Power Imagination			
Satisfaction, Zygomaticus	-.05	-.10	.06
Satisfaction, Corrugator	.04	-.01	-.09
Frustration, Zygomaticus	.00	-.07	.11
Frustration, Corrugator	.08	.07	-.08
Power Images			
Satisfaction, Zygomaticus	-.05	-.06	-.13
Satisfaction, Corrugator	-.14	-.07	-.02
Frustration, Zygomaticus	.02	.04	.03
Frustration, Corrugator	-.10	-.03	-.05
Affiliation Game			
Satisfaction, Zygomaticus	-.04	-.06	-.18*
Satisfaction, Corrugator	.02	.04	.08
Frustration, Zygomaticus	-.04	-.04	-.15*
Frustration, Corrugator	.04	.05	.07
Affiliation Imagination			
Satisfaction, Zygomaticus	.01	.06	-.03
Satisfaction, Corrugator	.08	.03	.03
Frustration, Zygomaticus	.00	.01	-.01
Frustration, Corrugator	.07	.04	.02
Affiliation Images			
Satisfaction, Zygomaticus	-.06	-.08	-.15*
Satisfaction, Corrugator	-.12	-.04	.13
Frustration, Zygomaticus	-.04	.00	.01
Frustration, Corrugator	-.02	.03	.03

Note. * indicates $p < .05$. ** indicates $p < .01$.

positive reactivity to affiliation satisfaction but it was related to lower positive muscle reactivity in response to affiliation satisfaction in the game and in the image presentation, but not in the imagination exercise. Finally, narcissistic rivalry was unrelated to negative muscle reactivity in response to affiliation satisfaction across tasks. Thus, individuals with higher narcissism levels did not report or exhibit higher or lower reactivity in response to affiliation satisfaction, except for those with higher narcissistic rivalry levels, who did exhibit lower positive muscle reactivity in response to affiliation satisfaction in the game and in the image presentation.

Affiliation Frustration. We hypothesized that overall narcissism and narcissistic admiration would be unrelated to negative affective reactivity in response to affiliation frustration, but that narcissistic rivalry would be related to lower negative and higher positive affective reactivity in response to affiliation frustration. Indeed, we found that overall narcissism and narcissistic admiration were unrelated to self-reported negative reactivity to affiliation frustration. Overall narcissism and narcissistic admiration were also unrelated to positive or negative muscle reactivity in response to affiliation frustration across tasks. Contrary to our expectations, narcissistic rivalry was significantly related to higher self-reported negative reactivity to affiliation frustration and to lower positive muscle reactivity in response to affiliation frustration in the game (although it was unrelated to such reactivity in the imagination exercise and in the image presentation). Finally, narcissistic rivalry was unrelated to negative muscle reactivity in response to affiliation frustration across tasks. Thus, individuals with higher overall narcissism and narcissistic admiration levels did not report or exhibit higher or lower reactivity in response to affiliation frustration. However, individuals with higher narcissistic rivalry levels reported higher negative reactivity in response to affiliation frustration, and also exhibited lower positive reactivity in response to affiliation frustration in the game.

Robustness Checks. First, we examined whether our results could be due to chance alone. The proportion of associations that reached statistical significance was small (13.1%) yet still almost three times greater than what could be attributed to mere chance (which would result in only 5% significant associations). Statistically significant associations of narcissism with affective reactivity indices were generally small in size, except for those pertinent to self-reported power reactivity, which were medium in size. Second, we examined the robustness of our fEMG analyses. In past work, researchers sometimes used composite scores of zygomaticus and (reverse-scored) corrugator reactivity (e.g., Dufner et al., 2015, 2018; Hess et al., 2017). We adopted this method in supplementary analyses (Supplement, Table S4), showing similar results, with no differences in the statistical significance of findings.

Narcissism and its Direct and Indirect Relation to Motivated Behavior

We investigated whether narcissism was directly and indirectly related to power and affiliation behaviors in the structured interaction. Correlations of narcissism and its associated affective reactivity indices with power and affiliation behaviors are presented in Table 3.

Power Behaviors. We hypothesized that narcissism would be directly related to a higher degree of power behaviors. We found that only overall narcissism and narcissistic admiration were directly related to a higher degree of power behaviors ($ps \leq .033$), whereas narcissistic rivalry was not ($p > .482$).

We also hypothesized that narcissism would be indirectly related to a higher degree of power behaviors via higher positive and lower negative reactivity to power satisfaction and via lower positive and higher negative reactivity to power frustration. Correlation findings suggested that only self-reported positive reactivity to power satisfaction could possibly account for the association between narcissism and power behaviors. Mediation analyses indicated that neither overall narcissism, $B = 0.16$, $SE = 0.09$, 95 % CI [-0.0016, 0.3400], nor narcissistic admiration, $B = 0.05$, $SE = 0.03$, 95 % CI [-0.0071, 0.1016], were indirectly related to a higher degree of power behaviors via self-reported positive reactivity to power satisfaction. However,

Table 3
Correlations of Overall Narcissism, Narcissistic Admiration, Narcissistic Rivalry, and Their Associated Affective Contingencies Indices with Power and Affiliation Behaviors

	Power Behaviors	Affiliation Behaviors
Overall Narcissism	.19*	.02
Narcissistic Admiration	.20*	.08
Narcissistic Rivalry	.06	-.15
Self-reported Contingencies		
Power		
Satisfaction	.22*	-.02
Frustration	.12	.03
Affiliation		
Frustration	.04	.09
fEMG Indexed Contingencies		
Power Game		
Frustration, Zygomaticus	-.04	.11
Affiliation Images		
Satisfaction, Zygomaticus	.07	.12
Frustration, Zygomaticus	.17	.05
Affiliation Images		
Satisfaction, Zygomaticus	.01	.16

Note. * indicates $p < .05$.

narcissistic rivalry was indirectly related to a higher degree of power behaviors via higher self-reported positive reactivity to power satisfaction. The overall model with narcissistic rivalry, self-reported positive reactivity to power satisfaction, and power behaviors explained approximately 4% of variance in power behaviors, $F(2, 206) = 4.77, p = .003$. Narcissistic rivalry positively predicted self-reported positive reactivity to power satisfaction, $B = 0.42, SE = 0.06, t(207) = 7.23, p < .001$, which in turn positively predicted power behaviors above and beyond narcissistic rivalry, $B = 0.15, SE = 0.05, t(206) = 2.92, p = .004$. The total effect of narcissistic rivalry on power behaviors was not statistically significant, $B = 0.04, SE = 0.04, t(207) = 0.97, p = .331$, and neither was the direct effect, $B = -0.02, SE = 0.02, t(206) = -0.43, p = .671$. However, there was a significant indirect effect: narcissistic rivalry was indirectly related to a higher degree of power behaviors via higher self-reported positive reactivity to power satisfaction, $B = 0.06, SE = 0.03, 95\% \text{ CI } [0.0156, 0.1175]$. Thus, to the extent that individuals with higher narcissistic rivalry reported more positive reactivity to power satisfaction, they showed more power-related behaviors.

Affiliation Behaviors. We hypothesized that narcissistic rivalry would be negatively related to affiliation behaviors. In contrast to this, narcissistic rivalry was, like overall narcissism and narcissistic admiration, not directly related to affiliation behaviors ($ps \geq .103$).

We further hypothesized that narcissistic rivalry would be indirectly related to a lower degree of affiliation behaviors via lower positive reactivity to affiliation satisfaction and higher negative reactivity to affiliation frustration. However, none of the affective reactivity indices significantly associated with narcissistic rivalry was significantly associated with affiliative behaviors.

Robustness Checks. First, we examined whether our results could be due to chance alone. The proportion of associations that reached statistical significance was modest (15%) yet still almost three times greater than what could be attributed to mere chance (which would result in only 5% significant associations). In all analyses, statistically significant findings were small in size. Second, we examined the robustness of our fEMG analyses, using composite scores of zygomaticus and corrugator reactivity. Associations of narcissism with composite scores of zygomaticus and corrugator reactivity (Supplement, Table S5) produced similar results and showed an additional, significant positive association of composite positive reactivity in response to affiliation images with affiliative behavior (confirming Dufner et al., 2015). Composite positive reactivity to affiliation images fully mediated the association between narcissistic rivalry and affiliative behavior.

Discussion

The present study is the first systematic investigation of the affective contingencies of narcissism. Building on motivational theories of narcissism and combining subjective reports with physiological assessments, we hypothesized that narcissists' affective contingencies would be stronger in the power but not in the affiliation domain. We also examined whether this asymmetry would be reflected in narcissists' interpersonal behavior. Our findings indicated that narcissists have stronger contingencies in the power but not in the affiliation domain, with one exception: individuals with higher levels of narcissistic rivalry exhibited stronger contingencies in the power domain, weaker contingencies in the affiliation satisfaction domain, and stronger contingencies in the affiliation frustration domain. Affective contingencies, however, did not systematically account for the link between narcissism and interpersonal behavior. Our findings were more consistent when focusing on self-reports rather than on the physiological assessments. Even so, these results suggest that a signature affective system characterized by asymmetry in power and affiliation motivation that is more pronounced for individuals with higher levels of narcissistic rivalry might underlie trait narcissism.

Affective Contingencies

Our study informs understanding of the building blocks of personality. By demonstrating that narcissism is linked to a specific set of affective contingencies, our findings lend support to theories positing that personality traits are built on distinct affective “*if...then*” contingencies that become activated in response to specific environmental triggers (Denissen & Penke, 2008; Geukes, van Zalk, et al., 2017; Mischel & Shoda, 1995; Wrzus & Roberts, 2017). In this way, our findings suggest that affective contingencies capture signature person-situation transactions, and that these are at the heart of intra-individual and inter-individual differences in personality (Rauthmann, 2020). They illustrate how trait levels are linked to inter-individual differences in affective responses across similar situations (e.g., narcissists experience more pleasure when gaining power than non-narcissists), as well as to intra-individual differences in affective responses across different situations (e.g., narcissists experience increased pleasure when gaining power but not when feeling included). These trait-relevant affective responses might be owed to underlying motives. Personality traits (including the Big Five; Barrick et al., 2013; Neel et al., 2015) might contribute in different ways to the fulfillment of motives such as power and affiliation. For example, people high in conscientiousness might partly fulfill the affiliation motive via conformity with social standards, whereas people high in neuroticism might do so via continuous pursuit of reassurance from others. This dovetails with the idea that people develop higher levels of those traits that allow them to fulfill their motives in the ways indicated by social environments (Dweck, 2017).

Narcissism Theory

Our findings contribute to knowledge about the types of social dynamics that narcissists seek. Social dynamics can, in broad terms, either take the form of social closeness with others (affiliation) or the form of social influence over others (power; McClelland, 1987). Consistent with narcissism theories (Baumeister & Vohs, 2001; Campbell et al., 2006b; Campbell & Green, 2008; Grapsas, Denissen, et al., 2020; Morf & Rhodewalt, 2001; Zeigler-Hill, McCabe, et al., 2018), our findings show that narcissists do not uniformly strive for both forms of social dynamics, but primarily for those of its aspects associated with power. Importantly, our findings suggest that this asymmetry might be owed to underlying affective contingencies. Theorists have proposed that narcissism is underpinned by affective contingencies that are stronger in the domain of power than in the domain of affiliation (Grapsas, Brummelman, et al., 2020; Johnson et al., 2012; Mahadevan et al., 2016; Zeigler-Hill, McCabe, et al., 2018). By unraveling these contingencies, our findings open a window into understanding why narcissists might sometimes sacrifice affiliation in the pursuit of power (Baumeister & Vohs, 2001; Campbell et al., 2006b; Campbell & Green, 2008; Grapsas, Denissen, et al., 2020; Morf & Rhodewalt, 2001; Zeigler-Hill, McCabe, et al., 2018). Since narcissists do not experience particular pleasure from bonding with others—but those high in rivalry might paradoxically experience particular displeasure when such bonds might be dissolved—it should not come as a surprise that they are more likely to criticize others (Wright et al., 2017), derogate others (Park & Colvin, 2015; Rau et al., 2020), or lash out against others when they feel powerless (Denissen et al., 2018). Thus, an asymmetry in affective contingencies can explain some seemingly paradoxical narcissistic behaviors.

Our findings highlight the value of studying the differences between narcissistic admiration and rivalry to unravel the full affective spectrum of narcissism. Our findings were virtually identical for overall narcissism and narcissistic admiration, suggesting that narcissistic admiration encompasses the most predominant narcissistic features (the narcissistic “default” mode; (Back, 2018; Grapsas, Brummelman, et al., 2020; Wetzel et al., 2016). Findings for narcissistic rivalry revealed a more pronounced asymmetry between power and affiliation, suggesting that narcissistic rivalry constitutes a complementary narcissistic dimension that not all narcissists manifest to the same degree (Back, 2018; Grapsas, Denissen, et al., 2020; Wetzel et al., 2016). These findings also dovetail with the idea narcissistic rivalry is governed by a zero-sum mindset (Brummelman, Gürel, et al., 2018), according to which affiliation and power cannot coexist (Grapsas, Brummelman, et al., 2020; Ten Brinke & Keltner, 2020). According to this mindset, other people are power competitors and should thus be treated as enemies: with suspicion when they are friendly (as suggested by lower reactivity to affiliation satisfaction), with aggression when they are unfriendly (as indicated by higher reactivity to affiliation frustration). Thus, whereas all narcissists appear especially motivated to pursue power but not affiliation, those higher in narcissistic rivalry appear motivated to pursue power even at the cost of affiliation.

Our study can potentially advance knowledge about the affective contingencies of narcissism in three ways. First, our study shows that these contingencies have a dual nature. Whereas some affective contingencies can be conscious and accessible via self-reports, others can be more automatic or even unconscious. Theorists have proposed that conscious affective contingencies are more closely connected to self-reported goals, values, and motives, whereas automatic or unconscious affective contingencies are more closely connected to biological reward systems (Schultheiss et al., 2012). The dual nature of affective contingencies associated with narcissism suggests that different psychological and physiological processes might contribute to narcissistic behavior across different types of motive-relevant experiences. Second, our findings advance understanding how narcissists' affective contingencies operate. Consistent with motivation theories (Depue & Morrone-Strupinsky, 2005; McClelland, 1987b), our findings showed that increased (vs. decreased) reactivity to motive satisfaction is positively linked with increased (vs. decreased) reactivity to motive frustration. However, we also found that for some people this is systematically not the case. Individuals higher in narcissistic rivalry exhibited attenuated reactivity towards satisfying experiences of affiliation but increased, rather than attenuated, reactivity toward frustrating experiences of affiliation. This finding suggests that some narcissists exhibit deviations from the general way in which people are expected to react to specific motive-relevant situations. Finally, our findings suggest that affective contingencies do not consistently account for narcissists' behavior. Methodologically, this finding could be explained by the reduced sample size pertaining to the behavioral data, as well as the relatively low temporal stability of fEMG indexed affective reactivity (Hess et al., 2017). A complementary, conceptual explanation, could be that these contingencies might indicate a lower threshold for motive-relevant behaviors to emerge, yet that threshold might not be easily reached in contexts without pronounced motive salience (e.g., in the absence of competition).

Our findings can provide insight into why narcissists often experience emotional turmoil. For example, narcissists tend to show increased stress when under social evaluation (Brummelman, Nikolić, et al., 2018; Grapsas, Denissen, et al., 2020; Reinhard et al., 2012); are prone to experiencing shame, anger and aggression in the face of failure (Denissen et al., 2018; Thomaes, Bushman, et al., 2008); and show bouts of vulnerability (Edershile & Wright, 2020) and fluctuations in self-esteem based on the power they have in their daily lives (Geukes, Nestler, et al., 2017; Zeigler-Hill, Vrabel, et al., 2018). Our findings suggest that narcissists' affect might oscillate depending on which of their social motives becomes satisfied or frustrated. We propose that researchers should shift the focus from what narcissists generally feel to what determines how narcissists feel in any particular moment. This dovetails with dynamic models of narcissism (Back, 2018; Grapsas, Denissen, et al., 2020; Morf & Rhodewalt, 2001) and personality (Fleeson & Jayawickreme, 2015; Geukes, van Zalk, et al., 2017; Mischel & Shoda, 1995; Wrzus & Roberts, 2017), which suggest that trait-like tendencies actually reflect frequently recurring states that emerge in person-environment transactions.

For example, a recurring sense of having power might generate recurring states of increased pleasure in narcissists, which in turn might come across as an average tendency to experience positive affect. In situations when this perception is threatened, however, negative emotions like anger or anxiety might occur.

Strengths, Limitations, and Future Research Directions

Our study has several strengths. First, we brought together long-held assumptions about the contingencies underlying personality with state-of-the-art motivational theories of narcissism, thus adopting a theoretical framework that applies to broader personality research. Second, we were the first to systematically study this integrative theoretical framework in a systematic way, using multidimensional assessment of narcissism, subjective and physiological assessments of affective contingencies across a range of paradigms, and ecologically valid assessment of real-life social behavior. However, our study also has limitations. First, some of our physiological reactivity indices demonstrated low reliability and poor convergent validity with self-reports of affective reactions in the lab. We nevertheless considered it important to include all physiological reactivity indices available at our disposal because they could provide some first, tentative indications about narcissists' real-time affective reactions toward satisfying and frustrating experiences of power and affiliation. Future studies should replicate our findings and seek even more reliable assessments of these contingencies (e.g., by increasing the number of items/events; cf. Dufner et al., 2015, 2018). Second, to examine to what extent affective contingencies predict behavior across time and contexts, we conducted a one-year follow-up of participants' power- and affiliation-related behaviors in a context that was detached from our assessment of affective contingencies. Future research should examine whether affective contingencies do consistently predict behavior if they are assessed in the very same context

Our findings generate new avenues for future work. Future studies should investigate the origins, development, and malleability of the affective contingencies of narcissism. The literature on motivation and narcissism suggests that these affective contingencies can be both genetically transmitted and environmentally shaped (Brummelman, Thomaes, Nelemans, Orobio de Castro, Overbeek, et al., 2015; Brummelman & Grapsas, 2020; Brummelman & Sedikides, 2020; K. S. Carlson & Gjerde, 2009; Grapsas, Denissen, et al., 2020; McClelland, 1987b; Vernon et al., 2008). For example, it is possible that these contingencies are at least partly shaped through social referencing by the social environment. Children might learn these reactions by parents who express intense pleasure (e.g., smile intensely) when children gain power over peers, or intense displeasure (e.g., frown intensely) when their children are powerless against peers (Assor & Tal, 2012; Brummelman & Sedikides, 2020; Grapsas, Denissen, et al., 2020). If so, then these contingencies might be sensitive to targeted interventions (e.g., by toning down the expression of pleasure or displeasure in parents' affective reactions toward their child's power gain and loss).

Conclusion

Scholars have long assumed that narcissism is rooted in affective contingencies in the domain of power. We investigated this idea systematically using a comprehensive multi-method design. The current study provides exciting first evidence suggestive of such contingencies.



Chapter 4

Climbing up or Falling Down: Narcissism Predicts Physiological Sensitivity to Social Status in Children and Their Parents

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Abstract

Children's narcissism may be rooted in sensitivity to *social status* (i.e., prominence, respect, and influence in a social group), and this sensitivity might be shared with their parents. Testing this idea, a randomized experiment examined how children with high narcissism levels and their parents respond to gains and losses of social status. On a simulated social media platform, children ($N = 123$, ages 8-13) competed with fictitious peers for status and were randomly assigned to gain or lose status. Unbeknownst to children, parents viewed the course of the task. Children's and parents' affective reactions during the task were measured with facial electromyography, which detects spontaneous facial muscle activity linked to positive affect (i.e., zygomaticus major activity, involved in smiling) and negative affect (i.e., corrugator supercilii activity, involved in frowning). Children with higher narcissism levels showed steeper increases in negative affect during status loss, and steeper increases in both positive and negative affect during status gain. Their parents mirrored these steeper increases in positive affect during their child's status gain, but they did not mirror the increases in negative affect. These results suggest that children with high narcissism levels and their parents show intensified affective-motivational responses to children's status-relevant experiences. These responses may be transmitted from one generation to the other (e.g., genetically or through parent-child socialization).

Keywords: social status, physiological sensitivity, childhood narcissism, facial electromyography

From a young age, children are concerned about *social status*. Status indicates children's position within a social hierarchy (Anderson et al., 2015) and is often reflected in their popularity (i.e., social visibility, importance, and influence; Lease et al., 2002). Although the status motive is universal (Anderson et al., 2015), there might be individual differences in children's sensitivity to status gains and losses (McClelland, 1987b). We propose that children's status sensitivity is positively associated with narcissism. We hypothesized that children with higher narcissism levels would show intensified positive and negative affective responsiveness to status gains and losses, and that so would their parents. We tested this idea in a randomized experiment, using facial electromyography (fEMG) to track children's and parents' affective responses (e.g., smiling, frowning) to children's status gains and losses.

Narcissism and Status Sensitivity

Narcissism is a personality trait that emerges in childhood and is characterized by feelings of superiority, sense of entitlement, and desire for respect and admiration (Thomaes, Stegge, et al., 2008). Narcissism is not a disorder but a normally distributed personality trait, with no cut-off that separates "non-narcissists" from "narcissists" (Foster & Campbell, 2007). Certain measures of narcissism are related to mental health problems and problematic social relationships (e.g., internalizing problems, aggression, and bullying; Barry & Malkin, 2010; Reijntjes et al., 2016). Extreme levels of narcissism can develop into narcissistic personality disorder (Miller & Campbell, 2008), which is rarely diagnosed before adulthood (American Psychiatric Association, 2013).

We propose that childhood narcissism is characterized by heightened sensitivity to status. Personality traits may be coherent sets of strategies that serve specific motives, such as status (Denissen & Penke, 2008). Motivation often operates via affect, which signals pleasure and displeasure when individuals fulfill or fail to fulfill their motives (Berridge & Winkielman, 2003). According to motive disposition theory, individuals differ in their tendency to derive pleasure or displeasure from motive-relevant experiences (McClelland, 1987). Traits, then, might have unique affective-motivational contingencies (e.g., "*If people admire me, then I feel great*"; Mischel & Shoda, 1995). Accordingly, narcissism might be underpinned by a strong status motive, giving rise to heightened sensitivity to status gains and losses (Morf & Rhodewalt, 2001; Zeigler-Hill, McCabe, et al., 2018). This status sensitivity might underlie narcissism from childhood (Grapsas, Brummelman, et al., 2020).

Although this proposal has never been tested directly, indirect evidence supports it. Narcissism tends to emerge in middle-to-late childhood (Thomaes & Brummelman, 2016), when children start pursuing status more vigorously (Hawley, 1999). From this age, children with high narcissism levels tend to desire and seek status (Ojanen et al., 2012; Thomaes, Stegge, et al., 2008). To gain status, they may brag, show off, and try to be the center of attention (Reijntjes et al., 2016; Thomaes & Brummelman, 2016), often emerging as leaders

in peer groups (Brummelman et al., 2021). When losing status, however, they may lash out against competitors (Thomaes, Bushman, et al., 2008). Such motive-relevant behaviors are often fueled by motive-relevant affective responses (Dufner, Arslan, et al., 2015). We theorize that status sensitivity can reveal itself in heightened positive affect in response to status gains and heightened negative affect in response to status losses.

Children with high narcissism levels might acquire their status sensitivity partly through their parents. Given the heritability of narcissism (Vernon et al., 2008), status sensitivity might be genetically transmitted. Given the malleability of narcissism (Brummelman & Sedikides, 2020), parents might socialize status sensitivity. Status sensitivity might be reinforced by parental overvaluation—parents seeing and treating their children as more special and entitled, while pressuring them to stand out (Brummelman, Thomaes, Nelemans, Orobio de Castro, Overbeek, et al., 2015). Both perspectives suggest that parents of children with high narcissism levels exhibit heightened status sensitivity. We theorize that parents' status sensitivity can reveal itself in their affective responses to their children's status gains and losses.

Capturing Status Sensitivity

Children with high narcissism levels might be unable or unwilling to report their negative affective responses. They often do not report negative affect, even when their physiological responses suggest they do experience it (Brummelman, Nikolić, et al., 2018; Cascio et al., 2015). We therefore used fEMG to track children's and parents' spontaneous affective responses to status gains and losses. Zygomaticus major muscle activity is involved in smiling, reflecting positive affect, whereas corrugator supercilii muscle activity is involved in frowning, reflecting negative affect (Cacioppo et al., 1986). Because these spontaneous muscle contractions are difficult to suppress, they may reliably capture ongoing affective responses (Barrett et al., 2019).

Present Study

In a randomized experiment, we investigated how children with higher narcissism levels and their parents affectively responded to the child's status gain and loss. We focused on late childhood, when individual differences in narcissism first arise (Thomaes & Brummelman, 2016). We first assessed children's narcissism and parents' overvaluation levels. Children then performed an ecologically valid social media task, wherein they were randomly assigned to gain or lose status among same-age fictitious peers. Unbeknownst to children, parents watched this task on another screen. We hypothesized that children with higher narcissism levels and their parents would exhibit intensified positive affect (zygomaticus activity) in response to status gain and intensified negative affect (corrugator activity) in response to status loss.

Method

Participants

Participants were 123 children (99% Dutch origin; 55% girls) aged 8-13 ($M = 10.11$, $SD = 1.42$) and one of their parents (92% Dutch origin; 55% females) aged 34-58 ($M = 44.22$, $SD = 5.42$). The research was part of Science Live, a research program that enables scientists to recruit visitors of science museum NEMO (Amsterdam, the Netherlands) as participants. Parents provided active informed consent for themselves and their children. Children provided assent. Study procedures were approved by the Ethics Review Board of Tilburg University School of Social and Behavioral Sciences. Post-hoc power analyses with 1000 Monte Carlo simulations (simr package Version 1.0.5; Green & MacLeod, 2016) showed that the final sample size had sufficient power (above 80% in all but one cases, $\alpha = 0.05$, two-tailed) to detect the observed effect sizes of the highest-order significant interactions (Supporting Information).

Procedure and Measures

We reported all measures analyzed for this article's research questions (for all study measures, see Supporting Information).

Narcissism

Children completed the 10-item Childhood Narcissism Scale, which has unidimensional structure and is normally distributed (Thomaes et al., 2008). Items (e.g., "I am a very special person") were rated on 4-point scales (0 = *not at all true*, 3 = *completely true*). Responses were averaged across items ($M = 1.21$, $SD = 0.45$, $\alpha = .73$). For validation purposes, we also administered the Narcissistic Admiration and Rivalry Questionnaire Short Scale (Back et al., 2013), an alternative narcissism measure that we adapted for use with children. We present results for this scale in the Supporting Information.

Parental Overvaluation

Parents completed the 7-item Parental Overvaluation Scale, which has unidimensional structure and is normally distributed (Brummelman, Thomaes, Nelemans, Orobio de Castro, & Bushman, 2015). Items (e.g., "My child is more special than other children") were answered on 4-point scales (0 = *not at all true*, 3 = *completely true*). Responses were averaged across items ($M = 1.32$, $SD = 0.51$, $\alpha = .75$).

Social Media Task

Children participated in an online social media task (adapted from Lee et al., 2020; Wolf et al., 2015). Parents secretly viewed the task on another screen.

To emulate real-life status competition, the task was framed as an online popularity contest (Supporting Information). Children created a public profile and interacted online with 11

fictitious peers to collect likes for being “special and exceptional,” concepts that overlap with children’s representations of high-status, popular individuals (Gülgöz & Gelman, 2017; Vaughn & Waters, 1981). Likes were visible below each profile, and contestants’ placement in the popularity hierarchy was shown on a ranking board. Children were randomly assigned to a *high-status* or a *low-status* condition. Children in the high-status condition ($n = 41$) received nine likes out of 11 over time. Reflecting a high yet believable level of status, children progressively rose in popularity, ending up in the second highest position. Children in the low-status condition ($n = 42$) received only two likes out of 11, progressively dropping to, and remaining at, the bottom of the ranking. The likes that fictitious peers received remained constant across conditions. The interaction lasted for three minutes, with time visibly counted down.

Our study also included a third condition ($n = 40$), intended to be neutral. In this condition, children were informed that they would compete for popularity, but there was no option to give or receive likes. Debriefing revealed that children in this condition felt confused and frustrated during the task, as they could not understand how popularity was being determined. For this reason, we excluded this condition from analyses.

fEMG Recordings

We measured children’s and parents’ affective reactions via fEMG during a baseline, when participants viewed a waiting screen (5 seconds), and during the task (180 seconds). We recorded muscle activity of the zygomaticus major (contracted when smiling, reflecting positive affect) and the corrugator supercilii (contracted when frowning, reflecting negative affect). Muscle activity was filtered (van Boxtel, 2010), rectified, and aggregated per second (Supporting Information).

Manipulation Check

After the task, children indicated whether they were popular during the task (1 = *not at all true*, 4 = *completely true*) and how many more likes they received compared to their peers (1 = *much fewer likes*, 5 = *many more likes*). Parents indicated whether their child was popular during the task (1 = *not at all true*, 4 = *completely true*) and how many more likes their child received compared to its peers (1 = *much fewer likes*, 5 = *many more likes*). Participants could also respond “*I do not know*” (coded as missing in analyses).

Analytic Strategy

Analyses were conducted in R (Version 3.6.1; R Core Team, 2019). Within participants, we winsorized extreme muscle activity values (i.e., we substituted values exceeding the 95%-quantile with the value of the 95%-quantile). Continuous variables were z-standardized. We used the lme4 package (Version 3.6.3; Bates et al., 2015) to run random-intercept multilevel models, separately per muscle (zygomaticus, corrugator). Dependent variables

were nested within individuals and were regressed on time (continuous within-subjects), condition (between-subjects; 0 = low status, 1 = high status), children's narcissism or parental overvaluation (continuous between-subjects), and their two- and three- way interactions. P-values were extracted with the *lmerTest* package (Version 3.1.1; Kuznetsova et al., 2017). Results were identical when p-values were obtained using model comparison (Supporting Information). Significant interactions were broken down by condition and probed using simple slopes (Aiken & West, 1991).

Results

Preliminary Analyses

Descriptive statistics and correlations are presented in Table 1. Consistent with prior findings (Brummelman, Thomaes, Nelemans, Orobio de Castro, Overbeek, et al., 2015; Derry, 2018; Nguyen & Shaw, 2020), there was a modest, although statistically non-significant, positive association of children's narcissism with parental overvaluation.

Table 1
Means, Standard Deviations, and Correlations for Main Variables in Children and Parents

	<i>M</i>	<i>SD</i>	Correlations				
			2.	3.	4.	5.	6.
1. Children's Narcissism	1.25	0.45	.14	.05	.01	-.01	-.07
Low Status	1.21	0.49	.16	.12	-.02	.05	-.04
High Status	1.28	0.42	.10	-.05	.08	-.05	-.19
2. Parental Overvaluation	1.31	0.54		.00	-.03	-.01	-.07
Low Status	1.42	0.55		-.04	-.06	.08	.00
High Status	1.21	0.51		.18	.09	-.07	-.27
3. Child Corrugator Activity (<i>z</i>)	0.00	1.00			.11***	.02	.04***
Low Status	0.19	1.22			.01	-.02	.04**
High Status	-0.19	0.67			.21***	.07***	.04***
4. Child Zygomaticus Activity (<i>z</i>)	0.00	1.00				-.01	.01
Low Status	0.12	1.23				-.02	.04***
High Status	-0.12	0.69				.00	-.03**
5. Parent Corrugator Activity (<i>z</i>)	0.00	1.00					-.02*
Low Status	-0.03	0.75					-.01
High Status	0.03	1.21					-.04***
6. Parent Zygomaticus Activity (<i>z</i>)	0.00	1.00					
Low Status	0.08	1.35					
High Status	-0.09	0.42					

Note. * $p < .05$, ** $p < .01$, *** $p < .001$. Correlations between muscles are within-person.

There were no condition differences in children's age, narcissism, or sex, nor in parents' age, overvaluation, or sex, $ps \geq .080$, indicating successful random assignment. Compared to children in the low-status condition, children in the high-status condition reported being more popular, $t(64) = 9.44, p < .001$ (low status: $M = 1.76, SD = 0.79$; high status: $M = 3.33, SD = 0.54$) and receiving more likes, $t(68) = 7.27, p < .001$ (low status: $M = 2.27, SD = 1.26$; high status: $M = 4.12, SD = 0.78$). Compared to parents in the low-status condition, parents in the high-status condition reported their child being more popular, $t(79) = 11.60, p < .001$ (low status: $M = 1.50, SD = 0.71$; high status: $M = 3.23, SD = 0.63$) and receiving more likes, $t(74) = 12.10, p < .001$ (low status: $M = 1.31, SD = 0.83$; high status: $M = 3.65, SD = 0.86$). Thus, the manipulation appeared effective.

Children's Affective Responses

Our first set of analyses examined children's sensitivity to status gains and losses.

Zygomaticus Activity

We tested the hypothesis that children's narcissism would be associated with increased zygomaticus activity when children gained status (Table 2). There were no effects of condition or narcissism, but there was an effect of time, with zygomaticus activity decreasing over the

Table 2

Analyses of Children's Winsorized Muscle Activity Predicted by Status Loss vs Gain Condition, Time, and Children's Narcissism Levels

		Zygomaticus Activity			Corrugator Activity		
Intraclass Correlation		.81			.95		
Fixed Effects		β	$SE(\beta)$	t	β	$SE(\beta)$	t
Intercept		0.11	0.14	0.79	0.19	0.15	1.32
Condition		-0.23	0.20	-1.14	-0.38	0.21	-1.82
Time		-0.02	0.01	-4.33***	0.02	0.00	8.52***
Narcissism		-0.02	0.13	-0.12	0.13	0.14	0.93
Condition \times Time		0.01	0.01	1.08	0.03	0.00	7.71***
Condition \times Narcissism		0.07	0.20	0.35	-0.17	0.21	-0.79
Time \times Narcissism		0.01	0.00	0.43	0.01	0.00	3.79***
Condition \times Time \times Narcissism		0.03	0.01	3.77***	0.01	0.00	3.49***
3-Way Interaction Tests (Time Effect)		β	$SE(\beta)$	t	β	$SE(\beta)$	t
Low Status	Higher Narcissism	ns	ns	ns	0.03	0.00	8.57***
	Lower Narcissism	ns	ns	ns	0.01	0.00	3.78***
High Status	Higher Narcissism	0.02	0.01	2.11*	0.07	0.00	19.42***
	Lower Narcissism	-0.04	0.01	-5.56***	0.03	0.00	7.04***

Note. Condition was dummy coded with "0" for Low Status and "1" for High Status. * $p < .05$ ** $p < .01$ *** $p < .001$, p values calculated using Satterthwaite degrees of freedom.

course of the experiment. There were no two-way interactions, but there was a three-way condition \times time \times narcissism interaction.

We broke the three-way interaction down by condition (Figure 1). In the low-status condition, there was no time \times narcissism interaction. In the high-status condition, however, there was a two-way time \times narcissism interaction, $\beta = .03$, $SE = .01$, $t(7337) = 5.02$, $p < .001$. Zygomaticus activity increased over time for children with higher ($M + 1SD$) narcissism but decreased over time for children with lower ($M - 1SD$) narcissism. Thus, during status gain, children with higher narcissism levels exhibited increasing zygomaticus activity, whereas those with lower narcissism levels exhibited decreasing zygomaticus activity.

Corrugator Activity

We tested the hypothesis that children’s narcissism would be associated with increased corrugator activity when children lost status (Table 2). There were no effects of condition or narcissism, but there was an effect of time, with corrugator activity increasing over the course of the experiment. The two-way interactions were qualified by a three-way condition \times time \times narcissism interaction.

We broke the three-way interaction down by condition (Figure 1). In the low-status condition, there was a time \times narcissism interaction, $\beta = .01$, $SE < .01$, $t(7516) = 3.77$, $p < .001$. Corrugator

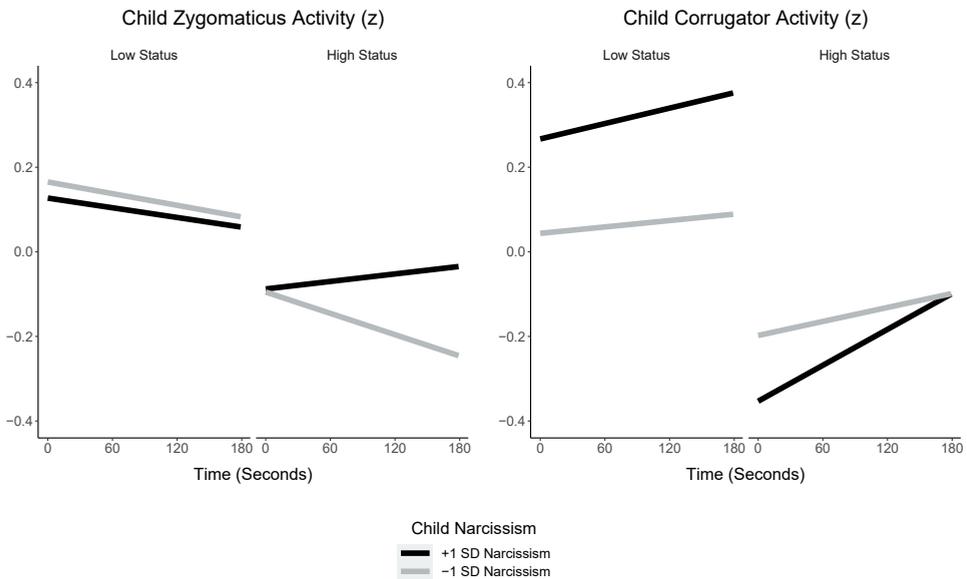


Figure 1 Conditional effects of time on children’s zygomaticus (left panel) and corrugator (right panel) z-transformed activity for values of children’s narcissism at -1 SD (black lines) and +1 SD (yellow lines) in the low status (left half of panels) and the high-status (right half of panels) conditions.

activity increased more steeply for children with higher ($M + 1SD$) narcissism than for children with lower ($M - 1SD$) narcissism. In the high-status condition, the time \times narcissism interaction was similar but more pronounced, $\beta = .02$, $SE < .01$, $t(7337) = 7.78$, $p < .001$. Corrugator activity increased more steeply over time for children with higher ($M + 1SD$) narcissism than for children with lower ($M - 1SD$) narcissism. Thus, children with higher narcissism levels exhibited increasing zygomaticus activity, especially during status gain.

Parents' Affective Responses

Our second set of analyses examined parents' sensitivity to their children's status gains and losses.

Zygomaticus Activity, Children's Narcissism

We tested the hypothesis that children's narcissism would be associated with increased zygomaticus activity in parents when children gained status (Table 3). There were no effects of condition or children's narcissism, but there was an effect of time, with zygomaticus activity decreasing over time. There was also a time \times condition interaction, which was qualified by a three-way time \times condition \times children's narcissism interaction.

Table 3

Analyses of Parents' Winsorized Muscle Activity Predicted by Status Loss vs Gain Condition, Time, and Children's Narcissism Levels

		Zygomaticus Activity			Corrugator Activity		
Intraclass Correlation		.97			.93		
Fixed Effects		β	$SE(\beta)$	t	β	$SE(\beta)$	t
Intercept		.08	.15	0.53	-.02	.15	-0.15
Condition		-.16	.22	-0.75	.05	.22	0.25
Time		-.00	.00	-2.56*	-.03	.00	-9.62***
Child Narcissism		-.05	.14	-0.35	.03	.14	0.82
Condition \times Time		.01	.00	2.02*	.05	.00	12.57***
Condition \times Child Narcissism		-.04	.22	-0.16	-.09	.22	-0.44
Time \times Child Narcissism		-.01	.00	-4.66***	-.00	.00	-0.22
Condition \times Time \times Child Narcissism		.02	.00	5.90***	-.00	.00	-1.08
3-Way Interaction Tests (Time Effect)		β	$SE(\beta)$	t	β	$SE(\beta)$	t
Low Status	Higher Child Narcissism	-0.01	0.00	-4.91***	ns	ns	ns
	Lower Child Narcissism	0.00	0.00	1.34	ns	ns	ns
High Status	Higher Child Narcissism	0.01	0.00	3.12**	ns	ns	ns
	Lower Child Narcissism	-0.01	0.00	-2.50*	ns	ns	ns

Note. Condition was dummy coded with "0" for Low Status and "1" for High Status. * $p < .05$ ** $p < .01$ *** $p < .001$, p values calculated using Satterthwaite degrees of freedom.

We broke the three-way interaction down by condition (Figure 2). In the low-status condition, there was a time \times children’s narcissism interaction, $\beta = -.01$, $SE < .01$, $t(7516) = -4.12$, $p < .001$. Zygomaticus activity decreased over time for parents of children with higher ($M + 1SD$) narcissism but remained stable over time for parents of children with lower ($M - 1SD$) narcissism. In the high-status condition, there was also a time \times children’s narcissism interaction, $\beta = .01$, $SE < .01$, $t(7337) = 4.49$, $p < .001$. Zygomaticus activity increased over time for parents of children with higher ($M + 1SD$) narcissism but decreased over time for parents of children with lower ($M - 1SD$) narcissism. Thus, during status loss, parents of children with higher narcissism levels exhibited decreasing zygomaticus activity, whereas during status gain, they exhibited increasing zygomaticus activity.

Corrugator Activity, Children’s Narcissism

We tested the hypothesis that children’s narcissism would be associated with increased corrugator activity in parents when children lost status (Table 3). There were no effects of condition or children’s narcissism. There was an effect of time, with corrugator activity decreasing over time. There was also a condition \times time interaction, but no condition \times time \times children’s narcissism interaction.

We broke the two-way interaction down by testing the time effect per condition (Figure 2). In the low-status condition, there was a significant decrease in corrugator activity over time,

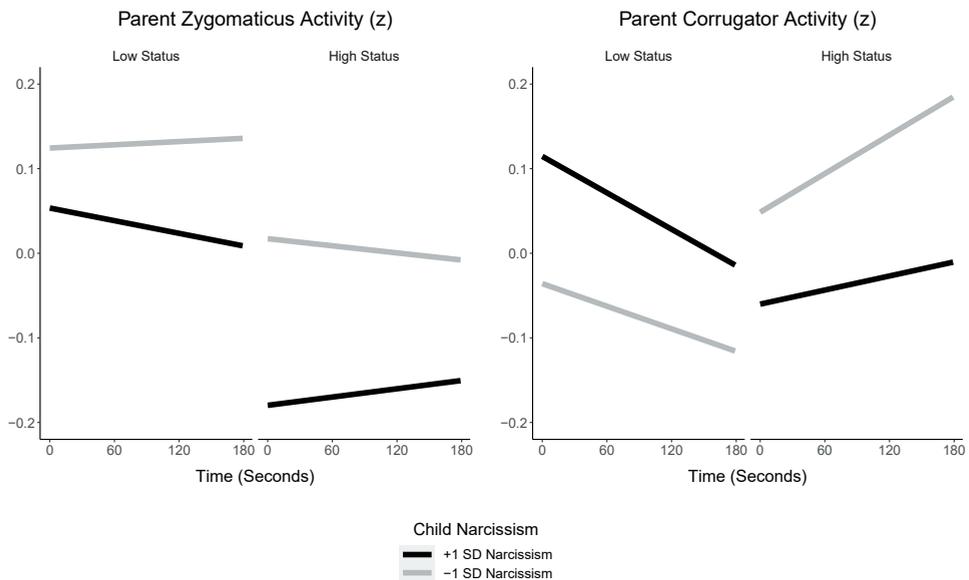


Figure 2 Conditional effects of time on parents’ zygomaticus (left panel) and corrugator (right panel) z-transformed activity for values of children’s narcissism at -1 SD (black lines) and +1 SD (yellow lines) in the low status (left half of panels) and the high-status (right half of panels) conditions.

$\beta = -.03$, $SE < .01$, $t(7517) = -7.55$, $p < .001$. In the high-status condition, however, there was a significant increase in corrugator activity over time, $\beta = .02$, $SE < .01$, $t(7338) = 13.47$, $p < .001$. Thus, during status loss, parents exhibited decreasing corrugator activity, whereas during status gain, parents exhibited increasing corrugator activity.

Zygomaticus Activity, Parental Overvaluation

We tested the hypothesis that parental overvaluation would be associated with increased zygomaticus activity in parents when children gained status (Table 4). There were no effects of condition or parental overvaluation. There was an effect of time, with zygomaticus activity decreasing over time. There was also a condition \times time \times parental overvaluation interaction.

We broke the three-way interaction down by condition (Figure 3). In the low-status condition, there was no time \times parental overvaluation interaction. In the high-status condition, however, there was a time \times parental overvaluation interaction, $\beta = .02$, $SE < .01$, $t(7337) = 9.64$, $p < .001$. Zygomaticus activity increased over time for more ($M + 1SD$) overvaluing parents but decreased over time for less ($M - 1SD$) overvaluing parents. Thus, during status gain, more overvaluing parents exhibited increasing zygomaticus activity.

Table 4

Analyses of Parents' Winsorized Muscle Activity Predicted by Status Loss vs Gain Condition, Time, and Parental Overvaluation Levels

		Zygomaticus Activity			Corrugator Activity		
Intraclass Correlation		.97			.93		
Fixed Effects		β	$SE(\beta)$	t	β	$SE(\beta)$	t
Intercept		.08	.15	0.54	-.01	.15	-0.08
Condition		-.15	.21	-0.67	.05	.22	0.25
Time		-.00	.00	-1.97*	-.03	.00	-9.89***
Overvaluation		-.00	.16	-0.03	.06	.16	0.40
Condition \times Time		.00	.00	0.69	.06	.00	13.16***
Condition \times Overvaluation		-.10	.22	-0.48	-.14	.22	-0.64
Time \times Overvaluation		.00	.00	1.38	-.01	.00	-2.25*
Condition \times Time \times Overvaluation		.01	.00	4.57***	-.01	.00	-1.26
3-Way Interaction Tests (Time Effect)		β	$SE(\beta)$	t	β	$SE(\beta)$	t
Low Status	Higher Overvaluation	ns	ns	ns	ns	ns	ns
	Lower Overvaluation	ns	ns	ns	ns	ns	ns
High Status	Higher Overvaluation	0.01	0.00	-5.82***	ns	ns	ns
	Lower Overvaluation	-0.02	0.00	5.50***	ns	ns	ns

Note. Condition was dummy coded with "0" for Low Status and "1" for High Status. * $p < .05$ ** $p < .01$ *** $p < .001$, p values calculated using Satterthwaite degrees of freedom.

Corrugator Activity, Parental Overvaluation

We tested the hypothesis that parental overvaluation would be associated with increased corrugator activity in parents when children lost status (Table 4). There were no effects of condition or parental overvaluation. However, there was an effect of time, with corrugator activity decreasing over time. There was also a time × condition, as well as a time × overvaluation interaction. There was no condition × time × parental overvaluation interaction.

First, we broke down the time × condition interaction by testing the time effect per condition (Figure 3). In the low-status condition, corrugator activity decreased over time, $\beta = -.03$, $SE < .01$, $t(7517) = -7.55$, $p < .001$. In the high-status condition, however, corrugator activity increased over time, $\beta = .02$, $SE < .01$, $t(7338) = 13.47$, $p < .001$. Thus, during status loss, parents exhibited decreasing corrugator activity, whereas during status gain, parents exhibited increasing corrugator activity.

Second, we broke down the time × parental overvaluation interaction by testing the time effect for different parental overvaluation levels (Figure 3). Corrugator activity decreased over time for more ($M + 1SD$) overvaluing parents, $\beta = -.01$, $SE < .01$, $p < .001$, but increased over time for less ($M - 1SD$) overvaluing parents, $\beta = .01$, $SE < .01$, $p < .001$. Thus, during both status gain and loss, more overvaluing parents exhibited decreasing corrugator activity.

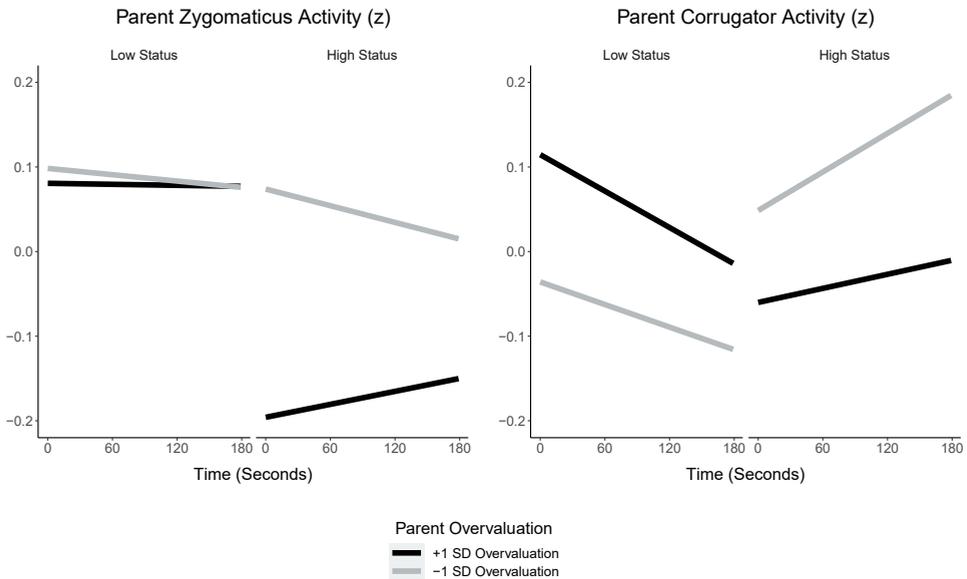


Figure 3 Conditional effects of time on parents’ zygomatic (left panel) and corrugator (right panel) z-transformed activity for values of parental overvaluation at -1 SD (black lines) and +1 SD (yellow lines) in the low status (left half of panels) and the high-status (right half of panels) conditions.

Auxiliary Analyses

Auxiliary analyses are presented in the Supporting Information.

Robustness Tests

We repeated main analyses excluding observations above 2 *SD* of z-standardized winsorized muscle activity. Findings were the same, except for corrugator activity in parents:

During status loss, parents of children with higher narcissism levels and more overvaluing parents exhibited increasing corrugator activity.

Specificity Tests

We compared results for narcissism to those for self-esteem. Self-esteem also involves favorable self-views (Brummelman et al., 2016b) but, unlike narcissism, protects against psychopathology (Hyatt et al., 2018). Before the task, children completed the Lifespan Self-Esteem Scale (Harris et al., 2018). First, we repeated main analyses in children while controlling for self-esteem. The pattern of results for narcissism did not change. Second, we conducted the same analyses for self-esteem that we conducted for narcissism. Like narcissism, self-esteem was associated with increasing zygomaticus and corrugator activity over time when children gained status. Unlike narcissism, self-esteem was associated with decreasing corrugator activity over time when children lost status. Thus, the overall pattern of results was specific to narcissism.

Discussion

This randomized experiment used fEMG to examine, for the first time, whether childhood narcissism is related to status sensitivity, and whether this sensitivity is shared with parents. Positive and negative affect were indexed via zygomaticus and corrugator activity. Children with higher narcissism levels experienced status loss more negatively, with steeper increases in negative affect. They also experienced status gain with increases in both positive and negative affect. Their parents mirrored these affective responses, although they experienced status gain as unambiguously positive, with steeper increases only in positive affect. Findings were modest in size yet robust.

Theoretical Implications

Children with higher narcissism levels exhibited intensified affective responses to status gains and losses. This provides the first direct evidence that childhood narcissism is characterized by heightened status sensitivity, which could indicate an underlying affective-motivational system geared toward status (Brummelman & Sedikides, 2020; Grapsas, Brummelman, et al., 2020; Morf & Rhodewalt, 2001; Zeigler-Hill, McCabe, et al., 2018). Parents of children with higher narcissism levels showed affective responses similar to their children's, which suggests

that status sensitivity can be intergenerationally transmitted. These results were distinct from those for self-esteem. Thus, our work shows, for the first time, that the affective signatures of narcissism emerge in childhood, are shared with parents, and are unique to narcissism. More broadly, our work concurs with the notion that personality traits, such as narcissism, reflect unique affective signatures (Dufner, Arslan, et al., 2015; McClelland, 1987b; Mischel & Shoda, 1995).

Our findings suggest that in children with higher narcissism levels, status gains trigger both positive and negative affect. Supplementary analyses show that for them, positive and negative affect during status gain did not co-occur in time (Supporting Information, pp. 52-53). This indicates that they did not experience status gain as more ambivalent (i.e., simultaneously positive and negative); rather, they cycled between positive and negative affect.

Why might gaining status trigger negative affect in children with high narcissism levels? In competitive settings, status gains might seem fleeting, raising concerns about losing status—especially so in children with a stronger status motive, such as children with higher narcissism levels (Case et al., 2020; Kakkar et al., 2019). These negative-affective states might have adaptive value, preparing children to protect or even enhance their status (Case et al., 2020; Huang et al., 2017).

Parents of children with higher narcissism levels and more overvaluing parents showed intensified affective responses to their child's status gains and losses. Why might such an intergenerational overlap in status sensitivity exist? Given that narcissism is partly heritable (Vernon et al., 2008), children with high narcissism levels might inherit their parents' status sensitivity. Additionally, parents might transmit status sensitivity through socialization (Brummelman, 2018; Brummelman & Sedikides, 2020). For example, parents might visibly show their pleasure and displeasure in their child's status gains and losses via their facial expressions. Consistent with work on social referencing (Bos et al., 2016) and reinforcement learning (Berridge, 2000), children might detect parents' affective reactions and interpret them as signs that they should pursue status to please them. However, an alternative explanation might be that parents accurately inferred and mirrored via their affective responses how their child would feel. Future work should identify the sources of this intergenerational overlap.

Strengths, Limitations, and Future Research

Strengths of our study include its developmental timing, ecologically valid social media task, and experimental design with real-time continuous physiological tracking of affect. Our study also has limitations. First, we manipulated status gains and losses in a one-shot social media interaction. Future research should examine how children respond to social media feedback and other experiences of status gain and loss over days, weeks, or months, as

these experiences might have cumulative effects (H. Y. Lee et al., 2020). Second, the task was designed to examine affective responses to the overall experience of status gain or loss over time, rather than to individual, isolated likes. Future research should examine how children respond to individual likes (Sherman et al., 2016). Third, we used fEMG to index affect. Although fEMG reliably assesses affect (Barrett et al., 2019), we do not claim a one-to-one mapping of facial muscle activity to affect, and we cannot rule out the possibility that facial muscle activity might reflect more than affect (e.g., corrugator activity can indicate mental effort; Kraaijenvanger et al., 2017).

Conclusion

Children's lives are rife with experiences of status gains and losses. Our findings show that the affective consequences of these experiences are especially pronounced in children with high narcissism levels and their parents. They suggest that an affective-motivational system may underlie childhood narcissism and pave the way to research how this system becomes intergenerationally transmitted.



Chapter 5

General Discussion

The present dissertation examined at the theoretical and the empirical level motivational contingencies of status that possibly underlie narcissism. **Chapter 2** outlined a theoretical model of “*if...then*” contingencies of social status in narcissism. The model illustrated why and when narcissistic behavior can take on an agentic, self-promoting flavor, or an antagonistic, other-derogating one—thus showing how the same individual might behave differently depending on their construal of the social context. Furthermore, the model illustrated how individual differences in agentic and antagonistic aspects of narcissism might develop based on recurring experiences of status gains and losses. **Chapter 3** investigated the idea that narcissism is rooted in affective contingencies that are stronger in the domain of power (an aspect of status) than in the domain of affiliation. Results largely indicated the existence of such an asymmetry, which was more pronounced for individuals higher in narcissistic antagonism. **Chapter 4** investigated the idea that the affective contingencies of narcissism in the domain of status can be detected in children and are possibly shared with parents. Children’s narcissism was associated with increased negative affect during status loss, and with increased positive as well as negative affect during status gain. In parents, children’s narcissism and parents’ overvaluation were associated with increased positive affect when children gained status.

Taken together, empirical findings from Chapters 3 and 4 provide some first, exciting evidence that lend support to the central assumptions of the theoretical model presented in Chapter 2. There we also various null associations, indicating that future multimethod research is necessary to understand exactly when “*if...then*” underlying personality contingencies do and do not manifest. Our findings open up the possibility that narcissism might be rooted in an affective system that is geared toward status. This motivational system appears present from childhood and is possibly intergenerationally transmitted.

Motivational Underpinnings of Personality

A central objective of psychology since its emergence has been to provide knowledge about why people might differ between each other in their personality traits. Across decades, a recurring hypothesis propelling psychological theories and research on this issue has been that such differences are grounded on individual differences in “*if...then*” affective contingencies in response to satisfactions and frustrations of diverse motives (Denissen & Penke, 2008; Dweck, 2017; Fleeson & Jayawickreme, 2015; Freud, 1927; Geukes, van Zalk, et al., 2017; Murray, 1938; Penke et al., 2007; Winter et al., 1998; Wood et al., 2015; Wrzus & Roberts, 2017). However, the empirical study of such contingencies has been largely overlooked, and theory about these contingencies has stayed at a generic, trait-unspecific level (Baumert et al., 2017). As a first step to address this issue, the present dissertation cut across psychological disciplines to provide a conceptual framework and first empirical evidence of “*if...then*” contingencies in narcissism. Rather than claiming that we have provided an unshakeable basis of evidence in light of our studies’ limitations and the novelty of our findings, our wish

is that this dissertation can spark conceptually integrative, multimethod research on the motivational roots of personality.

Such multimethod research can be undoubtedly challenging. As our results showed, self-reports and physiological responses can capture different affective contingencies associated with personality traits. Indeed, motives can be both conscious and explicit (e.g., self-ascribed goals) as well as spontaneous and unconscious (e.g., implicit attractions or repulsions toward specific incentives or disincentives; McClelland et al., 1989; Schultheiss et al., 2012). Scholars have associated conscious affective contingencies with conscious motives, and spontaneous or unconscious affective contingencies with unconscious motives, which are assumed to be grounded on biological reward systems (Berridge, 2000; Berridge & Winkielman, 2003; Schultheiss et al., 2012). The two motivational systems appear to influence behavior relatively independently (McClelland et al., 1989). For example, individuals with stronger physiologically indexed affective contingencies toward affiliation (e.g., smiling in response to affiliative images) behave in a more affiliative manner, regardless of whether they report higher levels of affiliation motivation (Dufner, Arslan, et al., 2015). Therefore, a challenge for future trait research will be to examine when conscious and unconscious motivational systems overlap, and how they interact with social contexts to predict behavior. Such studies can enhance our understanding of why and how personality traits emerge and develop across the lifespan, and can generate insights that will lead to more comprehensive and accurate personality trait theories (Baumert et al., 2017).

Narcissism Seen Through the Lens of the Status Motive

Getting along with others is assumed to be essential for psychological and relational adjustment (Baumeister & Leary, 1995). Based on this assumption, researchers and laypeople have often viewed high levels of narcissism as a deficit: an inability to focus on others' concerns and to get along with them. Challenging this deficit perspective, we propose that narcissism is a set of narrow strengths: a highly specialized self-regulation system geared toward social status. Our perspective suggests that narcissists might possess the capacities to get along with others, but due to their strong motive for status, they might also use these capacities less frequently.

This shift from a deficit-based to a strength-based perspective on narcissism bears several implications. First, our perspective debunks the lay belief that narcissists are fundamentally disinterested in relationships. It rather appears that narcissists are especially interested in those relationships that confer status. If anything, other people seem essential for narcissists: without competitors, there is no hierarchy to ascend; without audiences, no status to gain. Second, our perspective advances our understanding about how narcissists view the relational world. Narrowly focused on status attainment, narcissists likely treat interpersonal situations as arenas of status competition, not as opportunities to form close relationships with others.

Third, our perspective offers insights to tackle narcissistic resistance to psychotherapeutic treatment. Narcissists view narcissism as a personal asset (E. N. Carlson, 2013; Hart et al., 2018). Unsurprisingly, narcissists are especially resistant to treatment, partly because they are unwilling to reconsider how their narcissism can perpetuate their own interpersonal problems (Ronningstam, 2005). Instead of teaching narcissists skills to get along with others (which implies a deficit), interventions can focus on stressing how getting along and collaborating can benefit status pursuit (which implies a reconciliation of motives that narcissists might often pit against each other). In sum, our conceptualization of narcissism as a set of status-oriented relational strengths advocates that narcissism is deeply relational and should be understood, studied, and treated as such.

Reconsidering Narcissistic Vulnerability

This dissertation did not study the hypersensitive, withdrawn, and shy flavor of narcissism: vulnerable narcissism. Grandiose and vulnerable narcissism share antagonistic elements (Crowe et al., 2019; Krizan & Herlache, 2018). According to our framework, it is possible that narcissistic grandiosity, vulnerability, and antagonism, are rooted in the status motive. This motive can be fulfilled through competition with others, either via self-promotion (grandiose narcissism) or via antagonistic other-derogation (grandiose and vulnerable narcissism). Based on this idea, our framework can contribute to the refinement of theory and research on vulnerable narcissism. Our findings showed that narcissists are not only relatively sensitive to status-relevant opportunities and gains, but also to status-relevant setbacks and losses. When narcissists repeatedly lose status and are unable to regain it, they might feel increasingly insecure about their superiority and their capacity to gain status—in other words, they might become more narcissistically vulnerable (Back, 2018; Johnson et al., 2012). Thus, according to this perspective, vulnerable narcissism might develop through repeated experiences of status loss. This idea dovetails with research showing that narcissists' self-esteem tends to depend on status (Zeigler-Hill, Vrabel, et al., 2018), and that narcissists tend to exhibit daily bouts of vulnerability (Edershile & Wright, 2020). A promising avenue to better understand what narcissistic vulnerability is (i.e., why it belongs to the full narcissism spectrum) and how it is connected to grandiose narcissism would be to treat it as the fragility of individuals' sense of superiority and capacity to gain status. Future research that tests this idea promises clarity about a psychological construct that is often primarily measured and treated as a manifestation of neuroticism more so than of narcissism (Miller et al., 2018).

Investigating the Motivational Roots of Personality Development

Our theoretical proposition that motives might underlie the development of narcissism is applicable to both genetic and socialization research. Indeed, this thesis aligns with prior work that views personality traits as rooted in genetically transmitted sensitivities toward specific classes of motive-relevant incentives (Denissen & Penke, 2008; Penke et al., 2007; Penke & Jokela, 2016). This thesis also aligns with socialization work showing that narcissism

develops especially in social environments that prioritize and reinforce individualism, agency, and status attainment (Brummelman, Thomaes, Nelemans, Orobio de Castro, Overbeek, et al., 2015; Foster et al., 2003). Like our conceptual work, our empirical findings tentatively supported both perspectives: in line with the genetic perspective, parents of narcissistic children appeared especially sensitive to their children's status-relevant experiences. In line with the socialization perspective, more overvaluing parents showed a similar pattern of status sensitivity. In all likelihood, genes and socialization might contribute in unique and even complementary ways (Thomaes & Brummelman, 2016) to the development of individual differences in narcissism.

Based on this notion, a task for future developmental research will be to identify how genetically transmitted and socialized motives might contribute to the development of individual differences in narcissism, as well as in other personality traits. The present dissertation points to three key areas of inquiry. First, to pinpoint the genetic transmission of personality traits, future research should systematically study the motives underlying parents' and children's personality traits. Second, to pinpoint the socialization of personality traits, future research should examine how the underlying motives of these traits become socialized in the family and in children's extrafamilial social environments (e.g., school, peer relationships, sports). Third, to pinpoint how motives might underpin the development of personality traits, future research should unravel how individual differences in the developmental trajectories of personality traits are associated with the development of individual differences in their underlying motives. By addressing these three key questions simultaneously, future developmental research can generate a first integrative basis of evidence on how individual differences in personality traits might develop out of genetically transmitted and socialized motivational systems.

5

Conclusion

Why do people's personalities differ? This is an existential question psychology has sought to inform since its conception. We addressed this question for the personality trait of narcissism. Drawing from the present dissertation, we suggest that people's personalities differ because their motives differ.



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Chapter Supplements

Chapter 3 Supplement

Supplementary Materials for Chapter 3: Affective Contingencies of Narcissism

Table S1
List of Study Measures

Self-Reports			
Construct	Measure		
Overall Narcissism	Narcissistic Personality Inventory-15		
Narcissistic Admiration and Rivalry	Narcissistic Admiration and Rivalry Questionnaire		
Power Contingencies	Constructed for this study		
Affiliation Contingencies	Constructed for this study		
Lab Tasks			
Task	Affect Measure		
Power Game (politician)	Zygomaticus	Corrugator	Post-Task Self-Reports of Affect
Power Imagination Exercise	Zygomaticus	Corrugator	Post-Task Self-Reports of Affect
Power Images	Zygomaticus ^{abc}	Corrugator ^{abc}	Post-Task Self-Reports of Affect ^c
Affiliation Game (Cyberball)	Zygomaticus	Corrugator	Post-Task Self-Reports of Affect
Affiliation Imagination Exercise	Zygomaticus	Corrugator	Post-Task Self-Reports of Affect
Affiliation Images	Zygomaticus ^{abc}	Corrugator ^{abc}	Post-Task Self-Reports of Affect ^{bc}
Lab Behaviors			
Type of Behaviors	Behaviors Coded		
Power Behaviors	brash gestures, loud voice, interrupting experimenter, attempts to dominate the conversation, boasting		
Affiliation Behaviors ^b	smiling ^b , relaxed laughter ^b , social warmth ^b , is friendly ^b , aims to create pleasant atmosphere ^b , angry or disgusted facial expression		
Daily Diaries (Baseline for Post-Task Self-Reports of Affect)			
Construct	Affect Measure		
Daily Positive and Negative Affect	Positive And Negative Affect Schedule		

Note. ^a Reported in Study 2 of Hess et al. (2017). ^b Reported in Dufner et al. (2015). ^c Reported in (Dufner, Arslan, et al., 2018)

Convergent Validity of fEMG Indexed Contingencies

After each lab task, participants rated how much positive and negative affect they experienced during the task (1 = *not at all*, to 5 = *very much*). In the case of the games and imagination exercises, the items that participants responded to did not distinguish affective experiences in specific parts (e.g., satisfaction/frustration) of the tasks, thus referring to each task as a whole. In the case of images, these items were answered after viewing each satisfying and frustrating image, and responses were averaged across items per type of affect (positive or negative) and image (e.g., power satisfaction). Reliability of positive affect was acceptable for power satisfaction images ($M = 2.32$, $SD = 0.74$, $\alpha = .60$), but lower for power frustration images ($M = 1.26$, $SD = 0.38$, $\alpha = .54$). In contrast, reliability of negative affect was low for power satisfaction images ($M = 1.69$, $SD = 0.54$, $\alpha = .52$), but good for power frustration images ($M = 3.22$, $SD = 0.76$, $\alpha = .70$). Reliability of positive affect was good for both affiliation satisfaction ($M = 3.63$, $SD = 0.77$, $\alpha = .78$) and frustration ($M = 1.29$, $SD = 0.44$, $\alpha = .70$) images. Finally, reliability of negative affect was low for affiliation satisfaction images ($M = 1.24$, $SD = 0.33$, $\alpha = .45$), but good for affiliation frustration images ($M = 3.19$, $SD = 0.80$, $\alpha = .76$).

Before correlating self-reports of affect after the tasks with fEMG indexed contingencies, we sought to isolate task-specific affective responses from participants' affect response tendencies. We first created a baseline for participants' affect response tendencies by using participants' daily diary data on positive and negative affect. Each day for 14 (not necessarily consecutive) days, participants completed the 20-item Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988). The PANAS measures, with 10 adjectives each, positive affect (e.g., "enthusiastic"), and negative affect (e.g., "distressed"). Participants were asked daily to rate how they felt on that day on 5-point scales (1 = *very slightly or not at all*, 5 = *extremely*). Daily ratings of participants with fully complete daily diary affect data were averaged across days and adjectives, separately for positive ($M = 2.71$, $SD = .52$, $\alpha = .94$) and negative ($M = 1.56$, $SD = .36$, $\alpha = .91$) affect. To isolate task-specific affective responses from participants' affect response tendencies, we computed baseline-corrected positive and negative self-reported affect for each task by partialing out, respectively, the average positive and negative affect reported in daily diaries. Correlations of fEMG contingencies with corresponding self-reports of affect after each task are found in Table S2.

Table S2

Correlations Between fEMG Indexed Contingencies and Self-reported Affect Following Each Task

Task	Task Part	Positive Affect		Negative Affect	
		Zygomaticus	Corrugator	Zygomaticus	Corrugator
Power Game	Satisfaction	.19**	-.16*	-.09	.10
	Frustration	.18*	-.20**	-.05	.21**
Affiliation Game	Satisfaction	.15*	-.18*	-.07	.02
	Frustration	.29**	-.21**	-.05	.07
Power Story	Satisfaction	.17*	-.25**	-.01	.02
	Frustration	.16*	-.10	.01	-.02
Affiliation Story	Satisfaction	.01	-.10	-.09	.04
	Frustration	.08	.01	-.04	-.03
Power Images	Satisfaction	.13	-.14	-.12	.13
	Frustration	-.19	.00	.08	.03
Affiliation Images	Satisfaction	.15*	-.09	-.12	.05
	Frustration	-.03	-.01	-.08	.10

Note. * $p < .05$, ** $p < .01$

Table S3
Self-reported Affective Contingencies Intercorrelations and Correlations With fEMG Indexed Contingencies

	Self-Reported Contingencies			
	Power		Affiliation	
	Satisfaction	Frustration	Satisfaction	Frustration
Self-Reported Contingencies				
Power				
Frustration	.42**			
Affiliation				
Satisfaction	.24**	.23**		
Frustration	.24**	.57**	.47**	
fEMG Indexed Contingencies				
Power Game				
Satisfaction, Zygomatikus	-.13	-.12	.05	-.05
Satisfaction, Corrugator	-.04	-.01	.03	-.02
Frustration, Zygomatikus	-.17*	.03	-.02	.13
Frustration, Corrugator	.07	.04	-.06	-.04
Power Imagination				
Satisfaction, Zygomatikus	.13	.05	.10	.02
Satisfaction, Corrugator	-.04	-.01	.02	.06
Frustration, Zygomatikus	.08	.02	.09	.09
Frustration, Corrugator	.00	-.06	.04	-.04
Power Images				
Satisfaction, Zygomatikus	-.01	.00	.01	.23**
Satisfaction, Corrugator	-.02	.22**	.10	.12
Frustration, Zygomatikus	.01	-.05	-.01	-.08
Frustration, Corrugator	-.08	.08	.07	.09
Affiliation Game				
Satisfaction, Zygomatikus	-.25**	-.14*	-.17*	-.13
Satisfaction, Corrugator	.09	-.03	-.04	-.01
Frustration, Zygomatikus	-.19**	-.07	-.08	-.10
Frustration, Corrugator	.09	.06	-.02	.06
Affiliation Imagination				
Satisfaction, Zygomatikus	.01	.01	.03	.10
Satisfaction, Corrugator	-.03	.04	-.02	-.04
Frustration, Zygomatikus	-.07	.00	-.04	.03
Frustration, Corrugator	.01	.04	.00	-.01
Affiliation Images				
Satisfaction, Zygomatikus	.03	.05	.05	.03
Satisfaction, Corrugator	-.11	-.01	-.12	.01
Frustration, Zygomatikus	.01	.00	-.02	-.01
Frustration, Corrugator	.00	.11	.16*	.14*

Note. * $p < .05$, ** $p < .01$

Table S4

Correlations of Overall Narcissism, Narcissistic Admiration, and Narcissistic Rivalry with Composite Scores (PAC) of fEMG Indexed Contingencies

	Overall Narcissism	Narcissistic Admiration	Narcissistic Rivalry
fEMG Indexed Contingencies			
Power Game			
Satisfaction PAC	.01	.00	.01
Frustration PAC	-.16*	-.16*	-.14*
Power Imagination			
Satisfaction PAC	-.06	-.05	.10
Frustration PAC	-.05	-.09	.13
Power Images			
Satisfaction PAC	.03	-.02	-.10
Frustration PAC	.08	.04	.05
Affiliation Game			
Satisfaction PAC	-.05	-.05	-.16*
Frustration PAC	-.06	-.04	-.15*
Affiliation Imagination			
Satisfaction PAC	-.04	.02	-.04
Frustration PAC	-.06	-.03	-.02
Affiliation Images			
Satisfaction PAC	.00	-.05	-.17*
Frustration PAC	-.01	-.02	-.01

Notes. Composite scores of fEMG Indexed Contingencies (Positive Affective Contingencies – PAC) were calculated by subtracting baseline-corrected corrugator reactivity from baseline-corrected zygomaticus reactivity.

* $p < .05$, ** $p < .01$

Table S5

Correlations of Selected (Associated with Narcissism Indices) Composite Scores (PAC) of fEMG Indexed Contingencies with Power and Affiliation Behaviors

	Power Behaviors	Affiliation Behaviors
Power Game		
Frustration PAC	-.07	.07
Affiliation Game		
Satisfaction PAC	.01	.15
Frustration PAC	.12	.06
Affiliation Images		
Satisfaction PAC	.00	.20*

Notes. Composite scores of fEMG Indexed Contingencies (Positive Affective Contingencies – PAC) were calculated by subtracting baseline-corrected corrugator reactivity from baseline-corrected zygomaticus reactivity.

* $p < .05$, ** $p < .01$

Supplemental Mediation Analysis

Although narcissistic rivalry was not associated with affiliation behaviors, it was associated with lower composite positive reactivity in response to affiliation satisfaction in the image presentation. Supplemental correlation analyses (Table S5) indicated that this reactivity index was significantly negatively associated with affiliation behaviors. We therefore conducted a mediation analysis with 5000 bootstraps to examine whether this reactivity index accounted for the association between narcissistic rivalry and affiliative behaviors. The overall model with narcissistic rivalry, composite positive reactivity in response to images of affiliation satisfaction, and affiliation behaviors explained approximately 6% of variance in affiliation behaviors, $F(2, 206) = 6.73, p < .001$. Narcissistic rivalry negatively predicted composite positive reactivity when participants viewed images of affiliation satisfaction, $B = -0.11, SE = 0.04, t(207) = -2.15, p = .011$, which in turn positively predicted affiliation behaviors above and beyond narcissistic rivalry, $B = 0.19, SE = 0.07, t(206) = 2.85, p = .004$. The total effect of narcissistic rivalry on affiliation behaviors was statistically significant, $B = -0.10, SE = 0.04, t(207) = -2.27, p = .024$, yet the direct effect was not, $B = -0.08, SE = 0.04, t(206) = -1.11, p = .077$. The confidence intervals of the indirect effect tentatively suggest that narcissistic rivalry was indirectly related to a lower degree of affiliation behaviors via lower composite positive reactivity when participants viewed images of affiliation satisfaction, $B = -0.02, SE = 0.01, 95\% \text{ CI } [-0.0458, -0.0010]$.

Chapter 4 Supplement

Supplementary Materials for Chapter 4: Climbing up or falling down: Narcissism predicts physiological sensitivity to social status in children and their parents

Method Supplement

Social Media task

The social media task was presented as a competitive popularity game (Figure S1) in an online social media platform that participants were verbally informed was ostensibly under development. Children first created a personal profile by entering their initials (Figure S2), selecting a personal avatar from a list of predesigned portraits of youths (Figure S3), and writing a paragraph about themselves (Figure S4). Children viewed the game instructions, then the visual layout of the game. In the high-status and the low-status condition, children were informed that contestants would read one another's profiles and give likes (similar to Facebook likes) to any contestant, aside from themselves, they found special and exceptional. A notification popped up each time any contestant received a like. Likes were visible below each contestant's profile. Each contestant's position in the popularity hierarchy was shown in a ranking board, with the child at the top of the board being the contestant with most likes at that time (Figures S5, S6). Children in the no likes condition (intended to be neutral) were not informed about giving or gaining likes (Figure S7), and the visual layout of the game excluded the likes below the profiles, the notifications, and the ranking board (Figure S8).

In the high-status condition, children soon started sharing the first position with fictitious peers (S9). Over time, they shared it with fewer and fewer (S10) and finished the task second in ranking (S11).

In the low-status condition, children soon dropped to one of the lowest ranking positions (S12), and short thereafter to the lowest ranking (S13), remaining there for the task duration (S14).

In the no likes condition, children did not interact with fictitious peers (S15).



'Wie is populair'?

Dit spel gaat over wie het meest populair is.
Je speelt dit spel via internet met andere kinderen.

Eerst schrijf je een verhaaltje over jezelf.
Daarna kies je een plaatje dat bij jou hoort.
Zo kunnen de andere kinderen jou leren kennen.

Hoe leuker de andere kinderen jou vinden, hoe populairder je bent!

Als je dit hebt gelezen, klik hier:

Figure S1. All conditions, page 1 of social media task. Introduction to the game.



Letters van je naam

Tijdens het spel gebruik je niet je hele naam. Je gebruikt maar twee letters:
de eerste letter van je voornaam, en de eerste letter van je achternaam.

Bijvoorbeeld: Als je Peter Bos heet, dan vul je in: PB. Als je Suzanne Oost heet, dan vul je in: SO.

Schrijf hieronder twee letters: de eerste letter van je voornaam, en de eerste letter van je achternaam:

Figure S2. All conditions, page 2 of social media task. Entering personal initials.

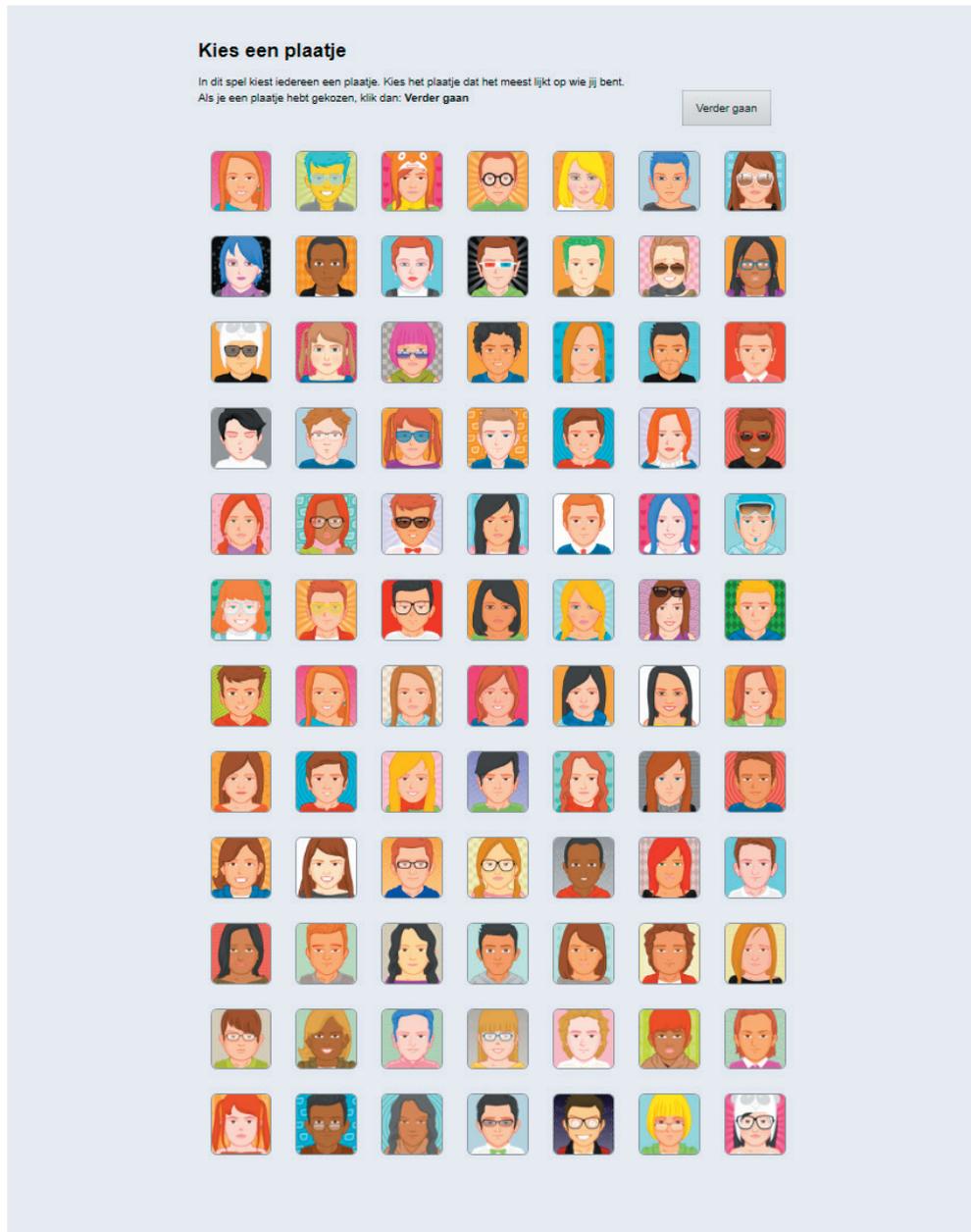


Figure S3. All conditions, page 3 of social media task. Selecting a personal avatar.

Schrijf over wie jij bent

Iedereen in dit spel schrijft iets over zichzelf. De andere kinderen gaan dit lezen.

Schrijf hieronder iets over jou.
Je mag alles schrijven wat je wilt!

Bijvoorbeeld: Wat zijn je hobby's? Welke sport vind je leuk?
Welke boeken, films of liedjes vind je leuk?
Wat vind je leuk om te doen, bijvoorbeeld in het weekend?

Hoeveel woorden je nog mag schrijven: 400

Als je verhaaltje af is, klik dan:

Figure S4. All conditions, page 4 of social media task. Writing a self-description

Duimpjes krijgen en geven

Het spel gaat bijna beginnen!

Als het spel begint, krijgen de andere kinderen jouw verhaaltje en plaatje te zien.

Jij krijgt ook hun verhaaltjes en plaatjes te zien.

Populair zijn betekent dat andere kinderen jou speciaal en bijzonder vinden.

Als kinderen jou populair vinden, dan geven ze jou een duimpje:



Hoe meer duimpjes je hebt, hoe populairder jij bent!

Als jij andere kinderen populair vindt, dan mag je ze ook duimpjes geven.

Figure S5. Low- and high-status conditions, page 5 of social media task. Instructions about likes. In the game, likes are given to those who are deemed as popular, that is, special and exceptional.



Figure S6. Low- and high-status conditions, page 6 of social media task. Visual layout of the game.



Figure S7. No likes condition, page 5 of social media task.



Figure S8. No likes condition, page 6 of social media task. Visual layout of the game.



Figure S9. High status condition. Initial sharing of first position with other peers.

S

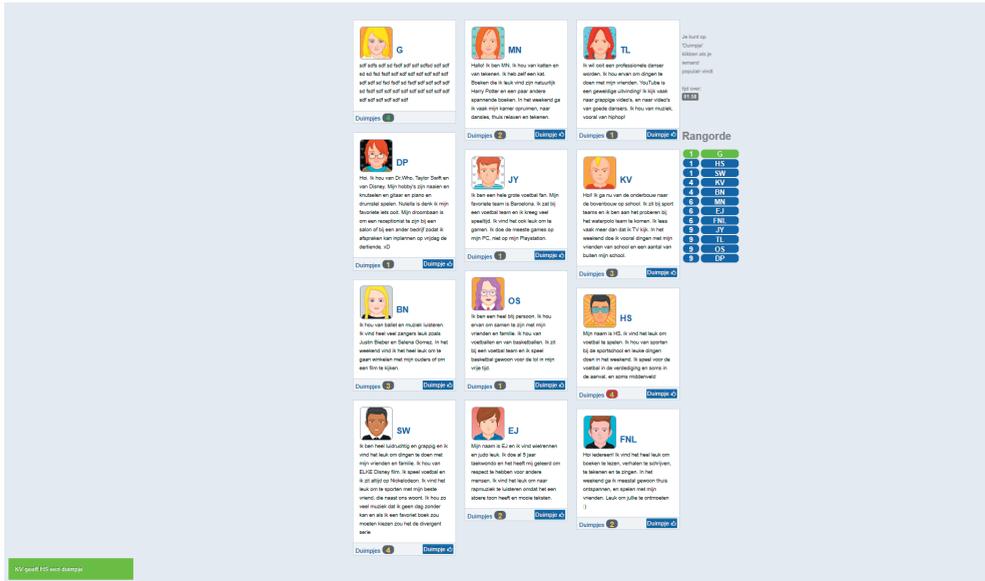


Figure S10. High status condition. Sharing first position with fewer peers.



Figure S11. High status condition. Approaching the end of the game as second in ranking.

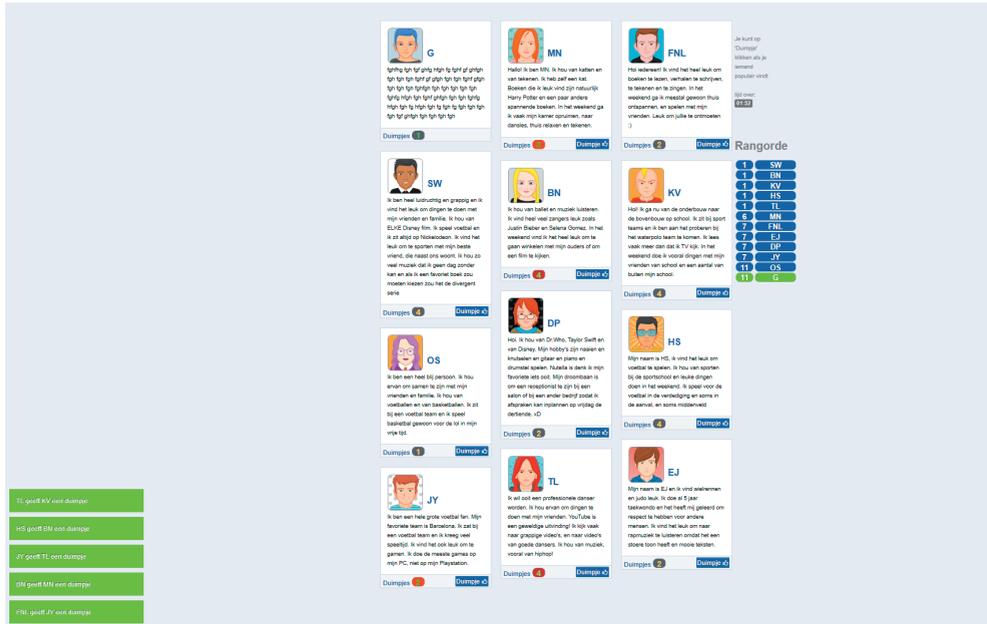


Figure S13. Low status condition. Participant in the bottom of ranking.



Hg

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JY

Ik ben een hele grote voetbal fan. Mijn favoriete team is Barcelona. Ik zat bij een voetbal team en ik kreeg veel speeltijd. Ik vind het ook leuk om te gamen. Ik doe de meeste games op mijn PC, niet op mijn Playstation.



HS

Mijn naam is HS, ik vind het leuk om voetbal te spelen. Ik hou van sporten bij de sportschool en leuke dingen doen in het weekend. Ik speel voor de voetbal in de verdediging en soms in de aanval, en soms middenveld



FNL

Hoi iedereen! Ik vind het heel leuk om boeken te lezen, verhalen te schrijven, te tekenen en te zingen. In het weekend ga ik meestal gewoon thuis ontspannen, en spelen met mijn vrienden. Leuk om jullie te ontmoeten :)



EJ

Mijn naam is EJ en ik vind wielrennen en judo leuk. Ik doe al 5 jaar taekwondo en het heeft mij geleerd om respect te hebben voor andere mensen. Ik vind het leuk om naar rapmuziek te luisteren omdat het een stoere toon heeft en mooie teksten.



KV

Hoi! Ik ga nu van de onderbouw naar de bovenbouw op school. Ik zit bij sport teams en ik ben aan het proberen bij het waterpolo team te komen. Ik lees vaak meer dan dat ik TV kijk. In het weekend doe ik vooral dingen met mijn vrienden van school en een aantal van buiten mijn school.



MN

Hallo! Ik ben MN. Ik hou van katten en van tekenen. Ik heb zelf een kat. Boeken die ik leuk vind zijn natuurlijk Harry Potter en een paar andere spannende boeken. In het weekend ga ik vaak mijn kamer opruimen, naar dansles, thuis relaxen en tekenen.



TL

Ik wil ooit een professionele danser worden. Ik hou ervan om dingen te doen met mijn vrienden. YouTube is een geweldige uitvinding! Ik kijk vaak naar grappige video's, en naar video's van goede dansers. Ik hou van muziek, vooral van hiphop!



OS

Ik ben een heel blij persoon. Ik hou ervan om samen te zijn met mijn vrienden en familie. Ik hou van voetballen en van basketballen. Ik zit bij een voetbal team en ik speel basketbal gewoon voor de lol in mijn vrije tijd.



SW

Ik ben heel luidruchtig en grappig en ik vind het leuk om dingen te doen met mijn vrienden en familie. Ik hou van ELKE Disney film. Ik speel voetbal en ik zit altijd op Nickelodeon. Ik vind het leuk om te sporten met mijn beste vriend, die naast ons woont. Ik hou zo veel muziek dat ik geen dag zonder kan en als ik een favoriet boek zou moeten kiezen zou het de divergent serie



BN

Ik hou van ballet en muziek luisteren. Ik vind heel veel zangers leuk zoals Justin Bieber en Selena Gomez. In het weekend vind ik het heel leuk om te gaan winkelen met mijn ouders of om een film te kijken.



DP

Hoi. Ik hou van Dr.Who, Taylor Swift en van Disney. Mijn hobby's zijn naaien en knutselen en gitaar en piano en drumstel spelen. Nutella is denk ik mijn favoriete iets ooit. Mijn droombaan is om een receptionist te zijn bij een salon of bij een ander bedrijf zodat ik afspraken kan inplannen op vrijdag de dertiende. xD

tijd over:
02:48

Figure S15. No likes condition. No interaction during the game.

EMG Recordings

Facial EMG equipment was placed on children and parents prior to questionnaire completion and remained attached throughout the testing session. Following standard procedures (Fridlund & Cacioppo, 1986), we first cleaned participants' skin using alcohol pads. We then placed two bipolar Ag/AgCl electrodes 15 mm from one another on participants' right zygomaticus major muscle, and two bipolar Ag/AgCl electrodes 15 mm from one another on participants' right corrugator muscle. We also placed a common reference electrode on the forehead. Electrodes had a 2mm diameter contact area.

EMG recordings were retrieved at a sampling rate of 2000 Hz through a Biopac MP150 data acquisition unit. Signals were filtered online (10 Hz highpass filter, 500Hz lowpass filter) and offline (30 Hz – 500 Hz bandpass filter to remove movement artifacts and prevent aliasing, 50 Hz notch filter to remove power line interference; van Boxtel, 2010). Filtered signals were rectified and aggregated per second.

Power Analyses

We ran post-hoc power analyses on the effect sizes extracted from each highest-order interaction included in the main analyses. For each effect, 1000 Monte Carlo simulations for $\alpha = 0.05$ were run. Overall, power analyses indicated that the current sample size yielded sufficient power to detect the effect sizes that were found (Table S1).

Table S1
Post Hoc Power Analyses for Effect Sizes from Main Analyses

Analysis	Highest-Order Interaction	Observed Power
Children, zygomaticus activity	Condition*Time*Children's Narcissism	96.00%
Children, corrugator activity	Condition*Time*Children's Narcissism	93.70%
Parents, zygomaticus activity, Children's Narcissism	Condition*Time*Children's Narcissism	100%
Parents, corrugator activity, Children's Narcissism	Condition*Time	100%
Parents, zygomaticus activity, Parental Overvaluation	Condition*Time*Children's Narcissism	99.10%
Parents, corrugator activity, Parental Overvaluation	Condition*Time	100%
Parents, corrugator activity, Parental Overvaluation	Time*Parental Overvaluation	63.20%

Results Supplement

Preliminary Analyses

Random assignment was successful. There were no condition differences in children's age, $t(81) = -0.53, p = .595$, narcissism, $t(81) = 0.59, p = .556$, or sex/gender, $\chi^2(1) = 0.11, p = .741$, nor in parents' age, $t(81) = 1.05, p = .297$, parental overvaluation, $t(81) = 1.8, p = 0.08$, or parent's sex/gender, $\chi^2(1) = 0.29, p = .589$. Children's and parents' baseline muscle activity did not differ by condition, children's narcissism levels, or parental overvaluation levels.

Model Comparison

In main analyses, we computed p-values using the lmerTest package version 3.1.1 (Kuznetsova, Brockhoff, & Christensen, 2017). In Table S2 below, we present an alternative method of p-value computation, via model comparison. This approach yielded the same results.

Table S2
P-Values of Main Model Effects Estimated via Model Comparison

Fixed Effects	Zygomaticus Activity							Corrugator Activity Models						
	Df	AIC	BIC	LL	-2LL	χ^2	Sig.	Df	AIC	BIC	LL	-2LL	χ^2	Sig.
	Children, Child Narcissism Models													
Null Model	3	18336	18359	-9165	18330	-	-	3	-652.20	-629.30	329.10	-658.20	-	-
Time	4	18315	18346	-9154	18307	22.80	0.000	4	-1036.30	-1005.80	522.10	-1044.30	386.13	0.000
Time, Condition	5	18316	18354	-9153	18306	1.27	0.260	5	-1037.40	-999.40	523.70	-1047.40	3.15	0.076
Time, Condition, Narcissism	6	18318	18364	-9153	18306	0.02	0.891	6	-1035.70	-990.10	523.90	-1047.70	0.31	0.577
Time, Condition, Narcissism, Time*Condition	7	18318	18372	-9152	18304	1.88	0.170	7	-1102.00	-1048.70	558.00	-1116.00	68.24	0.000
Time, Condition, Narcissism, Time*Condition, Time*Narcissism ,	8	18306	18367	-9145	18290	13.89	0.000	8	-1161.90	-1101.00	588.90	-1177.90	61.92	0.000
Time, Condition, Narcissism, Time*Condition, Time*Narcissism ,	9	18308	18377	-9145	18290	0.12	0.725	9	-1160.50	-1092.00	589.30	-1178.50	0.61	0.433
Time, Condition, Narcissism, Condition*Narcissism	10	18296	18372	-9138	18276	14.19	0.000	10	-1170.70	-1094.60	595.30	-1190.70	12.18	0.000
Time, Condition, Narcissism, Time*Condition, Time*Narcissism ,								Parents, Child Narcissism Models						
Condition*Narcissism, Time*Condition*Narcissism														
Null Model	3	-11035	-11012	5521	-11041	-	-	3	3006	3029	-1500	3000	-	-
Time	4	-11035	-11004	5521	-11043	1.47	0.226	4	3007	3037	-1499	2999	1.36	0.243
Time, Condition	5	-11033	-10995	5522	-11043	0.62	0.433	5	3008	3047	-1499	2998	0.06	0.812
Time, Condition, Narcissism	6	-11031	-10986	5522	-11043	0.35	0.553	6	3010	3056	-1499	2998	0.01	0.937
Time, Condition, Narcissism, Time*Condition	7	-11034	-10980	5524	-11048	4.09	0.043	7	2857	2910	-1421	2843	155.62	0.000
Time, Condition, Narcissism, Time*Condition, Time*Narcissism ,	8	-11033	-10972	5524	-11049	1.28	0.259	8	2857	2918	-1421	2841	1.42	0.234

Continue

Continued

Fixed Effects	Zygomaticus Activity							Corrugator Activity Models						
	Df	AIC	BIC	LL	-2LL	χ^2	Sig.	Df	AIC	BIC	LL	-2LL	χ^2	Sig.
Time, Condition, Narcissism, Time*Condition, Time*Narcissism, Condition*Narcissism	9	-11031	-10962	5524	-11049	0.03	0.871	9	2859	2928	-1421	2841	0.19	0.660
Time, Condition, Narcissism, Time*Condition, Time*Narcissism, Condition*Narcissism, Time*Condition*Narcissism	10	-11064	-10988	5542	-11084	34.79	0.000	10	2860	2936	-1420	2840	1.16	0.282
Parents, Parental Overvaluation Models														
Null Model	3	-11035	-11012	5521	-11041	-	-	3	3006	3029	-1500	3000	-	-
Time	4	-11035	-11004	5521	-11043	1.47	0.226	4	3007	3037	-1499	2999	1.36	0.243
Time, Condition	5	-11033	-10995	5522	-11043	0.62	0.433	5	3008	3047	-1499	2998	0.06	0.812
Time, Condition, Overvaluation	6	-11031	-10986	5522	-11043	0.29	0.589	6	3010	3056	-1499	2998	0.01	0.924
Time, Condition, Narcissism, Time*Condition	7	-11034	-10980	5524	-11048	4.09	0.043	7	2857	2910	-1421	2843	155.62	0.000
Time, Condition, Overvaluation, Time*Condition, Time*Overvaluation ,	8	-11078	-11017	5547	-11094	46.69	0.000	8	2838	2899	-1411	2822	21.09	0.000
Time, Condition, Overvaluation, Time*Condition, Time*Overvaluation, Condition*Overvaluation	9	-11076	-11008	5547	-11094	0.23	0.634	9	2839	2908	-1411	2821	0.41	0.520
Time, Condition, Overvaluation, Time*Condition, Time*Overvaluation, Condition*Overvaluation, Time*Condition*Overvaluation	10	-11095	-11019	5558	-11115	20.91	0.000	10	2840	2916	-1410	2820	1.58	0.209

Note. Fixed effects in **bold** indicate the fixed effect added and tested for significance.

Children Robustness Analyses

Child Zygomaticus Activity

Results are presented in Table S3. Robustness analyses replicated the findings of main analyses.

There were no main effects of condition or narcissism. There was a main effect of time, with zygomaticus activity decreasing over time. There was a two-way interaction, with zygomaticus activity decreasing over time for higher levels of narcissism in children. There was a three-way interaction between condition, narcissism, and time, with zygomaticus activity increasing over time for children higher in narcissism in the high-status condition.

We broke the three-way interaction down by condition. In the low-status condition, there was a two-way interaction between time and narcissism, with zygomaticus activity decreasing more steeply for children with higher narcissism levels, $\beta = -.01$, $SE = .01$, $t(7149) = -2.53$, $p < .05$. Zygomaticus activity decreased more steeply over time for children with high ($M + 1SD$) narcissism levels, $\beta = -.03$, $SE = .01$, $p < .001$, than for children with low ($M - 1SD$) narcissism levels, $\beta = -.01$, $SE = .01$, $p = 0.02$. In the high-status condition, there was a two-way interaction between time and narcissism, with zygomaticus activity increasing more steeply for children with higher narcissism levels, $\beta = .03$, $SE = .01$, $t(6970) = 4.66$, $p < .001$. Zygomaticus activity remained stable for children with high ($M + 1SD$) narcissism levels, $\beta = .00$, $SE = .01$, $p = .53$, but decreased over time for children with low ($M - 1SD$) narcissism levels, $\beta = -.02$, $SE = .01$, $p < .001$. Together, these results show that children with higher levels of narcissism were inclined to smile decreasingly when losing status, but not when gaining status.

Child Corrugator Activity

Results are presented in Table S4. Robustness analyses replicated the findings of main analyses.

There were no main effects of condition or narcissism. There was a main effect of time, with corrugator activity increasing over time. There was a two-way interaction between time and narcissism, with corrugator activity increasing more steeply for children with higher narcissism levels. There was a three-way interaction between condition, narcissism, and time, with the increase of corrugator activity for children higher in narcissism being most pronounced in the high-status condition.

We broke the three-way interaction down by condition. In the low status condition, there was a two-way interaction between time and narcissism, with corrugator activity increasing more steeply for children with higher narcissism levels, $\beta = .01$, $SE < .01$, $t(6797) = 2.91$, $p < .01$. Corrugator activity increased more steeply for children with high ($M + 1SD$) narcissism levels, $\beta = .04$, $SE < .01$, $p < .001$, than for those with low ($M - 1SD$) narcissism levels, $\beta = .03$, $SE < .01$, $p < .001$. In the high-status condition, the effects of narcissism were similar but more

pronounced. There was a two-way interaction between time and narcissism, with corrugator activity increasing more steeply for children with higher narcissism levels, $\beta = .03$, $SE < .01$, $t(7024) = 9.32$, $p < .001$. Corrugator activity increased more steeply for children with high ($M + 1SD$) narcissism levels, $\beta = .07$, $SE < .01$, $p < .001$, than for those with low ($M - 1SD$) narcissism levels, $\beta = .02$, $SE < .01$, $p < .001$. Together, these results show that children with higher levels of narcissism were most inclined to frown increasingly, especially so when gaining status.

Parent Robustness Analyses

Parent Zygomaticus Activity, Children's Narcissism

Results are presented in Table S4. Robustness analyses replicated the findings of main analyses.

There were no main effects of children's narcissism or condition. There was a main effect of time, with zygomaticus activity decreasing over time. There was a two-way interaction between condition and time, with zygomaticus activity increasing over time in the high-status condition. There was two-way interaction between time and narcissism, with zygomaticus activity decreasing over time for higher levels of narcissism in children. Finally, there was a three-way interaction between condition, children's narcissism, and time, with zygomaticus activity increasing over time for parents of children with higher narcissism levels when children gained status.

We broke the 3-way interaction down by condition. In the low-status condition, there was a two-way interaction between time and children's narcissism, with zygomaticus activity decreasing for higher levels of children's narcissism, $\beta > -.01$, $SE < .01$, $t(7307) = 2.87$, $p < .01$. Zygomaticus activity decreased more for parents of children with high ($M + 1SD$) narcissism levels, $\beta = -.01$, $SE < .01$, $p < .001$, than for parents of children with low ($M - 1SD$) narcissism levels, $\beta = -.02$, $SE < .01$, $p < .001$. In the high-status condition, there was a two-way interaction between time and children's narcissism, with zygomaticus activity increasing for higher levels of children's narcissism, $\beta = .01$, $SE < .01$, $t(7321) = 4.26$, $p < .001$. Zygomaticus activity increased for parents of children with high ($M + 1SD$) narcissism, $\beta = .01$, $SE < .01$, $p < .001$, but it decreased for parents of children with low ($M - 1SD$) narcissism levels, $\beta = -.01$, $SE < .01$, $p = .01$. Together, these results show that parents of children with higher narcissism levels were most inclined to smile decreasingly when children lost status, but smiled increasingly when children gained status.

Parent Corrugator Activity, Children's Narcissism

Results are presented in Table S3. While children's narcissism did not moderate the effect of time on parents' corrugator activity in main analyses, it did so in robustness analyses.

There were no main effects of condition or children's narcissism. There was a main effect of time, with parents' corrugator activity decreasing over time. There was a two-way interaction between time and condition, with corrugator activity increasing over time in the high-status

condition. There was a two-way interaction between time and children's narcissism, with corrugator activity increasing over time for parents of children with higher narcissism levels. Finally, there was a three-way interaction between children's narcissism, condition, and time, with corrugator activity decreasing over time for parents of children with higher narcissism levels when children gained status. Thus, parents of children with higher narcissism levels were most inclined to frown decreasingly when children gained status.

We broke the three-way interaction down by condition. In the low-status condition, there was a two-way interaction between time and children's narcissism, with parents' corrugator activity increasing for higher narcissism levels in children, $\beta = .01$, $SE < .01$, $t(7337) = -12.04$, $p < .001$. Corrugator activity increased over time for parents of children with high ($M + 1SD$) narcissism levels, $\beta < .01$, $SE < .01$, $p < .001$, but decreased over time for parents of children with low ($M - 1SD$) narcissism levels, $\beta = -.01$, $SE < .01$, $p < .001$. In the high-status condition, there was no two-way interaction between time and children's narcissism. Together, the results of robustness analyses show that parents of children with higher narcissism levels were most inclined to frown increasingly, whereas parents of children with lower narcissism levels were most inclined to frown decreasingly, when children lost status. Robustness analyses thus replicated and extended the results yielded by main analyses.

Parent Zygomaticus Activity, Parental Overvaluation

Results are presented in Table S5. Robustness analyses replicated the findings of main analyses.

There were no main effects of condition or parental overvaluation. There was a main effect of time, with zygomaticus activity decreasing over time. There was a two-way interaction between condition and time, with zygomaticus activity increasing over time in the high-status condition. Finally, there was a three-way interaction between condition, parental overvaluation and time, with zygomaticus activity increasing over time for more overvaluing parents when children gained status. Thus, more overvaluing parents were inclined to smile increasingly when children gained status.

We broke the 3-way interaction down by condition. In the low-status condition, there was no two-way interaction between time and parental overvaluation. In the high-status condition, there was a two-way interaction between time and parental overvaluation, with zygomaticus activity increasing for higher levels of parental overvaluation, $\beta = .01$, $SE < .01$, $t(7321) = 9.29$, $p < .001$. Zygomaticus activity increased for parents of children with high ($M + 1SD$) parental overvaluation levels, $\beta = .01$, $SE < .01$, $p < .001$, but it decreased for parents with low ($M - 1SD$) parental overvaluation levels, $\beta = -.02$, $SE < .01$, $p < .001$. Together, these results show that overvaluing parents were most inclined to smile increasingly when children gained status.

Parent Corrugator Activity, Parental Overvaluation

Results are presented in Table S5. While parental overvaluation did not moderate the effect of time on parents' corrugator activity in main analyses, it did so in robustness analyses.

There were no main effects of condition or parental overvaluation. There was a main effect of time, with parents' corrugator activity decreasing over time. There was a two-way interaction between time and condition, with corrugator activity increasing over time in the high-status condition. There was a two-way interaction between time and parental overvaluation, with corrugator activity increasing over time for more overvaluing parents. Finally, there was a three-way interaction between parental overvaluation, condition, and time, with corrugator activity decreasing over time for more overvaluing parents when children gained status. Thus, parents who overvalued their children more were most inclined to frown decreasingly when children gained status.

We broke the three-way interaction down by condition. In the low-status condition, there was a two-way interaction between time and parental overvaluation, with parents' corrugator activity increasing for higher levels of parental overvaluation, $\beta < .01$, $SE < .01$, $t(7337) = 5.77$, $p < .001$. Corrugator activity remained stable for parents with high ($M + 1SD$) parental overvaluation levels, $\beta = .00$, $SE = .00$, $p = .20$, but decreased over time for parents with low ($M - 1SD$) parental overvaluation levels, $\beta = -.01$, $SE < .01$, $p < .001$. In the high-status condition, there was a two-way interaction between time and parental overvaluation, with parents' corrugator activity decreasing for higher levels of parental overvaluation, $\beta > -.01$, $SE < .01$, $t(7158) = 2.52$, $p < .05$. Corrugator activity remained stable for parents with high ($M + 1SD$) parental overvaluation levels, $\beta = .00$, $SE = .00$, $p = .13$, but increased over time for parents with low ($M - 1SD$) parental overvaluation levels, $\beta < .01$, $SE < .01$, $p < .001$. Together, the results of robustness analyses show that less overvaluing parents were most inclined to frown decreasingly when children lost status and more inclined to frown increasingly when children gained status. By contrast, overvaluing parents did not exhibit changes in frowning over time in any of the conditions.

Table S3

Robustness Analyses of Children's Winsorized Muscle Activity Predicted by Condition, Time, and Children's Narcissism Levels

Fixed Effects	Zygomaticus Activity			Corrugator Activity		
	β	$SE(\beta)$	t	β	$SE(\beta)$	t
Intercept	-.05	.10	-0.48	-.08	.08	-0.96
Condition	-.11	.14	-0.82	-.19	.12	-1.61
Time	-.02	.00	-5.39***	.04	.00	14.94***
Narcissism	.07	.09	0.72	.05	.08	0.66
Condition*Time	.00	.00	0.92	.01	.00	1.63
Narcissism*Condition	.00	.15	0.02	-.03	.12	-0.28
Time*Narcissism	-.01	.00	-2.51*	.01	.00	2.83**
Condition*Time*Narcissism	.02	.00	3.83***	.02	.00	5.40***

Note. Condition was dummy coded with "0" for Low Status and "1" for High Status.

* $p < .05$ ** $p < .01$ *** $p < .001$, p values calculated using Satterthwaite degrees of freedom.

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Table S4

Robustness Analyses of Parents' Winsorized Muscle Activity Predicted by Condition, Time, and Children's Narcissism Levels

Fixed Effects	Zygomaticus Activity			Corrugator Activity		
	β	$SE(\beta)$	t	β	$SE(\beta)$	t
Intercept	-.11	.06	-1.88	-.14	.03	-4.77***
Condition	.03	.09	0.39	-.02	.04	-0.46
Time	-.01	.00	-8.19***	-.03	.00	-4.57***
Narcissism	.04	.06	0.66	-.01	.03	-0.27
Condition*Time	.01	.00	6.16***	.01	.00	6.01***
Narcissism*Condition	-.12	.09	-1.40	-.02	.04	-0.45
Time*Narcissism	-.00	.00	-3.01**	.01	.00	12.19***
Condition*Time*Narcissism	.01	.00	5.02***	-.01	.00	-8.46***

Note. Condition was dummy coded with "0" for Low Status and "1" for High Status.

* $p < .05$ ** $p < .01$ *** $p < .001$, p values calculated using Satterthwaite degrees of freedom.

Table S5

Robustness Analyses of Parents' Winsorized Muscle Activity Predicted by Condition, Time, and Parental Overvaluation Levels

Fixed Effects	Zygomaticus Activity			Corrugator Activity		
	β	SE (β)	t	β	SE (β)	t
Intercept	-.12	0.06	-2.00*	-.13	.03	-4.57***
Condition	.06	.09	0.67	-.02	.04	-0.64
Time	-.01	.00	-8.06***	-.00	.00	-4.06***
Overvaluation	-.03	.06	-0.50	.01	.03	0.43
Condition*Time	.01	.00	5.04***	.01	.00	5.91***
Overvaluation*Condition	-.08	.09	-0.88	.00	.04	0.05
Time*Overvaluation	-.01	.00	-0.77	.00	.00	5.86***
Condition*Time*Overvaluation	.02	.00	6.59***	-.01	.00	-5.96***

Note. Condition was dummy coded with "0" for Low Status and "1" for High Status.

* $p < .05$ ** $p < .01$ *** $p < .001$, p values calculated using Satterthwaite degrees of freedom.

Children Narcissistic Admiration and Rivalry Analyses

Children also completed our adaptation for children of the six-item Narcissistic Admiration and Rivalry Questionnaire–Short form (NARQ-S; Back et al., 2013). The questionnaire measures, with three items each, an agentic narcissistic dimension termed *narcissistic admiration*, and an antagonistic narcissistic dimension termed *narcissistic rivalry*. The full scale can be found in the Supplementary Appendix A, below. Sample items include: “I enjoy thinking about how special I am” (admiration), and “If other children try to be better than me, I want them to fail” (rivalry). Items were rated on 4-point scales (0 = not agree at all, to 3 = agree completely). Responses were separately averaged across items for admiration ($M = 0.78$, $SD = 0.47$, $\alpha = .60$) and rivalry ($M = 0.67$, $SD = 0.57$, $\alpha = .64$), and jointly for the total scale ($M = 0.89$, $SD = 0.63$, $\alpha = .62$). Admiration and rivalry were weakly, positively associated ($r = .22$, $p = .05$). As the scale has not been validated before in children, we refrained from including it in main analyses. We nevertheless repeated analyses with this instrument, to provide some first insights on how narcissistic admiration and rivalry moderate children’s affective responses to status gain and loss.

Preliminary Analyses

Correlations with main variables

Childhood narcissism measured by the CNS was highly associated with admiration ($r = .62$, $p < .001$) and the total NARQ-S score ($r = .60$, $p = .001$), and moderately associated with rivalry ($r = .31$, $p < .05$). Parental overvaluation was not significantly associated with any of the NARQ-S narcissism indicators.

Random Assignment

There were no condition differences in children’s admiration, $t(81) = 0.10$, $p = .90$, rivalry, $t(81) = 0.90$, $p = .40$, or total admiration and rivalry score, $t(81) = 0.61$, $p = .50$. Children’s corrugator and zygomaticus activity during the baseline did not differ by children’s admiration levels. However, children’s corrugator activity during the baseline differed by narcissistic rivalry, with higher overall corrugator activity for children higher in rivalry, $\beta = .71$, $SE = .18$, $t(83) = 3.93$, $p < .001$, and lower overall corrugator activity for children higher in rivalry when children would gain status, $\beta = -.63$, $SE = .21$, $t(83) = -2.93$, $p < .01$. Breakdown by condition revealed a positive effect of rivalry in low status, $\beta = .71$, $SE = .22$, $t(42) = 3.25$, $p < .01$, but no effect of rivalry in high status. Likewise, corrugator activity differed by total narcissistic admiration and rivalry scores, with higher overall corrugator activity for children higher in rivalry, $\beta = .46$, $SE = .16$, $t(83) = 2.80$, $p < .01$, and lower overall corrugator activity for children higher in rivalry when children would gain status, $\beta = -.49$, $SE = .21$, $t(83) = -2.32$, $p < .01$. Breakdown by condition revealed a positive effect of rivalry in low status, $\beta = .46$, $SE = .20$, $t(42) = 2.29$, $p = .03$, but no effect of rivalry in high status. When analyzing the effect of narcissistic rivalry and the effect of total admiration and rivalry on children’s corrugator

activity during the popularity game, we controlled for baseline corrugator activity to take into account these preexisting baseline differences.

Children Narcissistic Admiration Analyses

Child Zygomaticus Activity

Results are presented in Table S6. There were no main effects of condition or narcissistic admiration. There was a main effect of time, with zygomaticus activity decreasing over time. There were no two-way interactions. There was a three-way interaction between condition, time, and narcissistic admiration, with zygomaticus activity increasing over time for children higher in narcissistic admiration when children gained status.

We broke the three-way interaction down by condition. In the low-status condition, there was no two-way interaction between time and narcissistic admiration. In the high-status condition, there was an interaction between narcissistic admiration and time, with zygomaticus activity increasing over time for children higher in narcissistic admiration, $\beta = .01$, $SE = .01$, $t(7337) = 2.37$, $p < .05$. Zygomaticus activity remained stable for children with high ($M + 1SD$) narcissistic admiration levels, $\beta = .00$, $SE = .01$, $p = .98$, but decreased over time for children with low ($M - 1SD$) narcissistic admiration levels, $\beta = -.02$, $SE = .01$, $p < .001$. Together, these results show that only children low in narcissistic admiration were inclined to smile decreasingly when gaining status.

Child Corrugator Activity

Results are presented in Table S6. There were no effects of condition or narcissistic admiration. There was a main effect of time, with corrugator activity increasing over time. There was a two-way interaction between time and condition, with corrugator activity increasing more steeply in the high-status condition. There was a two-way interaction between time and narcissism, with corrugator activity increasing more steeply for children with higher narcissistic admiration levels. Thus, children with higher levels of narcissistic admiration were inclined to frown increasingly, both when losing, and when gaining status.

Children Narcissistic Rivalry Analyses

Child Zygomaticus Activity

Results are presented in Table S7. There was no main effect of condition or narcissistic rivalry. There was a main effect of time, with zygomaticus activity decreasing over time. There was a two-way interaction between time and narcissistic rivalry, with zygomaticus activity decreasing more steeply for children higher in narcissistic rivalry. There was a three-way interaction between condition, time, and narcissistic rivalry, with zygomaticus activity increasing over time for children higher in narcissistic rivalry when children gained status.

We broke the 3-way interaction down by condition. In the low-status condition, there was a two-way interaction between time and narcissistic rivalry, with zygomaticus activity decreasing more steeply for children with higher narcissistic rivalry levels, $\beta = -.03$, $SE = .01$, $t(7516) = -5.46$, $p < .001$. Zygomaticus activity decreased over time for children with high ($M + 1SD$) narcissistic rivalry levels, $\beta = -.06$, $SE = .01$, $p < .001$, but it remained stable for children with low ($M - 1SD$) narcissistic rivalry levels, $\beta = .01$, $SE < .01$, $p = 0.25$. In the high-status condition, there was a two-way interaction between time and narcissistic rivalry, with zygomaticus activity increasing for children with higher narcissistic rivalry levels, $\beta = .01$, $SE < .01$, $t(7337) = 2.02$, $p = .04$. Zygomaticus activity remained stable over time for children with high ($M + 1SD$) narcissistic rivalry levels, $\beta = .00$, $SE = .01$, $p < .54$, but decreased over time for children with low ($M - 1SD$) narcissistic rivalry levels, $\beta = -.02$, $SE = .01$, $p < 0.001$. Together, these results show that children with high levels of rivalry were inclined to smile decreasingly when losing status, whereas children with low levels of rivalry were inclined to smile decreasingly when gaining status.

Child Corrugator Activity

Results are presented in Table S7. There was a main effect of condition, with corrugator activity being lower in the high-status condition. There was a main effect of time, with corrugator activity increasing over time. There was a two-way interaction between condition and time, with corrugator activity increasing more steeply in the high-status condition. There was a two-way interaction between time and narcissistic rivalry, with corrugator activity decreasing over time for children higher in narcissistic rivalry. There was a three-way interaction between condition, time, and narcissistic rivalry, with corrugator activity increasing over time for children higher in narcissistic rivalry when children gained status.

We broke the 3-way interaction down by condition. In the low-status condition, there was a two-way interaction between time and narcissistic rivalry, with corrugator activity decreasing over time for children with higher narcissistic rivalry levels, $\beta = -.02$, $SE < .01$, $t(7516) = -5.85$, $p < .001$. Corrugator activity remained stable for children with high ($M + 1SD$) narcissistic rivalry levels, $\beta = .00$, $SE < .01$, $p = .91$, but it increased over time for children with low ($M - 1SD$) narcissistic rivalry levels, $\beta = .04$, $SE < .01$, $p < .001$. In the high-status condition, there was no two-way interaction between time and narcissistic rivalry. Together, these results show that only the children with low rivalry were most inclined to frown increasingly when losing status.

Children Narcissistic Admiration and Rivalry Total Score Analyses

Child Zygomaticus Activity

Results are presented in Table S8. There were no main effects of condition or narcissism. There was a main effect of time, with zygomaticus activity decreasing over time. There was a two-way interaction between time and narcissism, with zygomaticus activity decreasing over time for children higher in narcissism. There was a three-way interaction between condition,

narcissism, and time, with zygomaticus activity increasing over time for children higher in narcissism in the high-status condition.

We broke the three-way interaction down by condition. In the low-status condition, there was a two-way interaction between time and narcissism, with zygomaticus activity decreasing over time for children higher in narcissism, $\beta = -.02$, $SE = .01$, $t(7516) = -3.86$, $p < .001$. Zygomaticus activity decreased over time for children with high ($M + 1SD$) narcissism levels, $\beta = -.04$, $SE = .01$, $p < .001$, but remained stable over time for children with low ($M - 1SD$) narcissism levels, $\beta = -.00$, $SE = .01$, $p = .75$. In the high-status condition, there was a two-way interaction between time and narcissism, with zygomaticus activity increasing for children with higher narcissism levels, $\beta = .01$, $SE < .01$, $t(7337) = 2.77$, $p = .01$. Zygomaticus activity remained stable over time for children with high ($M + 1SD$) narcissism levels, $\beta = .00$, $SE = .01$, $p = .96$, but decreased over time for children with low ($M - 1SD$) narcissism levels, $\beta = -.03$, $SE = .01$, $p < .001$. Together, these results show that children with higher narcissism levels were most inclined to smile decreasingly when losing status, but not when gaining status.

Child Corrugator Activity

Results are presented in Table S8. There was a main effect of condition, with corrugator activity being lower in the high-status condition. There was a main effect of time with corrugator activity increasing over time. There was a two-way interaction between time and condition, with corrugator activity increasing over time in the high-status condition. There was a three-way interaction between condition, time, and narcissism, with corrugator activity increasing over time for children with higher narcissism levels in the high-status condition.

We broke the three-way interaction down by condition. In the low-status condition, the interaction between narcissism and time was insignificant. In the high-status condition, there was a two-way interaction between time and narcissism, with corrugator activity increasing over time for children with higher narcissism levels, $\beta = .01$, $SE < .01$, $t(7337) = 3.79$, $p < .001$. Corrugator activity increased more steeply for children with high ($M + 1SD$) narcissism levels, $\beta = .06$, $SE < .01$, $p < .001$, than for those with low ($M - 1SD$) narcissism levels, $\beta = .04$, $SE < .01$, $p < .001$. Together, these results show that children with higher narcissism levels were most inclined to frown increasingly when gaining status.

Children Narcissistic Admiration Robustness Analyses

Child Zygomaticus Activity

Results are presented in Table S9. Findings from robustness analyses differed from findings of main analyses.

There were no main effects of condition or narcissistic admiration. There was a main effect of time, with zygomaticus activity decreasing over time. There were no two-way or three-way

interactions. Thus, robustness analyses did not replicate findings from main analyses, showing no effect of narcissistic admiration on children's zygomaticus activity.

Child Corrugator Activity

Results are presented in Table S9. Findings from robustness analyses replicated findings from main analyses.

There were no main effects of condition or narcissistic admiration. There was a main effect of time, with corrugator activity increasing over time. There was a two-way interaction between time and condition, with corrugator activity increasing over time in the high-status condition. There was a two-way interaction between time and narcissistic admiration, with corrugator activity increasing over time for children with higher levels of narcissistic admiration. Thus, children with higher levels of narcissistic admiration were inclined to frown increasingly, both when losing, and when gaining status.

Children Narcissistic Rivalry Robustness Analyses

Child Zygomaticus Activity

Results are presented in Table S10. Findings from robustness analyses replicated findings of main analyses.

There was no main effect of condition or narcissistic rivalry. There was a main effect of time, with zygomaticus activity decreasing over time. There was a two-way interaction between time and narcissistic rivalry, with zygomaticus activity decreasing more steeply for children higher in narcissistic rivalry. There was a three-way interaction between condition, time, and narcissistic rivalry, with zygomaticus activity increasing over time for children higher in narcissistic rivalry when children gained status.

We broke the three-way interaction down by condition. In the low-status condition, there was a two-way interaction between time and narcissistic rivalry, with zygomaticus activity decreasing more steeply for children with higher narcissistic rivalry levels, $\beta = -.03$, $SE < .01$, $t(7149) = -7.29$, $p < .001$. Zygomaticus activity decreased over time for children with high ($M + 1SD$) narcissistic rivalry levels, $\beta = -.05$, $SE = .01$, $p < .001$, but increased over time for children with low ($M - 1SD$) narcissistic rivalry levels, $\beta = .01$, $SE < .01$, $p = 0.04$. In the high-status condition, there was a two-way interaction between time and narcissistic rivalry, with zygomaticus activity increasing for children with higher narcissistic rivalry levels, $\beta = .01$, $SE < .01$, $t(7192) = 3.82$, $p < .001$. Zygomaticus activity remained stable over time for children with high ($M + 1SD$) narcissistic rivalry levels, $\beta = .00$, $SE < .01$, $p = .44$, but decreased over time for children with low ($M - 1SD$) narcissistic rivalry levels, $\beta = -.03$, $SE < .01$, $p < .001$. Together, these results show that children with high levels of rivalry were inclined to smile decreasingly when losing status, whereas children with low levels of rivalry were inclined to smile decreasingly when gaining status.

Child Corrugator Activity

Results are presented in Table S10. Findings from robustness analyses differed from findings of main analyses.

There was a main effect of condition, with corrugator activity being lower in the high-status condition. There was a main effect of time, with corrugator activity increasing over time. There were no two-way or three-way interactions. Thus, robustness analyses did not replicate findings from main analyses, showing no effect of narcissistic rivalry on children's zygomaticus activity.

Children Narcissistic Admiration and Rivalry Total Score Robustness Analyses***Child Zygomaticus Activity***

Results are presented in Table S11. Findings from robustness analyses replicated findings from main analyses.

There were no main effects of condition or narcissism. There was a main effect of time, with zygomaticus activity decreasing over time. There was a two-way interaction between time and narcissism, with zygomaticus activity decreasing over time for children higher in narcissism. There was a three-way interaction between condition, narcissism, and time, with zygomaticus activity increasing over time for children higher in narcissism in the high-status condition.

We broke the three-way interaction down by condition. In the low-status condition, there was a two-way interaction between time and narcissism, with zygomaticus activity decreasing over time for children higher in narcissism, $\beta = -.01$, $SE < .01$, $t(7149) = -3.59$, $p < .001$. Zygomaticus activity decreased over time for children with high ($M + 1SD$) narcissism levels, $\beta = -.03$, $SE = .01$, $p < .001$, but remained stable over time for children with low ($M - 1SD$) narcissism levels, $\beta = -.01$, $SE < .01$, $p = .31$. In the high-status condition, there was a two-way interaction between time and narcissism, with zygomaticus activity increasing for children with higher narcissism levels, $\beta = .01$, $SE = .01$, $t(6970) = 2.95$, $p < .01$. Zygomaticus activity remained stable over time for children with high ($M + 1SD$) narcissism levels, $\beta = -.01$, $SE < .01$, $p = .15$, but decreased over time for children with low ($M - 1SD$) narcissism levels, $\beta = -.02$, $SE < .01$, $p < .001$. Together, these results show that children with higher narcissism levels were most inclined to smile decreasingly when losing status, but not when gaining status.

Child Corrugator Activity

Results are presented in Table S11. Findings from robustness analyses on the conditional effect of narcissism partly differed from findings of main analyses, showing higher increase in corrugator activity over time in the low status condition for children with higher narcissism levels.

There was a main effect of condition, with corrugator activity being lower in the high-status condition. There was a main effect of time, with corrugator activity increasing over time. There was a two-way interaction between time and condition, with corrugator activity increasing over time in the high-status condition. There was a three-way interaction between condition, time, and narcissism, with corrugator activity decreasing over time for children with higher narcissism levels in the high-status condition.

We broke the three-way interaction down by condition. In the low-status condition, there was a two-way interaction between time and narcissism, with corrugator activity increasing over time for children with higher narcissism levels, $\beta = .02$, $SE < .01$, $t(6799) = 5.93$, $p < .001$. Corrugator activity increased more steeply for children with high ($M + 1SD$) narcissism levels, $\beta = .06$, $SE < .01$, $p < .001$, than for those with low ($M - 1SD$) narcissism levels, $\beta = .02$, $SE < .01$, $p < .001$. In the high-status condition, there was a two-way interaction between time and narcissism, with corrugator activity increasing over time for children with higher narcissism levels, $\beta = .01$, $SE < .01$, $t(7025) = 3.34$, $p < .001$. Corrugator activity increased more steeply for children with high ($M + 1SD$) narcissism levels, $\beta = .05$, $SE < .01$, $p < .001$, than for those with low ($M - 1SD$) narcissism levels, $\beta = .04$, $SE < .01$, $p < .001$. Together, these results show that children with higher narcissism levels were most inclined to frown increasingly, and especially so when losing status.

Integrative Discussion of Findings From CNS and NARQ

Our supplementary analyses parse narcissism into narcissistic admiration and rivalry. Children with higher levels of narcissistic admiration most strongly mirrored children with higher levels of CNS narcissism on corrugator activity: they frowned increasingly when both gaining and losing status. Thus, these children seemed to experience stress during status pursuit, regardless of whether this pursuit was successful or unsuccessful. By contrast, children with higher levels of narcissistic rivalry most strongly mirrored children with higher levels of CNS narcissism on zygomaticus activity: they increasingly smiled when gaining status. Given that narcissistic rivalry represents the antagonistic dimension of narcissism (Back et al., 2013; Grapsas, Brummelman, Back, & Denissen, 2020). This finding suggests that children with higher levels of narcissistic rivalry possibly enjoyed their status supremacy over their competitors.

Table S6

Analyses of Children's Winsorized Muscle Activity Predicted by Condition, Time, and Children's Narcissistic Admiration Levels

Fixed Effects	Zygomaticus Activity			Corrugator Activity		
	β	<i>SE</i> (β)	<i>t</i>	β	<i>SE</i> (β)	<i>t</i>
Intercept	.11	.14	0.79	.19	.16	1.28
Condition	-.22	.20	-1.13	-.38	.21	-1.81
Time	-.02	.01	-4.38***	.02	.00	8.34***
Admiration	-.05	.14	-0.36	.17	.15	1.14
Condition*Time	.01	.01	-1.36	.03	.00	8.22***
Admiration *Condition	.04	.20	0.20	-.27	.21	-1.31
Time*Admiration	-.01	.01	-1.22	.01	.00	3.49***
Condition*Time*Admiration	.02	.01	2.62**	.00	.00	0.54

Note. Condition was dummy coded with "0" for Low Status and "1" for High Status.

* $p < .05$ ** $p < .01$ *** $p < .001$, p values calculated using Satterthwaite degrees of freedom.

Table S7

Analyses of Children's Winsorized Muscle Activity Predicted by Condition, Time, and Children's Narcissistic Rivalry Levels

Fixed Effects	Zygomaticus Activity			Corrugator Activity		
	β	<i>SE</i> (β)	<i>t</i>	β	<i>SE</i> (β)	<i>t</i>
Intercept	.12	.14	0.86	.07	.04	1.48
Condition	-.24	.20	-1.22	-.13	.07	-2.04*
Time	-.03	.01	-5.00***	.02	.00	7.47***
Rivalry	.10	.18	0.53	.06	.06	0.96
Condition*Time	.01	.01	1.71	.03	.00	8.66***
Rivalry*Condition	-.01	.22	-0.06	-.04	.07	-0.53
Time*Rivalry	-.03	.01	-5.16***	-.02	.00	-5.86***
Condition*Time*Rivalry	.04	.01	5.49***	.02	.00	5.85***

Note. Condition was dummy coded with "0" for Low Status and "1" for High Status. Corrugator analyses control for baseline corrugator activity.

* $p < .05$ ** $p < .01$ *** $p < .001$, p values calculated using Satterthwaite degrees of freedom.

Table S8

Analyses of Children's Winsorized Muscle Activity Predicted by Condition, Time, and Children's Narcissistic Admiration and Rivalry (NARQ) Levels

Fixed Effects	Zygomaticus Activity			Corrugator Activity		
	β	$SE(\beta)$	t	β	$SE(\beta)$	t
Intercept	.11	.14	0.79	.06	.05	1.41
Condition	-.23	.20	-1.15	-.13	.07	-1.99*
Time	-.02	.01	-4.63***	.02	.00	8.23***
NARQ	.00	.16	0.00	.05	.05	0.87
Condition*Time	.01	.01	1.44	.03	.00	8.11***
NARQ*Condition	.05	.20	9.25	-.01	.07	-0.17
Time*NARQ	-.02	.01	-3.64***	-.00	.00	-0.46
Condition*Time*NARQ	.03	.01	4.67***	.01	.00	2.71**

Note. Condition was dummy coded with "0" for Low Status and "1" for High Status. Corrugator analyses control for baseline corrugator activity.

* $p < .05$ ** $p < .01$ *** $p < .001$, p values calculated using Satterthwaite degrees of freedom.

Table S9

Robustness Analyses of Children's Winsorized Muscle Activity Predicted by Condition, Time, and Children's Narcissistic Admiration Levels

Fixed Effects	Zygomaticus Activity			Corrugator Activity		
	β	$SE(\beta)$	t	β	$SE(\beta)$	t
Intercept	-.05	.10	-0.53	-.09	.08	-1.03
Condition	-.11	.14	-0.75	-.18	.12	-1.54
Time	-.02	.00	-5.27***	.04	.00	15.08***
Admiration	-.10	.10	-0.97	-.03	.09	-0.36
Condition*Time	.00	.00	0.98	.01	.00	2.00*
Admiration*Condition	.08	.14	0.56	.02	.12	0.17
Time*Admiration	.00	.00	0.33	.02	.00	6.09***
Condition*Time*Admiration	-.00	.00	-0.33	-.00	.00	-0.73

Note. Condition was dummy coded with "0" for Low Status and "1" for High Status.

* $p < .05$ ** $p < .01$ *** $p < .001$, p values calculated using Satterthwaite degrees of freedom.

Table S10

Robustness Analyses of Children's Winsorized Muscle Activity Predicted by Condition, Time, and Children's Narcissistic Rivalry Levels

Fixed Effects	Zygomaticus Activity			Corrugator Activity		
	β	SE (β)	<i>t</i>	β	SE (β)	<i>t</i>
Intercept	-.05	.10	-0.47	-.96	.08	-12.01***
Condition	-.12	.14	-0.84	-.14	.06	-2.32*
Time	-.02	.00	-6.29***	.04	.00	14.56***
Rivalry	.03	.13	0.26	.04	.06	0.62
Condition*Time	.01	.00	1.53	.01	.00	1.95
Rivalry*Condition	.04	.16	0.25	-.02	.07	-0.22
Time*Rivalry	-.03	.00	-7.22***	.01	.00	1.86
Condition*Time*Rivalry	.04	.01	8.16***	-.01	.00	-1.42

Note. Condition was dummy coded with "0" for Low Status and "1" for High Status.

Corrugator analyses control for baseline corrugator activity.

* $p < .05$ ** $p < .01$ *** $p < .001$, p values calculated using Satterthwaite degrees of freedom.

Table S11

Robustness Analyses of Children's Winsorized Muscle Activity Predicted by Condition, Time, and Children's Narcissistic Admiration and Rivalry (NARQ) Levels

Fixed Effects	Zygomaticus Activity			Corrugator Activity		
	β	SE (β)	<i>t</i>	β	SE (β)	<i>t</i>
Intercept	-.06	.10	-0.56	.04	.04	0.89
Condition	-.11	.14	-0.75	-.14	.06	-2.31*
Time	-.02	.00	-5.55***	.04	.00	15.57***
NARQ	-.07	.12	-0.59	.03	.05	.054
Condition*Time	.01	.00	1.10	.01	.00	1.42
NARQ*Condition	.11	.15	0.74	.01	.06	.015
Time*NARQ	-.01	.00	-3.56***	.02	.00	5.77***
Condition*Time*NARQ	.02	.00	4.28***	-.01	.00	-2.60**

Note. Condition was dummy coded with "0" for Low Status and "1" for High Status.

Corrugator analyses control for baseline corrugator activity.

* $p < .05$ ** $p < .01$ *** $p < .001$, p values calculated using Satterthwaite degrees of freedom.

Children's Self-Esteem Analyses

To examine the specificity of our findings, we included self-esteem in our study. Developmental research shows that narcissism and self-esteem are modestly associated because they both involve favorable self-views, but they are also distinct because the quality of the favorable self-views they involve differs (Brummelman & Sedikides, 2020; Brummelman, Thomaes, & Sedikides, 2016). Narcissism reflects a sense of superiority and entitlement, whereas self-esteem reflects a sense of worth as a person. Whereas narcissism increases risk for psychopathology (e.g., conduct problems), self-esteem protects against it (e.g., lower anxiety and depression; Harris, Donnellan, & Trzesniewski, 2018). To test the specificity of findings in children, we repeated narcissism analyses controlling for their self-esteem levels, and then we conducted with self-esteem the same analyses we conducted with narcissism.

Measure of Self-Esteem

We measured self-esteem with the four-item Lifespan Self-Esteem Scale (LSES; Harris et al., 2018). Sample items include: "How do you feel about yourself?", and "How do you feel about the kind of person you are?". Items were rated on 5-point scales (1 = Really sad, to 5 = Really Happy), with each response option accompanied by an illustration of the corresponding feeling (e.g., Really Sad is illustrated with a crying face, Really Happy is illustrated with an open-mouthed smile). Responses were averaged across items ($M = 4.06$, $SD = 0.58$, Cronbach's $\alpha = .80$). Like with narcissism, for multilevel analyses, we z-standardized self-esteem scores.

Correlation With Children's Narcissism

Supporting their conceptual distinction, narcissism and self-esteem were only modestly positively correlated in our final sample, $r(81) = .24$, $p = .029$.

Narcissism Analyses Controlling for Self-Esteem

We repeated analyses on the effect of children's narcissism on their muscle activity while controlling for children's self-esteem levels. Results remained virtually unchanged, and this was also confirmed by the lack of significant differences between the models with and without self-esteem as a covariate (zygomaticus $\chi^2(1) = 0.28$, $p = .600$; corrugator $\chi^2(1) = 0.04$, $p = .833$). For parsimony, we omit the full presentation of these results.

Effects of Children's Self-Esteem on Muscle Activity

We conducted in children the same analyses for self-esteem that we conducted for narcissism. Results are presented in Table S12.

Child Zygomaticus Activity

Zygomaticus activity analyses for self-esteem mirrored those of narcissism. There was a main effect of time, with zygomaticus activity decreasing over the course of the experiment. There

were no two-way interactions, but there was a three-way interaction between condition, time, and self-esteem.

We broke the three-way interaction down by condition. In the low-status condition, there was no interaction between time and self-esteem. In the high-status condition, however, there was a significant two-way interaction between time and self-esteem, $\beta = .03$, $SE = .01$, $t(7339) = 5.60$, $p < .001$. Zygomaticus activity increased over time for children with high ($M + 1SD$) self-esteem, $\beta = .02$, $SE = .01$, $p = .02$, but decreased over time for children with low ($M - 1SD$) self-esteem, $\beta = -.05$, $SE = .01$, $p < .001$. Thus, like children with high narcissism, children with high self-esteem increasingly smiled when gaining status. Like children with low narcissism, children with low self-esteem decreasingly smiled when gaining status.

Child Corrugator Activity

Corrugator activity analyses for self-esteem mirrored those of narcissism when children gained status but were opposite when children lost status. There was a main effect of time, with corrugator activity increasing over time. There were two-way interactions between time and condition, as well as between time and self-esteem. These interactions, however, were qualified by a three-way interaction between time, condition, and self-esteem.

We broke down the three-way interaction by condition. In the low status condition, there was a significant two-way interaction between time and self-esteem, $\beta = -.01$, $SE < .01$, $t(7518) = -2.77$, $p = .006$. Corrugator activity increased less steeply for children with high ($M + 1SD$) self-esteem, $\beta = .01$, $SE < .01$, $p < .001$, than for children with low ($M - 1SD$) self-esteem $\beta = .03$, $SE < .01$, $p < .001$. In the high-status condition, there was also a significant two-way interaction between time and self-esteem, $\beta = .01$, $SE < .01$, $t(7339) = 4.40$, $p < .001$. Corrugator activity increased more steeply for children with high ($M + 1SD$) self-esteem, $\beta = .06$, $SE < .01$, $p < .001$, than for children with low ($M - 1SD$) self-esteem $\beta = .04$, $SE < .01$, $p < .001$. Thus, like children with high narcissism, children with high self-esteem increasingly smiled when gaining status. However, unlike children with high narcissism, children with high self-esteem smiled less when gaining status.

Discussion of Self-Esteem Analyses

The results from self-esteem analyses showed that effects of narcissism on muscle activity were not owed to children's self-esteem levels. Furthermore, they showed that narcissism and self-esteem have partly similar and partly different effects on children's muscle activity. When gaining status, children with higher self-esteem seemed to experience the more intense mixture of positive and negative affect experienced by children with high narcissism. By contrast, when losing status, children with lower self-esteem seemed to experience the more intense negative affect experienced by children with higher narcissism levels. These results show that, unlike narcissism, children's self-esteem protects them from the negative

impact of status loss, but is, like narcissism, responsible, for children's heightened affective ambivalence during status gain. The results also suggest that the overall pattern of findings attributed to narcissism seems distinct, and thus not owed to an underlying transdiagnostic, pathological trait.

Table S12

Analyses of Children's Winsorized Muscle Activity Predicted by Condition, Time, and Children's Self-Esteem Levels

Fixed Effects	Zygomaticus Activity			Corrugator Activity		
	β	<i>SE</i> (β)	<i>t</i>	β	<i>SE</i> (β)	<i>t</i>
Intercept	0.10	0.14	0.73	0.18	0.15	1.21
Condition	-0.21	0.20	-1.03	-0.39	0.21	-1.86
Time	-0.02	0.01	-4.18***	0.02	0.00	7.77***
Self-Esteem	-0.05	0.13	-0.36	-0.04	0.14	-0.29
Condition*Time	0.00	0.01	0.48	0.03	0.00	7.88***
Condition*Self-Esteem	0.00	0.20	-0.02	0.19	0.21	0.87
Time* Self-Esteem	0.00	0.00	0.87	-0.01	0.00	-2.78***
Condition*Time* Self-Esteem	0.03	0.01	3.96***	0.02	0.00	5.15***

Note. Condition was dummy coded with "0" for Low Status and "1" for High Status.

* $p < .05$ ** $p < .01$ *** $p < .001$, p values calculated using Satterthwaite degrees of freedom.

Children's Affective Synchrony Analyses

When gaining status, narcissism in children was related to increases in both frowning and smiling. To investigate whether these increases were synchronous (i.e., if children with higher narcissism simultaneously experienced increases in positive and negative affect), we regressed children's zygomaticus activity on corrugator activity, condition, narcissism, and all their possible interactions (controlling for baseline zygomaticus activity).

Results are presented in Table S13. There was a positive effect of baseline, but no effects of condition, corrugator activity, or narcissism. There was a two-way interaction between corrugator activity and condition. However, this was qualified by a three-way interaction between corrugator activity, condition, and narcissism.

We broke down the three-way interaction by condition. In the low status condition, there was no two-way interaction between narcissism and corrugator activity. In the high-status condition, however, there was a significant two-way interaction between narcissism and corrugator activity. Corrugator activity was unrelated to zygomaticus activity for children with high ($M + 1SD$) narcissism, $\beta = 0.01$, $SE = 0.03$, $p = .641$. However, corrugator activity was positively related to zygomaticus activity for children with low ($M - 1SD$) narcissism, $\beta = 0.88$, $SE = 0.03$, $p < .001$. Thus, when gaining status, for children with high narcissism, smiling and frowning did not co-occur. In conjunction with findings from main analyses, this suggests that children with high narcissism did not experience increases in positive and negative affect at the same time. Instead, they might have experienced fluctuations from heightened positive to heightened negative affect, though future studies should test this assumption.

Table S13

Analyses of Children's Winsorized Zygomaticus Activity Predicted by Baseline, Condition, Corrugator Activity, and Children's Narcissism Levels

Fixed Effects	Zygomaticus Activity		
	β	$SE(\beta)$	t
Intercept	-0.90	0.09	-10.01***
Baseline Zygomaticus	109.93	6.54	16.80***
Corrugator Activity	0.02	0.02	0.98
Condition	-0.04	0.10	-0.39
Narcissism	0.07	0.06	1.08
Corrugator Activity*Condition	0.43	0.03	14.68***
Corrugator Activity*Narcissism	-0.02	0.02	-0.93
Condition*Narcissism	-0.14	0.10	-1.40
Condition*Corrugator Activity*Narcissism	-0.41	0.03	-14.18***

Note. Condition was dummy coded with "0" for Low Status and "1" for High Status.

* $p < .05$ ** $p < .01$ *** $p < .001$, p values calculated using Satterthwaite degrees of freedom.

Cue Reactivity Analyses

To delve deeper into our findings, we examined whether the reactivity patterns we found in children and parents were owed to differences in their reactivity toward cues of status gain (i.e., likes children received) and loss (i.e., likes fictitious competitors received).

Reactivity to Likes Toward Self (Status Gain Cues)

First, we analyzed participants' responses to the likes children received. We first created a dummy variable in the data indicating the first three seconds following each like (coded as 1), because muscle activity in response to circumscribed cues usually peaks within 3 seconds (Dufner, Arslan, et al., 2015).

Children

We regressed, in separate models, zygomaticus and corrugator activity on the likes dummy, on experimental condition, on narcissism, and on all their possible interactions, while controlling for baseline muscle activity (Table S14). All focal effects were non-significant in both models.

Parents

We regressed, in separate models, zygomaticus and corrugator activity on the likes dummy, on experimental condition, on children's narcissism or overvaluation, and on all their possible interactions, while controlling for baseline muscle activity (Tables S15 & S16). In both zygomaticus activity models, all focal effects were non-significant. In both corrugator activity models, there was a significant two-way interaction between likes and condition, whereas all other effects were non-significant. Probing these two-way interactions in both models showed that, in the low status condition, parents frowned marginally more when their children received a like (narcissism model $\beta = .03$, $SE = 0.02$, $t = 1.89$, $p = 0.06$; overvaluation model $\beta = .03$, $SE = 0.02$, $t = 1.89$, $p = 0.05$). However, in both models, this difference in parents' corrugator reactivity was absent in the high status condition (narcissism model $\beta = -.01$, $SE = 0.01$, $t = -0.88$, $p = 0.38$; overvaluation model $\beta = -.01$, $SE = 0.01$, $t = -0.89$, $p = 0.36$).

Summary

The results suggest that children's reactions to the task were not owed to how much they smiled or frowned in response to the individual likes they received. Like their children, parents did not smile more in response to the individual likes their children received. However, parents frowned marginally more when children received likes in the low status condition (perhaps a sign of displeasure because these likes did not change their child's status), but this was not related to children's narcissism, or to parental overvaluation levels. Therefore, the main results regarding narcissism and parental overvaluation do not appear driven by individual differences in status gain cue reactivity.

Reactivity to Likes Toward Competitors (Status Loss Cues)

We tried to analyze participants' responses to likes others received. Because such likes were heavily dispersed in both experimental conditions and often quickly followed each other (e.g., often occurring one or two seconds after another) over the course of the task, isolating children's responses to such likes was impossible.

Table S14

Analyses of Children's Winsorized Muscle Activity Predicted by Condition, Likes, and Children's Narcissism Levels

Fixed Effects	Zygomaticus Activity			Corrugator Activity		
	β	$SE(\beta)$	t	β	$SE(\beta)$	t
Intercept	-0.92	0.07	-13.32***	-0.16	0.19	-0.85
Baseline	112.81	5.02	22.47***	38.93	13.93	2.79**
Likes	-0.01	0.03	-0.39	0.01	0.01	0.83
Condition	-0.11	0.07	-1.44	-0.34	0.21	-1.64
Narcissism	0.07	0.05	1.50	0.16	0.13	1.17
Likes*Condition	0.01	0.03	0.37	-0.03	0.02	-1.76
Likes*Narcissism	0.03	0.03	1.20	0.02	0.01	1.60
Condition*Narcissism	-0.06	0.08	-0.75	-0.21	0.21	-1.01
Likes*Condition*Narcissism	-0.02	0.03	-0.51	-0.01	0.02	-0.68

Note. Condition was dummy coded with "0" for Low Status and "1" for High Status. Like was dummy coded with "1" for muscle activity corresponding to the first 3 seconds following each like children received, and with "0" for all other timepoints.

* $p < .05$ ** $p < .01$ *** $p < .001$, p values calculated using Satterthwaite degrees of freedom.

Table S15

Analyses of Parents' Winsorized Muscle Activity Predicted by Condition, Likes, and Children's Narcissism Levels

Fixed Effects	Zygomaticus Activity			Corrugator Activity		
	β	$SE(\beta)$	t	β	$SE(\beta)$	t
Intercept	-0.70	0.03	-22.10***	-0.42	0.05	-7.64***
Baseline	80.56	1.62	49.68***	32.52	1.32	24.58***
Likes	-0.02	0.01	-1.77	0.03	0.02	1.89
Condition	-0.05	0.04	-1.35	0.11	0.07	1.45
Narcissism	0.00	0.03	-0.05	-0.02	0.05	-0.39
Likes*Condition	0.02	0.01	1.49	-0.04	0.02	-2.09*
Likes*Narcissism	0.01	0.01	0.87	0.00	0.02	0.01
Condition*Narcissism	-0.01	0.04	-0.23	0.02	0.08	0.25
Likes*Condition*Narcissism	-0.01	0.01	-0.75	0.00	0.02	0.16

Note. Condition was dummy coded with "0" for Low Status and "1" for High Status. Like was dummy coded with "1" for muscle activity corresponding to the first 3 seconds following each like children received, and with "0" for all other timepoints.

* $p < .05$ ** $p < .01$ *** $p < .001$, p values calculated using Satterthwaite degrees of freedom.

Table S16
Analyses of Parents' Winsorized Muscle Activity Predicted by Condition, Likes, and Parental Overvaluation Levels

Fixed Effects	Zygomaticus Activity			Corrugator Activity		
	β	$SE(\beta)$	t	β	$SE(\beta)$	t
Intercept	-0.70	0.03	-21.78***	-0.42	0.06	-7.49***
Baseline	80.66	1.62	49.70***	32.50	1.32	24.53***
Likes	-0.02	0.01	-1.45	0.03	0.02	1.92
Condition	-0.06	0.04	-1.45	0.11	0.08	1.46
Overvaluation	0.01	0.03	0.28	-0.01	0.05	-0.15
Likes*Condition	0.01	0.01	1.18	-0.04	0.02	-2.13*
Likes* Overvaluation	0.02	0.01	1.66	0.01	0.02	0.31
Condition*Overvaluation	0.01	0.04	0.13	0.00	0.08	-0.02
Likes*Condition* Overvaluation	-0.02	0.01	-1.37	0.00	0.02	-0.11

Note. Condition was dummy coded with "0" for Low Status and "1" for High Status. Like was dummy coded with "1" for muscle activity corresponding to the first 3 seconds following each like children received, and with "0" for all other timepoints.

* $p < .05$ ** $p < .01$ *** $p < .001$, p values calculated using Satterthwaite degrees of freedom.

Analyses of Demographic Effects on Main Findings in Children

Children's Gender Effects

Given that there are documented gender differences in narcissism and children's social goals, we examined whether children's gender moderated our findings. We first repeated analyses controlling for children's gender. Then, we repeated analyses including a four-way interaction term in each of the children analyses. When this interaction was significant, we performed main analyses separately per gender.

Controlling for Gender

We repeated analyses on the effect of children's narcissism on their muscle activity while controlling for children's gender. Results remained virtually unchanged, and this was also confirmed by the lack of significant differences between the models with and without gender as a covariate (zygomaticus $\chi^2(1) = 1.06, p = .303$; corrugator $\chi^2(1) = 0.89, p = .346$). For parsimony, we omit the full presentation of these results.

Gender as Moderator, Zygomaticus Activity.

We repeated analyses on the effect of children's narcissism on their zygomaticus activity by including gender and all its possible interactions with other variables. This resulted in a model with a four-way interaction including time, condition, narcissism, and gender, which was significant, $\beta = 0.15, SE = 0.02, t(14849) = 8.98, p < .001$. We therefore repeated main analyses separately for girls and boys.

Girls Model. Results are presented in Table S17. There were no main effects or two-way interactions. However, there was a significant three-way interaction between condition, time, and narcissism.

We broke down the three-way interaction by condition. In the low-status condition, there was no two-way interaction between time and narcissism. In the high-status condition, however, there was a two-way interaction between time and narcissism, $\beta = .08, SE = .01, t(3399) = 7.98, p < .001$. Zygomaticus activity increased for girls with high ($M + 1SD$) narcissism, $\beta = .06, SE = .01, p < .001$, but decreased for girls with low ($M - 1SD$) narcissism, $\beta = -.11, SE = .01, p < .001$. Therefore, girls with high narcissism increasingly smiled when gaining status.

Boys Model. Results are presented in Table S18. There was an effect of time, with zygomaticus activity decreasing over time. There was a two-way interaction between condition and time, and between time and narcissism, yet these were qualified by a three-way interaction between condition, time, and narcissism.

We broke the three-way interaction down by condition. In the low-status condition, there was a two-way interaction between time and narcissism, $\beta = .05$, $SE = .01$, $t(3578) = 7.08$, $p < .001$. Zygomaticus activity remained stable for boys with high ($M + 1SD$) narcissism, $\beta = .01$, $SE = .01$, $p = .471$, but decreased for boys with low ($M - 1SD$) narcissism, $\beta = -.07$, $SE = .01$, $p < .001$. In the high-status condition, the interaction between time and narcissism was non-significant. Therefore, boys with low narcissism decreasingly smiled when losing status.

Gender as Moderator, Corrugator Activity

We repeated analyses on the effect of children's narcissism on their corrugator activity by including gender and all its possible interactions with other variables. This resulted in a model with a four-way interaction including time, condition, narcissism, and gender, which was significant, $\beta = 0.02$, $SE = 0.01$, $t(14849) = 2.02$, $p = .043$. We therefore repeated main analyses separately for girls and boys.

Girls Model. Results are presented in Table S17. There were no condition, time, or narcissism main effects. There were two-way interactions between condition and time, as well as between time and narcissism. However, these were qualified by a three-way interaction between condition, narcissism, and time.

We broke down the three-way interaction by condition. In the low-status condition, there was a two-way interaction between time and narcissism, $\beta = .01$, $SE < .01$, $t(3936) = 3.55$, $p < .001$. Corrugator activity increased for girls with high ($M + 1SD$) narcissism, $\beta = .01$, $SE = .01$, $p = .005$, but decreased for girls with low ($M - 1SD$) narcissism, $\beta = -.01$, $SE = 0.01$, $p = .047$. In the high-status condition, there was also a two-way interaction between time and narcissism, $\beta = .05$, $SE = .01$, $t(3399) = 98$, $p < .001$. Corrugator activity increased for girls with high ($M + 1SD$) narcissism, $\beta = .04$, $SE < .01$, $p < .001$, but remained stable for girls with low ($M - 1SD$) narcissism, $\beta = -.01$, $SE = 0.01$, $p = .159$. Therefore, girls with higher narcissism increasingly frowned, and especially when gaining status.

Boys Model. Results are presented in Table S18. There was a main effect of time, with corrugator activity increasing over time. There was a two-way interaction between condition and time, as well as a two-way interaction between time and narcissism. These were qualified, however, by a three-way interaction between condition, time, and narcissism.

We broke down the three-way interaction by condition. In the low-status condition, there was a two-way interaction between time and narcissism, $\beta = -.02$, $SE < .01$, $t(3578) = -3.82$, $p < .001$. Corrugator activity increased less steeply for boys with high ($M + 1SD$) narcissism, $\beta = .03$, $SE = .01$, $p < .001$, but more steeply for boys with low ($M - 1SD$) narcissism, $\beta = .06$, $SE = .01$, $p < .001$. In the high-status condition, however, the interaction between time and

narcissism was not significant. Therefore, boys with low narcissism increasingly frowned when losing status.

Summary of Gender Effects

Main results were virtually unchanged when controlling for gender. Including gender as a moderator revealed that the effects of narcissism were more pronounced in girls than in boys. Given the limited sample size and the complexity of such interactions, these findings should be replicated in future research.

Children's Age Effects

Given that there are documented age differences in narcissism and children's social goals, we examined whether children's age moderated our findings. We first repeated analyses controlling for children's age. Then, we repeated analyses including a four-way interaction term with age in each of the children analyses. When this interaction was significant, we performed main analyses separately per age group ($M-1SD$ of age / $M + 1SD$ of age).

Controlling for Age

We repeated analyses on the effect of children's narcissism on their muscle activity while controlling for children's age. Results remained virtually unchanged, and this was also confirmed by the lack of significant differences between the models with and without age as a covariate (zygomaticus $\chi^2(1) = 0.18, p = .673$; corrugator $\chi^2(1) = 0.43, p = .511$). For parsimony, we omit the full presentation of these results.

Age as Moderator, Zygomaticus Activity

We repeated analyses on the effect of children's narcissism on their zygomaticus activity by including age and all its possible interactions with other variables. This resulted in a model with a four-way interaction including time, condition, narcissism, and age, which was significant, $\beta = 0.02, SE = 0.01, t(14849) = 2.52, p = .012$. We therefore repeated main analyses separately for younger (age $\geq M + 1SD$) and older (age $\leq M-1SD$) children.

Younger Children Model. Results are presented in Table S19. There were no main effects or two-way interactions, but there was a three-way interaction between time, condition, and narcissism.

We broke the three-way interaction down by condition. In the low-status condition, there was no two-way interaction between time and narcissism. In the high-status condition, however, there was a two-way interaction between time and narcissism, $\beta = .06, SE = .01, t(3399) = 6.50, p < .001$. Zygomaticus activity increased for younger children with high ($M + 1SD$) narcissism, $\beta = .05, SE = .01, p < .001$, but decreased for younger children with low ($M-1SD$) narcissism,

$\beta = -.07$, $SE = .01$, $p < .001$. Therefore, younger children with high narcissism increasingly smiled when gaining status.

Older Children Model. Results are presented in Table S19. There was a main effect of time, with zygomaticus activity decreasing over time. There was a two-way interaction between condition and time, as well as a two-way interaction between time and narcissism. There was no three-way interaction between condition, time, and narcissism.

We broke down the two-way interaction between condition and time by condition. In the low-status condition, there was an increase in zygomaticus activity over time, $\beta = .02$, $SE = .01$, $p = .020$. In the high-status condition, there was a decrease in zygomaticus activity over time, $\beta = -.06$, $SE = .01$, $p < .001$. Thus, older children in the low-status condition increasingly smiled when losing status, but decreasingly smiled when gaining status.

We also broke down the two-way interaction between time and narcissism by narcissism levels. Zygomaticus activity decreased more steeply over time for older children with high ($M + 1SD$) narcissism, $\beta = -.04$, $SE = .01$, $p < .001$, than for older children with low ($M - 1SD$) narcissism, $\beta = -.02$, $SE = .01$, $p = .025$. Thus, older children with high narcissism decreasingly smiled in both conditions.

Age as Moderator, Corrugator Activity

We repeated analyses on the effect of children's narcissism on their corrugator activity by including age and all its possible interactions with other variables. This resulted in a model with a four-way interaction including time, condition, narcissism, and age, which was not statistically significant, $\beta = -0.01$, $SE < .01$, $t(14849) = -1.94$, $p = .052$. We therefore did not repeat main analyses separately for younger ($age \geq M + 1SD$) and older ($age \leq M - 1SD$) children.

Summary of Age Effects

Main results were virtually unchanged when controlling for age. Including age as a moderator revealed that the effects of narcissism on zygomaticus activity were more pronounced in younger children, whereas there were no differences in the effects of narcissism between younger and older children. Given the limited sample size and the complexity of such interactions, these findings should be replicated in future research.

Parental Education Effects

Given that there are documented class differences in narcissism and children's social goals, we examined whether parents' education level, an important indicator of social class, moderated children's affective reactivity. Parents reported their highest level of education, with 11 categories (1= lower, basic education to 11 = scientific education (bachelor, masters

and above). Assuming a linear relationship between parent education level and children's affective reactivity to social status, we included parents' education level as a continuous ($M = 8.66$, $SD = 2.61$), z-standardized variable in the analyses. We regressed, in separate models, children's zygomaticus and corrugator activity on experimental condition, on time, on parental education, and on all their possible interactions. Results are presented in Table S20.

Zygomaticus Activity

There was a main effect of time, with zygomaticus decreasing over time, and a main effect of education level, with zygomaticus associated with lower education level. There was also a two-way interaction between time and education, yet it was qualified by a three-way interaction between condition, time, and education level.

We broke down the three-way interaction by condition. In the low-status condition, the interaction between time and education level was significant, $\beta = 0.04$, $SE < .01$, $t(7516) = 9.24$, $p < .001$. Zygomaticus activity increased for children of higher (*Max* value) educated parents, $\beta = 0.02$, $SE = .01$, $p = .009$, but decreased for children of lower ($M - 1SD$) educated parents, $\beta = -0.63$, $SE = .01$, $p < .001$. In the high-status condition, there was no two-way interaction between time and education level. Therefore, when children lost status, children of higher educated parents increasingly smiled, whereas children of lower educated parents decreasingly smiled.

Corrugator Activity

There was a main effect of time, with corrugator increasing over time. There was a two-way interaction between condition and time, and a two-way interaction between time and education, yet these were qualified by a three-way interaction between condition, time, and education level.

We broke down the three-way interaction by condition. In the low-status condition, the interaction between time and education level was significant, $\beta = 0.01$, $SE < .01$, $t(7516) = 5.49$, $p < .001$. Corrugator activity increased more steeply for children of higher (*Max* value) educated parents, $\beta = 0.03$, $SE < .01$, $p < .001$ than for children of lower ($M - 1SD$) educated parents, $\beta = 0.01$, $SE < .01$, $p = .022$. In the high-status condition, there was no two-way interaction between time and education level. Therefore, when children lost status, children of higher educated parents frowned more strongly over time than children of less educated parents.

Summary

These analyses suggest that children from higher-educated parents frowned and smiled more in response to status loss. There were no effects involving parental education level when children gained status.

Table S17

Analyses of Girls' Winsorized Muscle Activity Predicted by Condition, Time, and Narcissism

Fixed Effects	Zygomaticus Activity			Corrugator Activity		
	β	SE (β)	<i>t</i>	β	SE (β)	<i>t</i>
Intercept	0.36	0.24	1.49	0.29	0.26	1.11
Condition	-0.51	0.36	-1.41	-0.38	0.39	-0.96
Time	-0.01	0.01	-1.62	0.01	0.00	1.49
Narcissism	0.12	0.19	0.65	0.10	0.21	0.50
Condition*Time	0.01	0.01	0.89	0.05	0.01	8.57***
Condition* Narcissism	-0.08	0.37	-0.21	-0.07	0.41	-0.16
Time* Narcissism	-0.01	0.01	-1.43	0.01	0.00	3.71***
Condition*Time*Narcissism	0.09	0.01	7.46***	0.04	0.01	6.07***

Note. Condition was dummy coded with "0" for Low Status and "1" for High Status.

* $p < .05$ ** $p < .01$ *** $p < .001$, p values calculated using Satterthwaite degrees of freedom.

Table S18

Analyses of Boys' Winsorized Muscle Activity Predicted by Condition, Time, and Narcissism

Fixed Effects	Zygomaticus Activity			Corrugator Activity		
	β	SE (β)	<i>t</i>	β	SE (β)	<i>t</i>
Intercept	-0.08	0.17	-0.46	0.03	0.18	0.20
Condition	-0.01	0.23	-0.04	-0.29	0.25	-1.20
Time	-0.05	0.01	-7.08***	0.05	0.00	12.92***
Narcissism	-0.18	0.20	-0.87	0.30	0.21	1.41
Condition*Time	0.05	0.01	5.42***	0.01	0.01	2.32*
Condition* Narcissism	0.22	0.26	0.83	-0.34	0.28	-1.21
Time* Narcissism	0.05	0.01	5.70***	-0.02	0.00	-3.54***
Condition*Time*Narcissism	-0.05	0.01	-5.18***	0.02	0.01	3.51***

Note. Condition was dummy coded with "0" for Low Status and "1" for High Status.

* $p < .05$ ** $p < .01$ *** $p < .001$, p values calculated using Satterthwaite degrees of freedom.

Table S19

Analyses of Younger (M – 1SD) Children’s Winsorized Muscle Activity Predicted by Condition, Time, and Narcissism

Fixed Effects	Younger Children			Older Children		
	β	SE (β)	t	β	SE (β)	t
Intercept	0.02	0.24	0.10	0.20	0.26	0.80
Condition	-0.01	0.01	-1.60	-0.45	0.40	-1.12
Time	0.04	0.33	0.11	-0.06	0.01	-9.45***
Narcissism	-0.17	0.20	-0.84	-0.14	0.28	-0.51
Condition*Time	0.01	0.01	0.65	0.08	0.01	7.87***
Condition* Narcissism	0.00	0.01	-0.62	-0.19	0.75	-0.25
Time* Narcissism	0.29	0.31	0.95	-0.02	0.01	-2.78**
Condition*Time*Narcissism	0.06	0.01	5.80***	0.02	0.02	1.14

Note. Condition was dummy coded with “0” for Low Status and “1” for High Status.

* $p < .05$ ** $p < .01$ *** $p < .001$, p values calculated using Satterthwaite degrees of freedom.

Table S20

Analyses of Children’s Winsorized Muscle Activity Predicted by Condition, Time, and Parental Education Level

Fixed Effects	Zygomaticus Activity			Corrugator Activity		
	β	SE (β)	t	β	SE (β)	t
Intercept	0.10	0.14	0.71	0.19	0.15	1.26
Condition	-0.21	0.19	-1.07	-0.38	0.21	-1.77
Time	-0.02	0.01	-4.03***	0.02	0.00	8.50***
Education	-0.35	0.13	-2.65**	0.10	0.15	0.65
Condition*Time	0.01	0.01	1.17	0.03	0.00	8.15***
Condition* Education	0.30	0.19	1.55	-0.11	0.21	-0.49
Time* Education	0.04	0.00	8.71***	0.01	0.00	5.50***
Condition*Time* Education	-0.05	0.01	-6.88***	-0.02	0.00	-4.59***

Note. Condition was dummy coded with “0” for Low Status and “1” for High Status.

* $p < .05$ ** $p < .01$ *** $p < .001$, p values calculated using Satterthwaite degrees of freedom.

Supplementary Appendices

Supplementary Appendix A

Table S21

Complete List of Self-Report Questionnaires Included in the Study

Name	Measure Type	Rater	Part of Procedure
Demographics (constructed for this study)	-	Children, Parents	Pre-Task
Lifespan Self-esteem Scale (Harris et al., 2018)	Trait	Children, Parents	Pre-Task
Childhood Narcissism Scale (Thomaes, Stegge, Bushman, Olthof, & Denissen, 2008)	Trait	Children, Parents	Pre-Task
Narcissistic Admiration and Rivalry Questionnaire – Short Form (Back et al., 2013; adapted for children for this study)	Trait	Children, Parents	Pre-Task
Narcissistic Personality Inventory – 16 (Ames, Rose, & Anderson, 2006)	Trait	Parents	Pre-Task
Parental Overvaluation Scale (Brummelman, Thomaes, Nelemans, Orobio de Castro, & Bushman, 2015)	Trait	Parents	Pre-Task
Status Motive Scale (constructed for this study)	Trait	Children, Parents	Pre-Task
State Shame and Guilt Scale, Pride Subscale ((Brummelman et al., 2013) Marschall, Sanftner, & Tangney, 1994)	State	Children, Parents	Post-Task
State Shame and Guilt Scale, Shame Subscale (Marschall et al., 1994)	State	Children, Parents	Post-Task
State Anger Scale (Laurent et al., 1999)	State	Children, Parents	Post-Task
State Anxiety Scale (items from Positive and Negative Affect Schedule; Laurent et al., 1999)	State	Children, Parents	Post-Task
State Depression Scale (items from Positive and Negative Affect Schedule; Laurent et al., 1999)	State	Children, Parents	Post-Task
State Hostility Scale (constructed for this study)	State	Children	Post-Task
Status Motive Item (constructed for this study)	State	Children, Parents	Post-Task
Inclusion of Child in the Self Scale (Aron, Aron, & Smollan, 1992; Brummelman, Thomaes, Slagt, Overbeek, De Castro, & Bushman, 2013)	State	Parents	Post-Task
Message From Child to Peers (constructed for this study)	Open-ended question	Children	Post-Task
Message From Parent to Child (constructed for this study)	Open-ended question	Parents	Post-Task
Manipulation Check Scales (constructed for this study)	-	Children, Parents	Post-Task
Fidelity Check (constructed for this study)	Open-ended questions	Children, Parents	Post-Task

Supplementary Appendix B

Adaptation of the NARQ-S for Children

The original NARQ-S (Back et al., 2013) is designed to measure narcissistic admiration and rivalry in adolescents and adults and has, to our knowledge, not been used in research with children. To make the content of the scale more accessible and relevant for children, three of the manuscript's authors adapted the items of the English Scale, translated the items to Dutch, and back to English. Below, the reader can find both the Dutch adaptation, which was used in the study, and the back-translation to English, which can be used as a point of reference to the original NARQ-S.

NARQ-S, Child Version in Dutch.

Kies het antwoord dat het best bij je mening past.

Je hebt een antwoordformaat met 4 categorieën ter beschikking (van 0 = „Helemaal niet waar“ tot 3 = „Helemaal waar“).

	Helemaal niet waar	Niet echt waar	Best wel waar	Helemaal waar
1. Ik reageer bozig als andere kinderen meer aandacht krijgen dan ik.	0	1	2	3
2. Ik verdien speciale aandacht	0	1	2	3
3. Als andere kinderen proberen beter te zijn dan ik, dan hoop ik dat het ze mislukt.	0	1	2	3
4. Ik vind het fijn om na te denken over hoe speciaal ik ben.	0	1	2	3
5. Ik krijg veel aandacht omdat ik speciale dingen kan.	0	1	2	3
6. De meeste andere kinderen zijn sukkel.	0	1	2	3

NARQ-S, English Translation of the Child Version in Dutch.

Please circle the answer that fits your opinion best.

You have a response format with 4 options ranging from “0 = Not at all true” to “3 = Completely true”.

	Not at all true	Not really true	Quite true	Completely true
1. I react angrily if other children get more attention than I	0	1	2	3
2. I deserve special attention	0	1	2	3
3. If other children are trying to be better than me, I hope they fail at this	0	1	2	3
4. I find it nice to think about how special I am	0	1	2	3
5. I get a lot of attention because I can do special things	0	1	2	3
6. Most other children are losers	0	1	2	3

S

NARQ-S, Child Version, Scoring Instructions.

The total NARQ-S score is calculated by averaging scores across all Items. The admiration subscale score is calculated by averaging the scores of Items 2, 4, and 5. The rivalry subscale score is calculated by averaging the scores of Items 1, 3, and 6.

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Summary

This dissertation investigated the “why” of trait narcissism—its reason and purpose. Functional approaches to personality propose that people’s personalities are means to desired ends: they reflect ways through which people pursue the fulfillment of their motives. Building on these theories, this dissertation proposes that narcissism serves the fulfillment of a strong motive for social status (i.e., prominence, respect, and social influence within a social group). Based on this idea, it is hypothesized that narcissism is rooted in strong affective contingencies (i.e., affective reaction tendencies) toward fulfillments (e.g., gains) and frustrations (e.g., losses) of status. These contingencies are investigated both at the theoretical and at the empirical level.

Chapter 2 outlined a theoretical model of narcissistic status pursuit. The model proposes that narcissism is underpinned by a dominant status motive that can occasionally overshadow other social motives, such as the motive for affiliation. The model conceptualizes narcissism as a system of cognitive and behavioral “*if...then*” contingencies that become activated when individuals pursue social status in daily life. The model proposes that narcissists select situations that afford status. Narcissists vigilantly attend to cues related to the status they and others have in these situations and, based on these perceived cues, appraise whether they can elevate their status or reduce the status of others. Narcissists engage in self-promotion (admiration pathway; agency) or other-derogation (rivalry pathway; antagonism) in accordance with these appraisals. Each pathway has unique consequences for how narcissists are perceived by others, thus shaping their social status over time. The model illustrates why and when narcissists change their behavior, thus showing how the same individual might behave differently depending on their construal of the social context. Furthermore, the model illustrates how individual differences in agentic and antagonistic aspects of narcissism might develop based on recurring experiences of status gains and losses. Finally, the model addresses how experimental interventions in the contingencies of narcissism can facilitate changes in antagonistic behaviors of narcissistic status pursuit.

Chapter 3 tested the idea that narcissism is grounded on affective contingencies. If narcissists are more strongly motivated to pursue status, then they should also exhibit relatively strong affective contingencies toward satisfactions and frustrations in the domain of power, an instantiation of status. By contrast, such contingencies might not be equally strong in other motive domains, such as affiliation. We tested these hypotheses in a sample of young adults. To capture affective contingencies, we used fEMG reactivity across multiple lab tasks and self-reports of affective reactivity tendencies toward satisfying and frustrating experiences of power and affiliation. In addition, we examined the extent to which the affective contingencies of narcissism were also associated with power and affiliation behaviors in the lab at a one-year follow-up. Findings showed that, overall, narcissists exhibited stronger contingencies toward satisfactions of power than affiliation. Antagonistic narcissists were additionally found to exhibit equally strong contingencies toward frustrations of power and affiliation, which—in light of their stronger contingencies toward satisfactions of power—is consistent with a

hostile, zero-sum hierarchical view of interpersonal relationships. These findings suggest that narcissists might pursue power because they intrinsically enjoy it. The findings also suggest that narcissists' affective life and mental wellbeing might primarily depend on how much power they have. Finally, the findings suggest that antagonistic narcissists might be hostile not only because their affective life hinges strongly on power (which is consistent with a competitive profile), but also because they enjoy affiliation less but are nevertheless sensitive to affiliation frustrations (which is consistent with a profile of indifference to the needs of others coupled with a sensitivity to being rejected).

Chapter 4 tested the idea that the affective contingencies of narcissism in the domain of status are detectable from childhood and possibly shared with parents. We examined these ideas in an experimental study in late childhood (ages 8-13), when individual differences in narcissism and in the motive for status become increasingly pronounced. We first measured children's narcissism and parents' overvaluation levels. Then, we randomly assigned children to gain or lose status among fictitious peers in an online social media status contest, while parents secretly watched the contest on another computer screen. During the experiment, we tracked children's and parents' affective reactions via fEMG reactivity. Children's narcissism was over time (i.e., as the experiment progressed) associated with increasing levels of negative affect during status loss, and with increasing levels of positive as well as negative affect during status gain. In parents, children's narcissism and parents' overvaluation were over time associated with increasing positive affect when children gained status. These findings suggest that, although intrinsically rewarding, status pursuit is also stressful for narcissistic children. The findings further suggest that parents of narcissistic children and overvaluing seem to enjoy their child's status gain but might overlook how it might stress out their children. Together, these findings suggest that narcissism is from an early age characterized by an affective-motivational system geared toward status. This system appears to be intergenerationally transmitted via genetics, socialization, or both.

Taken together, empirical findings from Chapters 3 and 4 provide exciting evidence that lend support to the central assumptions of the theoretical model presented in Chapter 2. Placing a social motive at the heart of narcissism, the present dissertation suggests that narcissism is deeply relational and should be understood, studied, and treated as such. Narcissists appear to care deeply about social relationships that confer them status, and their psychological wellbeing appears to hinge on status. Rather than toning down narcissists' motive for status to tackle their often-troubled intimate relationships, interventions might be more fruitful when they focus on reconciling the motives for status and affiliation, which might frequently conflict with each other—especially so, for antagonistic narcissists. More broadly, the present dissertation suggests that personality has affective-motivational roots and is dynamic in nature. The dissertation can thus inspire research on why and how people come to resemble or differ from each other in their personality based on what they want, and on how they are predisposed and socialized to attain it.



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Stathis has always been interested in what makes us human. Driven by the romantic ambition to unravel the mysteries of people's suffering and handhold their way to happiness, he studied psychology at the University of Athens, Greece. After graduating (cum laude), Stathis specialized for three years in clinical psychology at the University of Athens and graduated as valedictorian in 2015. In 2016, soon after finishing his national service as a psychologist, Stathis pursued a

PhD in developmental psychology at Tilburg University. Throughout his academic journey, Stathis studied in 5 countries (Greece, Austria, the Netherlands, Germany, and United Kingdom), received various scholarships and awards, and worked in outpatient centers and psychiatric hospitals for children, adolescents, and adults. Most importantly, Stathis conducted studies he considered scientifically and societally important, and presented their results in articles he authored and published, as well as in international conferences. Stathis now works as a postdoctoral researcher at Utrecht University.