Schadenfreude as social-functional dominance regulator

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We report all studies we ever conducted in this line of research, all data exclusions, all manipulations, and all measures. Materials and de-identified data of the project are available on OSF (<https://osf.io/3ynhw>).

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Abstract

Schadenfreude follows from misfortunes happening to other individuals. It is therefore an essentially social emotion. However, previous research has mainly explored its intrapersonal functions. Complementing these findings, we propose a social-functional approach to schadenfreude. Seven studies (total $N = 2,362$) support that (a) schadenfreude is a reaction to a misfortune befalling an initially dominance-displaying individual and (b) the public expression of schadenfreude downregulates the dominance of the other person. Specifically, schadenfreude towards initially successful persons was intensified when they displayed dominance (i.e., hubristic pride or general dominance) instead of prestige (i.e., authentic pride or general prestige) or other displays (i.e., embarrassment) following their achievement (Studies 1 to 3). This effect was mediated via inferiors' malicious envy (Study 4). The public expression of schadenfreude then reduced the perceived dominance of the initially successful person compared to private expressions of schadenfreude and awkward silence (Studies 5 and 6). This dominance reduction further had downstream consequences for the superior person (Study 7). The findings underline the social functioning of schadenfreude and provide avenues for research on schadenfreude at the intrapersonal, interpersonal, and intergroup level.

Keywords: schadenfreude; dominance; status; envy; social-function of emotions

Schadenfreude as social-functional dominance regulator

Competitions may stir an explosive mix of emotions. Boastful winners can cause enduring grudge in losers and resentment over unfair treatment by referees potentially elicits furious retaliation. Such emotional outbursts even extend to the aftermath of the immediate competition. For instance, when the renowned tennis player Maria Sharapova was convicted of Meldonium abuse—an endurance enhancing drug—rivals and the public alike overwhelmingly expressed schadenfreude despite this reaction being at odds with the actual content of the news (Thomas, 2016). The fallen star modestly explained her failure and took full responsibility (Mitchell, 2016). Sharapova’s humility, however, stood in stark contrast to her common arrogant and nonchalant demeanor on and off court (Thomas, 2016). How can competitive legacies foster happiness at other’s misfortune and how may schadenfreude affect the social image of laughed at contenders?

The above situation could be a result of Sharapova’s social status. In fact, she was widely regarded as one of the most dominant tennis players who also earned millions of dollars with a variety of advertisements and her own sweets company (Schofield, 2015). Dominance constitutes one means to effectively attain social influence (Cheng, Tracy, Foulsham, Kingstone, & Henrich, 2013; Henrich & Gil-White, 2001). Yet, it may be socially costly. Others can react to such dominance with malicious envy (Crusius & Lange, 2016; Lange & Crusius, 2015a)—an emotion aimed at pulling dominant competitors down, maybe by expressing schadenfreude (Van Dijk, Ouwerkerk, Smith, & Cikara, 2015). Thus, here we propose that (a) dominance displays upon success may elicit others’ devilish laughs after subsequent failure and (b) this schadenfreude constitutes a social-functional strategy to reduce the superior’s initial dominance.

Schadenfreude

Schadenfreude is the happiness experienced when seeing another person suffer (Smith, 2014). It can be disentangled from gloating, which occurs when someone caused the

suffering of others (Leach, Spears, & Manstead, 2015). It is a loanword adapted from the German language and consists of the terms *Schaden* (harm) and *Freude* (joy). As this combination of allegedly incompatible units violates the virtue of compassion, scholars have considered schadenfreude to be morally questionable (Heider, 1958; McNamee, 2003). In contrast, somewhat surprisingly, most people from time to time publicly laugh about others' misfortunes. This is reflected in findings suggesting that schadenfreude occurs in various contexts related to intergroup conflicts (e.g., Cikara & Fiske, 2012), and, most critically for the current purpose, competitions (e.g., Leach & Spears, 2008). Across situations, it may be spontaneously expressed as (exaggerated) smiling (Boecker, Likowski, Pauli, & Weyers, 2015) and afterwards shared with others (Dasborough & Harvey, 2017). Thus, schadenfreude is probably a common experience (Van Dijk et al., 2015). Despite its importance, questions regarding its elicitation and functional value still require greater empirical scrutiny.

A diverse set of variables contributes to the elicitation of schadenfreude. Specifically, evidence supports that it is felt more strongly towards others we dislike (Hareli & Weiner, 2002) and whose success we perceive to be undeserved (Feather & Sherman, 2002). Furthermore, especially in competitive contexts, schadenfreude increases when one feels inferior to the other person (Leach & Spears, 2008) or maliciously envies the person's initial success (Lange, Weidman, & Crusius, in press; Van de Ven et al., 2015).

Van Dijk and colleagues (2015) subsumed these diverse eliciting factors, arguing that schadenfreude follows from threatening upward comparisons when the comparison target later suffers a misfortune. That is, if one considers another person unworthy of success—the person is disliked or perceived to be undeservingly successful—and one feels impotent and begrudging, this threatens the inferior's self-esteem. If the other then suffers a misfortune, it is reassuring to see this person get their just deserts. Thus, the function of schadenfreude is to re-establishing self-worth after threatening comparisons (see also Brambilla & Riva, 2017). This idea is supported by research showing that schadenfreude is amplified after threats to the self

(Van Dijk, Ouwerkerk, Wesseling, & Van Koningsbruggen, 2011a) and is damped in persons with high self-esteem or after self-affirmation (Van Dijk, Van Koningsbruggen, Ouwerkerk, & Wesseling, 2011b).

The function of schadenfreude operates apparently at the intrapersonal level. Schadenfreude elevates the self after threats to its value. However, schadenfreude is inherently social. A person other than the self is both the elicitor and target of the emotion. The underlying mechanisms that increase schadenfreude such as perceived deservingness, envy, or disliking refer to the other person. Moreover, in intergroup situations, schadenfreude is elicited as part of one's identification with the ingroup. Given this social nature of schadenfreude, we argue that schadenfreude may not only be functional for the self but may also be socially functional. We hypothesize that schadenfreude contributes to the regulation of hierarchical differences between the self and the other person. Specifically, we predict that (a) schadenfreude is a response to a failure happening to an initially dominant person and then (b) leads to a reduction in this person's dominance.

A Social-Functional Approach to Schadenfreude

Research converges on the notion that emotions convey important information that, in turn, elicit corresponding emotions or behaviors in observers (Van Kleef, 2009; Van Kleef, Van Doorn, Heerdink, & Koning, 2011). That is, based on someone's emotion, an observer may infer psychological states and may have certain affective reactions that then change this observer's emotions or behaviors. This interplay may be socially functional—it can help to regulate social relationships and contributes to the establishment and maintenance of social hierarchies (Fischer & Manstead, 2008; Keltner & Haidt, 1999; Parkinson & Manstead, 2015). For instance, the expression of embarrassment after a moral transgression signals appeasement (Keltner, 1995) and fosters observers' affiliative tendencies (Feinberg, Willer, & Keltner, 2012a). Therefore, embarrassment may be socially functional in regulating relationships.

What is the social function of schadenfreude? The social function of an emotion depends on its social goal (Fischer & Manstead, 2008). If schadenfreude is elicited following threatening upward comparisons (Van Dijk et al., 2015) in competitive contexts, the social function of schadenfreude should relate to the regulation of status hierarchies.

Although the desire for status is a fundamental human motive (Anderson, Hildreth, & Howland, 2015), theorizing and empirical evidence indicate that individuals can attain status via two different routes—prestige and dominance (Cheng et al., 2013; Cheng, Tracy, & Henrich, 2010; Henrich & Gil-White, 2001; Maner & Case, 2016). In prestige hierarchies, individuals gain respect by sharing skills and know-how with others. This signals to inferiors that they have high control to change personal status by emulating superiors. In contrast, in dominance hierarchies, individuals intimidate others with their natural characteristics. This creates fear in observers, leading to a fixed hierarchy.

We propose that schadenfreude contributes to the regulation of dominance hierarchies. Dominance hierarchies are rather fixed, as superiors stabilize their rank through physical force and intimidation (Henrich & Gil-White, 2001). Inferiors' attempts to improve their position are constantly undermined by dominant others. This lack of personal control to overcome inferiority can therefore elicit subordinates' malicious envy (Crusius & Lange, 2016; Lange & Crusius, 2015a). Inferiors remain attentive to any sign of weakness on the side of the dominant other and then exploit such situations immediately (Maner & Case, 2016). One consequence of malicious envy is schadenfreude (Van Dijk et al., 2015). This implies that if dominant individuals, for instance, suffer a misfortune, schadenfreude expressed by inferiors may constitute an adaptive strategy to publicly ridicule the oppressor and consequently decrease this person's dominance in the eyes of others. Thus, the public and socially shared expression of schadenfreude may convey the information to observers that the initially dominant person is no longer feared, leading observers to conclude that dominance is reduced.

Dominance can be signaled with a variety of cues (Maner & Case, 2016). The most common path to attain status is by displaying pride (Tracy, Shariff, & Cheng, 2010). It is elicited by the internal attribution of success (Tracy & Robins, 2004; Williams & DeSteno, 2008). Research suggests that pride is spontaneously expressed in competitive contexts (Tracy & Matsumoto, 2008) via various different displays (Tracy & Robins, 2007a) as long as social norms do not inhibit it (Van Osch, Zeelenberg, & Breugelmans, 2015). Importantly, pride has two forms—authentic and hubristic pride (Tracy & Robins, 2004, 2007b). Authentic pride occurs if a person attributes success to effort. Hubristic pride occurs if a person attributes success to talent. Research indicates that both pride forms have distinct displays (Lange & Crusius, 2015a; Nelson & Russell, 2014) and relate to different routes of status attainment (Cheng et al., 2010; Lange & Crusius, 2015a; Wubben, De Cremer, & van Dijk, 2012). Specifically, authentic pride leads to prestige attainment, whereas hubristic pride leads to dominance attainment.

In competitive contexts, evidence implies that superiors' displays of pride enhance inferiors' envy (Lange & Crusius, 2015a). Specifically, individuals who displays authentic pride are perceived as likable and prestigious, fostering benign envy—an emotion triggering the motivation to improve the self (e.g., Lange & Crusius, 2015b). In contrast, individuals who display hubristic pride are perceived as less likable and dominant, fostering malicious envy—an emotion triggering the motivation to harm the superior person (e.g., Lange & Crusius, 2015a) possibly by expressing schadenfreude after the superior's failure (Van Dijk et al., 2015). Therefore, displays of hubristic pride or dominance in general should enhance malicious envy and therefore lead to increased schadenfreude after a misfortune happening to the initially dominant person. This schadenfreude, if publicly expressed and socially shared, may then reduce the initially successful person's dominance.

The Current Research

In sum, we theorize that the social function of schadenfreude is to reduce superior individuals' dominance. To support this social-functional approach, two conditions must be met. First, (a) schadenfreude should be enhanced after a misfortune happening to a dominant person and (b) the public expression of schadenfreude should then undermine the initially successful person's dominance. Both conditions arise only in social relations, but the first mainly operates at the intrapersonal level (schadenfreude is triggered by dominant others), whereas the second operates at the interpersonal level (the public expression and sharing of schadenfreude reduces the dominance of the initially successful person). We tested these hypotheses in seven studies.

We report all studies we ever conducted in this line of research, all data exclusions, all manipulations, and all measures. Materials and de-identified data of the project are available on OSF ([https:// osf.io/3ynhw](https://osf.io/3ynhw)).

Study 1

The goal of Study 1 was to investigate the first condition that must be met for a social-functional approach to schadenfreude. That is, we investigated whether schadenfreude is increased in response to a misfortune befalling an initially dominant person. To this end, participants were confronted with a person who displayed hubristic pride after success and subsequently failed. We compared the hubristic pride display to two other emotional displays. First, although research implies that authentic pride also relates to status attainment, it leads to prestige and not dominance (Cheng et al., 2010; Lange & Crusius, 2015a). Therefore, it should not increase schadenfreude. In the control condition, the person displayed an emotion that is often expressed after success but signals low status, namely embarrassment (Shariff & Tracy, 2009). Such varying emotional displays affect perceptions of status even if, objectively, the person was equally successful (Shariff, Tracy, & Markusoff, 2012). Thus, manipulating emotion expressions in response to success provides a strong test of our

hypotheses. We predicted that superiors' hubristic pride would lead to more schadenfreude in inferiors after failure than authentic pride and embarrassment.

Method

Participants. Three-hundred seven¹ workers on Amazon's Mechanical Turk (MTurk) participated in Study 1. Their mean age was 32.77 years ($SD = 10$, range: 18 – 67; 172 men). This sample gave us approximately 90% power to detect a small to medium main effect of $\eta_p^2 = .035$ with $\alpha = .05$.

Materials and procedure. Participants imagined being in a seminar in which they had to write exams repeatedly (see Lange & Crusius, 2015a). They wanted to succeed on these exams. However, in the latest exam they were outperformed by a competitor called Hillary/Joe (in all studies participants' gender was matched to the competitors'). We manipulated how Hillary/Joe reacted to her/his success during a conversation after the seminar. We showed videos ostensibly depicting Hillary/Joe. S/he displayed either authentic pride ($n = 107$), hubristic pride ($n = 101$), or embarrassment ($n = 99$). The videos were previously validated (for validation data see Lange & Crusius, 2015a). As a manipulation check, participants indicated whether they thought Hillary/Joe felt accomplished, achieving, confident, fulfilled, productive, had self-worth, or successful (authentic pride), arrogant, conceited, egotistical, pompous, smug, snobbish, stuck-up (hubristic pride), embarrassed, shy, abashed, rueful, ashamed, affected (embarrassment), or neither of these (Lange & Crusius, 2015a). If participants indicated *neither of these* they were excluded (see Tracy & Prehn, 2012).

Subsequently, participants imagined that in the next exam, Hillary/Joe failed and received a very bad grade. We measured participants' schadenfreude with a scale developed by Van Dijk and colleagues (2006). We changed the item "I felt schadenfreude" to "I felt pleasure at the other's misfortune" as the term *schadenfreude* is less common in English.

Participants responded to five items on a scale from 1 (*strongly disagree*) to 7 (*strongly agree*). The reliability was excellent ($\alpha = .95$, $M = 3.09$, $SD = 1.74$, range: 1 – 7).

Results

Manipulation check. As intended, in the authentic pride condition participants labeled the display as authentic pride in 92% of the cases. In the hubristic pride condition, participants labeled the display as hubristic pride in 86% of the cases. In the embarrassment condition, participants labeled the display as embarrassment in 59% of the cases. The overall pattern was significant, $\chi^2(4) = 315.43$, $p < .001$, $\phi_c = .72$. Nevertheless, in the embarrassment condition, 33% of participants also labeled the display as hubristic pride. However, hubristic pride was chosen less frequently than embarrassment, $\chi^2(1) = 6.87$, $p = .01$, $\phi = .27$. Other cases were negligible. Thus, the manipulation was effective.

The effect of Display on schadenfreude. We conducted an ANOVA with Display (authentic pride vs. hubristic pride vs. embarrassment) as independent variable and schadenfreude as dependent variable. Our hypothesis was confirmed (see Figure 1). A contrast comparing the hubristic pride condition ($M = 4.28$, $SD = 1.5$) with the authentic pride ($M = 2.39$, $SD = 1.44$) and embarrassment conditions ($M = 2.63$, $SD = 1.64$) was significant, $F(1, 304) = 90.93$, $p < .001$, $\eta_p^2 = .23$, as were both individual comparisons, $ps < .001$. The orthogonal contrast comparing the authentic pride and embarrassment conditions was not significant, $F(1, 304) = 1.29$, $p = .26$, $\eta_p^2 = .004$.

Discussion

Study 1 supports the hypothesis that displaying hubristic pride (i.e., dominance) upon success enhances schadenfreude in others after subsequent failure. Also as predicted, displaying authentic pride did not change schadenfreude compared to a display signaling low status, namely embarrassment.

Study 2

The goal of Study 2 was to replicate Study 1 with schadenfreude elicited in the situation. Complementing the vignette approach, participants were confronted with an ostensibly real newspaper article about a student who expressed either authentic or hubristic pride. Later, the student suffered a misfortune and we assessed participants' schadenfreude. Hubristic pride should lead to more schadenfreude than authentic pride.

Method

Participants. One hundred thirty students (23 men) were approached at the university campus and invited to take part in multiple studies in the lab. This sample gave us approximately 90% power to detect a medium main effect of $g = 0.4$ with $\alpha = .05$. In this study, we did not include several other demographic questions (e.g., age) and items assessing our inclusion criteria. This was not done as Study 2 was part of a series of unrelated experiments and we wanted to keep it in the narrow time constraints of the research lab.

Materials and procedure. We presented participants with an ostensibly real, three-page newspaper article. In the article, an outstanding student called Lisa/Lukas described how s/he managed to receive the most renowned German student scholarship and which exceptional benefits s/he enjoyed with it.

Alongside the text, we displayed pictures to make the article more realistic. One picture represented Lisa/Lukas and was in fact the Caucasian, hands-on-hips pride display taken from the University of California, Davis, Set of Emotion Expressions (Tracy, Robins, & Schriber, 2009). This display does not differentiate between authentic and hubristic pride (Tracy & Prehn, 2012). To disambiguate it, we created two slightly different versions of the article. In the interview, Lisa/Lukas attributed success either to invested effort (i.e., authentic pride; $n = 66$) or natural talent (i.e., hubristic pride; $n = 64$). These different attribution patterns characterize authentic or hubristic pride, respectively (Tracy & Robins, 2007b). Presenting targets who attribute their success to effort or natural talent also disambiguated

observers' pride perceptions in previous research (Lange & Crusius, 2015a; Tracy & Prehn, 2012).

After participants read the interview, they were informed that two years later, the foundation decided whether each scholarship was extended to permanent funding. Lisa's/Lukas' scholarship was not extended. In relation to this, we measured participants' schadenfreude on a scale from 1 (*not at all*) to 10 (*very much*) with a German translation of the scale from Study 1 ($\alpha = .81$, $M = 3.31$, $SD = 1.87$, range: 1 – 8.8). Finally, as a manipulation check, participants indicated whether Lisa/Lukas felt authentic pride, hubristic pride, embarrassment, or neither of these with German translations of the items from Study 1. We excluded everyone who did not recognize authentic or hubristic pride.

Results

Manipulation check. As intended, in the effort condition, participants labeled the display as authentic pride in 94% of the cases. In the talent condition, participants labeled the display as hubristic pride in 31% of the cases. The overall pattern was significant, $\chi^2(1) = 13.7$, $p < .001$, $\phi = .32$. Although we expected that in the talent condition pride would be more frequently perceived as hubristic, it was overwhelmingly labeled authentic, $\chi^2(1) = 9$, $p = .003$, $\phi = .38$. Nevertheless, we successfully manipulated participants' perception about Lisa's/Lukas' pride between conditions. Lisa/Lukas was perceived as displaying more authentic pride in the effort condition and s/he was perceived as displaying more hubristic pride in the talent condition. This constitutes the necessary precondition to test our hypothesis.

The effect of Attribution on schadenfreude. We conducted a t -test with Attribution (effort vs. talent) as independent variable and schadenfreude as dependent variable. In line with our hypothesis, schadenfreude was higher in the talent ($M = 4.09$, $SD = 1.88$) than the effort condition ($M = 2.55$, $SD = 1.52$), $t(128) = -5.15$, $p < .001$, $g = -0.9$ (see Figure 2).

Discussion

Study 2 further corroborates our hypothesis that displaying dominance upon success enhances schadenfreude in others after failure. Extending Study 1, it replicates this effect with schadenfreude elicited in the situation.

Unexpectedly, participants rated pride as overwhelmingly authentic and not hubristic in the talent condition. We think that this pattern emerged because Lisa/Lukas in general deserved success based on outstanding achievement. The talent attribution might have damped this general perception of authentic pride (for a similar finding see Lange & Crusius, 2015a).

Study 3

The goal of Study 3 was to complement Studies 1 and 2 by investigating whether displays of dominance other than hubristic pride also increase schadenfreude. Although hubristic pride is the most central emotional display that leads to dominance attainment in competitive contexts (Tracy et al., 2010), dominance can manifest in a diverse set of behavioral cues (Cheng et al., 2013; Henrich & Gil-White, 2001; Maner & Case, 2016). Therefore, we presented participants with successful others who were described as either dominant or prestigious and assessed schadenfreude after this person failed. Dominant others should elicit more schadenfreude than prestigious others. We preregistered the study on AsPredicted.org (<https://aspredicted.org/sq6ay.pdf>).

Method

Participants. Ninety-nine German students were approached at the university campus and invited to take part in a short study. Their mean age was 23.52 years ($SD = 3.85$, range: 18 – 38; 34 men). This sample gave us approximately 90% power to detect a medium main effect of $g = 0.45$ with $\alpha = .05$.

Materials and procedure. Participants' task was to form an impression of Lisa/Lukas based on her/his profile in the high school yearbook. The profile described that s/he graduated with distinction and worked as school representative. The text was

accompanied by a cropped Caucasian happiness expression of the University of California, Davis, Set of Emotion Expressions (Tracy et al., 2009). Underneath the profile, several classmates commented on Lisa's/Lukas' personality. In these comments, s/he was described either as prestigious ($n = 49$) or dominant ($n = 50$). Specifically, the comments represented concrete manifestations of all prestige and dominance items from the scale by Cheng et al. (2010). For instance, the original prestige item "S/he is considered an expert on some matters by members of the group" was transformed into "In our class Lisa/Lukas was always THE math expert." The original dominance item "He/she enjoys having control over other members of the group" was transformed into "Lisa/Lukas enjoyed the control s/he had as part of her duty as school representative" (translated from German). As a manipulation check, participants rated Lisa's/Lukas' prestige and dominance with a German version of the prestige and dominance scales (Cheng et al., 2010) on a scale from 1 (*not at all*), 4 (*somewhat*) to 7 (*very much*). The prestige ($\alpha = .95$, $M = 4.99$, $SD = 1.59$, range: 1.22 – 7) and dominance scales ($\alpha = .94$, $M = 4.66$, $SD = 1.61$, range: 1.38 – 7) were both reliable and strongly negatively correlated, $r(97) = -.78$, $p < .001$. We think the correlation occurred because the profile descriptions were designed so that they map exactly on either the dominance or the prestige subscale leading to a contrast effect on the respective other dimension.

On the next page of the yearbook, students shared a story about Lisa/Lukas. That is, s/he once participated in a math tournament in which s/he accidentally destroyed a buzzer when s/he wanted to answer first. Because of that, Lisa/Lukas was disqualified. In response to this misfortune, we assessed participants' schadenfreude with the items from Study 2 on a scale from 1 (*does not apply at all*) to 7 (*applies very much*). The scale was reliable ($\alpha = .91$, $M = 3.25$, $SD = 1.74$, range: 1 – 7).

Results

Manipulation check. We conducted a MANOVA with Status Attainment (prestige vs. dominance) as independent variable and rated prestige and dominance as dependent

variables. This produced a multivariate effect of Status Attainment, $F(2, 96) = 178.78, p < .001, \eta_p^2 = .79$. As predicted, the prestige condition was rated as higher in prestige ($M = 6.37, SD = 0.59$) than the dominance condition, ($M = 3.64, SD = 0.98$), $F(1, 97) = 281.24, p < .001, \eta_p^2 = .74$, whereas the dominance condition was rated as higher in dominance ($M = 5.93, SD = 0.84$) than the prestige condition ($M = 3.35, SD = 1.08$), $F(1, 97) = 176.33, p < .001, \eta_p^2 = .65$. Thus, the manipulation was successful.

The effect of Status Attainment on schadenfreude. We conducted a *t*-test with Status Attainment (prestige vs. dominance) as independent variable and schadenfreude as dependent variable. As predicted, the dominance condition led to more schadenfreude ($M = 3.6, SD = 1.73$) than the prestige condition ($M = 2.88, SD = 1.68$), $t(97) = -2.11, p = .04, g = -0.42$ (Figure 3).

Discussion

Study 3 supports that a generally dominant as opposed to prestigious person elicits more schadenfreude when this person fails. It therefore extends Studies 1 and 2 by implying that the effect of superiors' dominance on inferiors' schadenfreude is not contingent on dominance signaled by hubristic pride.

Study 4

The goal of Study 4 was to extend Studies 1 to 3 by investigating our proposed mediator. Research supports that dominance displays after success enhance malicious envy in inferiors (Lange & Crusius, 2015a), an emotion related to increased schadenfreude after the successful person's failure (Lange et al., in press). We therefore predicted that the effect of hubristic pride on schadenfreude is mediated via malicious envy. As control variables, we included multiple scales. First, we also measured benign envy, which should be unrelated or even negatively related to schadenfreude. Second, we included other variables that have been theorized to negatively predict schadenfreude, that is, liking (Hareli & Weiner, 2002) and deservingness (Feather & Sherman, 2002). The predicted mediation for malicious envy

should be unaffected by these control variables. We did not have strong predictions for liking and deservingness, yet, given previous research, we hypothesized that they also mediate the effect of hubristic pride on schadenfreude such that hubristic pride leads to less liking and less deservingness, which then mediate negative effects on schadenfreude. We preregistered our predictions on AsPredicted.org (<https://aspredicted.org/wf96q.pdf>).

Method

Participants. Four hundred ninety-five MTurk workers participated in Study 4. Their mean age was 35.81 years ($SD = 11.11$, range: 18 – 74; 275 men). This sample gave us approximately 80% power to detect a mediation effect with small paths (Fritz & MacKinnon, 2007).

Materials and procedure. Study 4 was similar to Study 1. Participants imagined being part of a seminar in which they had to write exams repeatedly. Hillary/Joe achieved a better grade and displayed either authentic ($n = 249$) or hubristic pride ($n = 246$) using the same videos. Given that Study 1 and previous research (Lange & Crusius, 2015a) supports their validity, we omitted the manipulation check to rule out that it drives the effect. This also allowed us to ensure that the effects of the previous studies were not contingent on the manipulation check. Afterwards, we measured benign envy ($\alpha = .71$), malicious envy ($\alpha = .89$), and pain of envy ($\alpha = .86$). These scales were developed as part of the Pain-driven Dual Envy Theory (Lange et al., in press). It states that benign and malicious envy are largely independent, but both are positively correlated with pain. This constitutes a necessary condition to conclude that envy is present. It was fulfilled in Study 4 (see Table 1). Afterwards, participants indicated their liking towards Hillary/Joe ($\alpha = .88$) and how much they think that her/his success was deserved ($\alpha = .93$) on three items each. They were taken from previous research (Lange & Crusius, 2015a). Participants responded for all items on a scale from 1 (*not at all*) to 7 (*very much*). Then, participants learned that Hillary/Joe failed on the subsequent exam and we measured schadenfreude with the scale from Study 1 ($\alpha = .96$).

Results

Descriptive statistics and correlations are displayed in Table 1. We first conducted a MANOVA with Pride (authentic pride vs. hubristic pride) as independent variable and benign envy, malicious envy, pain, liking, deservingness, and schadenfreude as dependent variables (see Table 2). The multivariate effect of Pride was significant, $F(6, 488) = 22.33, p < .001, \eta_p^2 = .22$. Replicating Lange and Crusius (2015a), authentic pride led to more benign and less malicious envy than hubristic pride. Moreover, as predicted, hubristic pride led to more schadenfreude than authentic pride. In line with expectations, hubristic pride also led to less liking and less deservingness than authentic pride. Unrelated to our main predictions, pain was higher in the hubristic than the authentic pride condition.

We next proceeded to the mediation analyses. Benign envy, malicious envy, liking, and deservingness served as parallel mediators of the effect of Pride on schadenfreude (see Figure 4). A mediation analysis with 5,000 bootstrap re-samples and bias-corrected confidence intervals (Preacher & Hayes, 2008), revealed an indirect effect of Pride via malicious envy on schadenfreude, $ab = 0.34, SE = 0.10, CI95\% [0.17; 0.56]$, Sobel $Z = 4.15, p < .001$. In contrast, the indirect effect via benign envy was only marginally significant, $ab = -0.03, SE = 0.02, CI95\% [-0.08; 0.00]$, Sobel $Z = -1.66, p = .10$. In line with expectations, the indirect effects for liking, $ab = 0.60, SE = 0.11, CI95\% [0.41; 0.82]$, Sobel $Z = 6.34, p < .001$, and deservingness, $ab = 0.23, SE = 0.06, CI95\% [0.13; 0.37]$, Sobel $Z = 3.71, p < .001$, were also significant. Comparing the central mediators, the indirect effect of malicious envy was not significantly different from the indirect effects of liking, $ab = -0.26, SE = 0.16, CI95\% [-0.57; 0.04]$, and deservingness, $ab = 0.11, SE = 0.12, CI95\% [-0.12; 0.35]$, whereas the latter two differed, $ab = 0.37, SE = 0.11, CI95\% [0.16; 0.6]$. After controlling for the mediators, Pride did not have a direct effect on schadenfreude, $B = 0.01, SE = 0.13, p = .91$, suggesting full mediation.

Discussion

Study 4 replicates Studies 1 to 3 by supporting that dominance upon success fosters schadenfreude in others after failure. It extends the previous studies by supporting the mediating role of inferiors' malicious envy. Liking and deservingness, which were also theorized to relate to schadenfreude (Feather & Sherman, 2002; Hareli & Weiner, 2002), had independent effects. Importantly, the effect of malicious envy remained stable when controlling for these other mediators as well as for benign envy. In the supplementary materials, we report another study that replicates Study 4 (Study S1) with only malicious and benign envy included as mediators. The materials and data are also available on OSF.

Collectively, Studies 1 to 4 converge on the notion that schadenfreude is an emotional response to a misfortune befalling a person who displayed dominance after initial success. This supports the first condition in the social-functional approach of schadenfreude. But does the expression of schadenfreude then indeed effectively change the superior's dominance? Answering this question was the goal of the subsequent studies.

Study 5

The goal of Study 5 was to investigate the second condition that must be met to support a social-functional approach of schadenfreude. That is, we investigated whether the public expression of schadenfreude reduces initially successful persons' dominance. Superiors' dominance is a function of inferiors' sustained fear (Henrich & Gil-White, 2001). Publicly laughing about another person should be a sign of reduced fear, thereby undermining the intimidating nature of the dominant person. This is in line with evidence supporting that a person's disinhibited laughter signals high status to observers independent of the person's actual status (Oveis, Spectre, Smith, Liu, & Keltner, 2016). Thus, public laughter by inferiors might be a sign of changes in the dominance hierarchy.

Notably, status is a social consensus (Anderson et al., 2015), thus observers should agree on the dominance of others. Therefore, participants imagined observing a competitive situation between two individuals and evaluated the superior's dominance after the initial

success and after the subsequent failure given the inferior's reaction to the misfortune. To test our predictions, we included a *public schadenfreude* condition which should decrease dominance from after success to after failure. We compared this expression with two other conditions. First, a reaction showing that, despite the failure, other individuals still fear the dominant person would be *awkward silence*. This is in line with research linking fear to freezing behavior (e.g., Ekman & Cordaro, 2011). We therefore predicted that others' awkward silence would sustain the superior's dominance. Second, we included a more conservative control condition. If others do not dare to laugh in front of the successful person about the failure but only privately (i.e., suppressed laughter or laughing behind the person's back), this would show fear and therefore sustain dominance. That is, schadenfreude is not publicly expressed. This is in line with research supporting that persons who have low status show inhibited laughter in social situations (Oveis et al., 2016). We called this the *private schadenfreude* condition. In Study 5, we created and validated videos conveying the respective reactions. In sum, we predicted that the public expression of schadenfreude would reduce the superior's dominance, whereas status perception should be unaffected by awkward silence and the private expression of schadenfreude.

Method

Participants. Four hundred ninety MTurk workers participated in Study 5. Their mean age was 35.46 years ($SD = 11.51$, range: 18 – 73; one missing value; 230 men). This sample gave us approximately 90% power to detect a small interaction effect of $\eta_p^2 = .02$ with $\alpha = .05$.

Materials and procedure. Participants imagined the same situation as in Studies 1 and 4. As we wanted to measure perceptions of proud individuals' dominance, participants imagined the situation from a third-person perspective. Specifically, they imagined how Lisa/Matt participated in a seminar in which s/he had to write exams repeatedly and was outperformed by Hillary/Joe. In response to the initial success, Hillary/Joe displayed pride.

Studies 1, 2, and 4 support that schadenfreude is most strongly a response towards successful individuals who displayed hubristic pride. To simplify the design, Hillary/Joe therefore always displayed hubristic pride. Afterwards, we measured how much dominance participants ascribed to her/him. To that end, we adapted and developed items based on the dominance construct as described in Henrich and Gil-White (2001) and the scale developed by Cheng and colleagues (2010). We did not use the entire scale from Cheng and colleagues as most items focus on individual strategies to attain dominance (e.g., “I am willing to use aggressive tactics to get my way”). In our paradigm, participants evaluated Hillary’s/Joe’s dominance from a third-person perspective in relation to others’ reaction to her/him. This means that participants could have ascribed a dominance strategy to Hillary/Joe although they would have denied that the members of the seminar actually felt intimidated by her/him. We therefore measured dominance with three items focusing on the social aspect of dominance. This is the core of status (Anderson et al., 2015). Participants responded to three items (e.g., “Members of the seminar know it is better to let Hillary/Joe have her/his way”) on a scale from 1 (*not at all*), 3 (*somewhat*), to 7 (*very much*). The scale was reliable ($\alpha = .86$, $M = 3.6$, $SD = 1.52$, range: 1 – 7).

Then, Hillary/Joe again failed the subsequent exam. We manipulated whether Lisa/Matt and all other members of the seminar reacted to this failure with public schadenfreude ($n = 165$), awkward silence ($n = 164$), or private schadenfreude ($n = 161$). To do so, we showed participants videos in which actors conveyed the respective expression. In the public schadenfreude condition, the actor openly laughed and simultaneously pointed at the camera, pretending to publicly laugh about someone. In the awkward silence condition, the actor showed the embarrassment display from Study 1. We considered this a nervous expression as if the actor is insecure about how to react to the other’s failure. In the private schadenfreude condition, the actor suppressed the laughter while simultaneously covering the mouth with the right hand.

To validate the videos, we pretested them with $N = 104$ German students. Each participant watched one of the three videos without any provided context and indicated whether the expression displayed schadenfreude, awkward silence, suppressed laughter, or neither of these. The public schadenfreude video ($n = 40$) was perceived as schadenfreude in 85% of the cases. The awkward silence video ($n = 34$) was perceived as awkward silence in 82% of the cases. The private schadenfreude video ($n = 30$) was perceived as suppressed laughter in 47% of the cases but also as schadenfreude in 47% of the cases. The other cases were negligible. The overall pattern was significant, $\chi^2(6) = 113.16, p < .001, \phi_c = .60$. Although the private schadenfreude video was ambiguous with respect to whether it represented suppressed laughter or schadenfreude, the suppressed laughter option was chosen most frequently in the private schadenfreude condition compared to the other two, $\chi^2(2) = 29.1, p < .001, \phi_c = .37$. Thus, together with the fact that pretest participants saw the video without any context, we considered the videos valid.

After the video, participants again rated Hillary's/Joe's dominance with the same scale from above. The scale was reliable ($\alpha = .92, M = 2.56, SD = 1.56$, range: 1 – 7), and moderately positively correlated with dominance assessed before the manipulation, $r(488) = .33, p < .001$.

Results

We conducted a repeated measures ANOVA with Expression (public schadenfreude vs. awkward silence vs. private schadenfreude) and Time (before manipulation vs. after manipulation) as independent variables with repeated measures on the last factor. Dominance served as dependent variable. The analysis revealed a main effect of Expression, $F(2, 487) = 15.39, p < .001, \eta_p^2 = .06$, and a main effect of Time, $F(1, 487) = 192.68, p < .001, \eta_p^2 = .28$. These effects were qualified by the interaction between Expression and Time, $F(2, 487) = 31.8, p < .001, \eta_p^2 = .12$ (see Figure 5). As predicted, public schadenfreude reduced dominance from before ($M = 3.65, SD = 1.52$) to after the manipulation ($M = 2.14, SD =$

1.36), $F(1, 487) = 134.83, p < .001, \eta_p^2 = .22$. Also as predicted, awkward silence did not significantly change dominance from before ($M = 3.61, SD = 1.55$) to after the manipulation ($M = 3.41, SD = 1.74$), $F(1, 487) = 2.32, p = .13, \eta_p^2 = .01$. Contrary to predictions, private schadenfreude also decreased dominance from before ($M = 3.55, SD = 1.49$) to after the manipulation ($M = 2.11, SD = 1.14$), $F(1, 487) = 118.63, p < .001, \eta_p^2 = .20$. Or, to put it differently, before the manipulation dominance did not differ between conditions, $F(2, 487) = 0.20, p = .82, \eta_p^2 = .001$, whereas it differed after the manipulation, $F(2, 487) = 43.65, p < .001, \eta_p^2 = .15$. Specifically, awkward silence sustained more dominance than public schadenfreude, $p < .001$, and private schadenfreude, $p < .001$, while the latter two did not differ, $p = .98$.

Discussion

Study 5 provides evidence for our hypothesis that the public expression of schadenfreude reduces successful person's dominance. In contrast, awkward silence had no such effect on dominance. Unexpectedly, private schadenfreude also reduced dominance. Although the laughter was suppressed, it was nevertheless publicly displayed in front of the dominant person and shared by others. Therefore, maybe the private schadenfreude condition more closely resembled the public expression of schadenfreude. This also dovetails with the pretest results. To overcome this limitation, we aimed at replicating Study 5 with a different operationalization.

Study 6

The goals of Study 6 were to replicate and extend Study 5. Instead of using videos to convey others' reaction to the successful person's failure, we used verbal descriptions. Furthermore, we investigated how others' expressions may affect the perception of prestige. We predicted that public schadenfreude constitutes the only means to reduce dominance. In contrast, laughing privately but not publicly—in addition to showing that others are still afraid of the person—should indicate that they lost respect. As respect is the core element of

ascribed prestige (Henrich & Gil-White, 2001), prestige should be reduced by both public and private schadenfreude expressions.

Method

Participants. Four hundred eighty-six MTurk workers participated in Study 6. Their mean age was 34.16 years ($SD = 11.7$, range: 18 – 76; 214 men). This sample gave us approximately 90% power to detect a small main effect of $\eta_p^2 = .02$ with $\alpha = .05$.

Materials and procedure. Participants imagined the same situation as in Study 5. Again, Lisa/Matt was outperformed in a seminar by Hillary/Joe who displayed hubristic pride upon success. In light of Study 5's findings and to simplify the design, we omitted the dominance measure before the manipulation. Then, Hillary/Joe failed the subsequent exam and we manipulated how Lisa/Matt and all others reacted to this failure. In Study 6, we used verbal descriptions. In the public schadenfreude condition ($n = 160$), we described that Lisa/Matt expressed pleasure and actually laughed a little in front of Hillary/Joe and the others joined in. In the awkward silence condition ($n = 167$), we described that Lisa/Matt and all others started fidgeting and there was an awkward silence in the room. In the private schadenfreude condition ($n = 159$), we described that Lisa/Matt started fidgeting and there was an awkward silence in the room, yet when Hillary/Joe left, Lisa/Matt expressed pleasure and actually laughed a little and the others joined in.

Afterwards, we measured dominance with the scale from Study 5 ($\alpha = .84$, $M = 3.48$, $SD = 1.56$, range: 1 – 7). In addition, participants also indicated Hillary's/Joe's prestige. We again chose items from Cheng and colleagues (2010) that measured the social nature of prestige (e.g., "Members of the seminar respect and admire Hillary/Joe"). The scale was reliable ($\alpha = .89$, $M = 3.16$, $SD = 1.51$, range: 1 – 7) and moderately positively correlated with dominance, $r(484) = .38$, $p < .001$.

Results

We conducted a MANOVA with Expression (public schadenfreude vs. awkward silence vs. private schadenfreude) as independent variable and dominance and prestige as dependent variables. The multivariate effect of Expression on dominance and prestige was significant, $F(4, 966) = 12.89, p < .001, \eta_p^2 = .05$ (see Figure 6), as were the univariate effects for dominance, $F(2, 483) = 11.17, p < .001, \eta_p^2 = .04$, and prestige, $F(2, 483) = 14.97, p < .001, \eta_p^2 = .06$. Specifically, the predicted contrast for dominance comparing the public schadenfreude condition ($M = 3.01, SD = 1.56$) to both the awkward silence ($M = 3.73, SD = 1.52$) and private schadenfreude conditions ($M = 3.68, SD = 1.5$) was significant, $F(1, 483) = 22.23, p < .001, \eta_p^2 = .04$. The orthogonal contrast comparing the latter two was not, $F(1, 483) = 0.07, p = .79, \eta_p^2 < .001$. The predicted contrast for prestige comparing the public ($M = 2.97, SD = 1.64$) and private schadenfreude conditions ($M = 2.83, SD = 1.3$) to the awkward silence condition ($M = 3.66, SD = 1.44$) was significant, $F(1, 483) = 29.17, p < .001, \eta_p^2 = .06$. The orthogonal contrast comparing the former two was not, $F(1, 483) = 0.79, p = .37, \eta_p^2 = .002$. Finally, all predicted post-hoc comparisons between conditions were significant, $ps < .001$, whereas the unpredicted ones were not, $ps > .64$.

Discussion

Study 6 replicates Study 5 that others' public schadenfreude reduces, but awkward silence sustains, successful individuals' dominance. Furthermore, Study 5 extends Study 6 as it supports that private schadenfreude similarly sustains dominance. Thus, Studies 5 and 6 provide converging evidence that publicly expressed schadenfreude reduces dominant individuals' status. In addition, as predicted, prestige was undermined by both public and private schadenfreude expressions.

Study 7

The goal of Study 7 was to investigate whether the reduced perception of dominance following the public expression of schadenfreude has downstream consequences for the initially dominant person. Furthermore, Study 7 extended Studies 5 and 6 by assessing these

consequences from the perspective of a person who is directly involved in the competitive situation. In Studies 5 and 6, participants observed the situation from a third-person perspective. As long as one is not under the influence of the dominant other, it might be easier to judge this person as less influential.

We investigated downstream consequences in a context in which dominance displays and schadenfreude are frequently encountered, that is, sports (Leach, Spears, Branscombe, & Doosje, 2003; McNamee, 2003). We tested our predictions in a tennis scenario using actual tennis players. We confronted participants with a dominant opponent and manipulated whether the audience reacted to a failed shot of the competitor with public schadenfreude or awkward silence. Participants could then choose between options that represented cheating or honest behavior. We predicted that public schadenfreude would lead to more cheating than awkward silence. This is because dominance displays elicit malicious envy in inferiors (Studies 4 and S1; Lange & Crusius, 2015a). As long as the other person is still perceived as dominant, others fear this person's influence. Public schadenfreude by observers may reduce this fear and therefore release the hostile actions promoted by malicious envy. This may then lead to impulsive, immoral acts (Lange, Paulhus, & Crusius, 2018). In the current case, the participants might be inclined to give the ball out even if this is incorrect. In the scenario, both players are dependent on the decisions of the other player which can be compared to a repeated prisoner's dilemma (Kreps, Milgrom, Roberts, & Wilson, 1982). Therefore, cheating might have long-term negative social costs. We preregistered the study on AsPredicted.org (<https://aspredicted.org/nq477.pdf>).

Method

Participants. Three hundred fifty-five active semi-professional tennis players participated in Study 7. We asked for permission from coaches to send the study link to team members and posted the link on various social media websites dedicated to tennis. As specified in the preregistration, we left the link online for two weeks. We set a minimum

sample size of 200. The tennis players' mean age was 32.74 years ($SD = 11.48$, range: 16 – 72, two missing values; 165 men).

Materials and procedure. Participants imagined being in a match against a same-sex competitor in front of one's own and the opposing team's members. The competitor plays very well and wins the first set. Following various point wins, the competitor raises his/her hands and celebrates him-/herself. Following close point losses, s/he subtly threatens the participant. Thus, the competitor displayed hubristic pride over success and engaged into general dominance tactics.

An unnerving rally is described that results in a tough call for the participant. Specifically, the competitor experiences a mishap and accidentally plays the ball with the frame of the tennis racket, leading it to fly in a steep angle across the field, landing just on the mark of the field. The participant sees that, objectively, the ball is in, meaning that the competitor should win the point. However, the audience believes that the ball was out, which would imply that the competitor does not win the point. We manipulated how the audience reacts. They showed either public schadenfreude—one spectator bursts in laughing and the others, including the opposing team members, join in giggling and smiling ($n = 180$)—or awkward silence—the audience is moaning, no one dares to say anything, and they nervously gaze downwards ($n = 175$). As the match is played indoors, no mark indicates whether the ball was in or out. In addition, no referee is available to solve the situation, that is, as usual in amateur tennis, the players have to umpire themselves. This gives the participant the opportunity to decide whether the ball was in or out. This constitutes one central decision amateur tennis players are facing repeatedly. The competitor again engages in dominant behavior and looks skeptically to the participant waiting for the decision. Giving the ball in is the morally correct option, and giving the ball out, constitutes outright lying (i.e., cheating). We reasoned that giving the ball out reflects a downstream consequence of reduced perceptions of dominance.

Participants indicated that they can easily imagine the situation ($M = 3.41$, $SD = 0.67$, range: 2 – 4, scale from 1 to 4) and 89% already experienced or observed such a situation. Thus, the scenario was very realistic.

Results

We conducted a χ^2 -test with Expression (public schadenfreude vs. awkward silence) as independent variable and Decision (ball out vs. ball in) as dependent variable. Our hypothesis was confirmed (see Figure 7). Following the audience's public schadenfreude, 53% of the participants lied and gave the ball out, whereas following the audience's awkward silence, 39% gave the ball out, $\chi^2(1) = 6.9$, $p = .01$, $\phi = .14$.

Discussion

Study 7 implies that reduced dominance following public schadenfreude expressions has downstream consequences for the initially successful person. Moreover, it suggests that such effects may not only occur when participants are in a third-person observer perspective (as in Studies 5 and 6) but also when they are actively involved in the situation.

In the current context, the effect of public schadenfreude on cheating is small. Future research should investigate how public schadenfreude changes other downstream consequences for the initially dominant person.

Additional Studies

We conducted three additional studies. First, in a preregistered study (<https://aspredicted.org/ce4wf.pdf>), we attempted to investigate (a) the effect of an initially successful person's dominance on others' schadenfreude after this person's failure and (b) the effect of schadenfreude on the reduction of the person's dominance from after success to after failure in a single study. In an ostensible competition with two other persons, one competitor either behaved in a dominant or prestigious manner in response to an initial success and later failed. In a fictitious chat, participants could adapt an emoticon to express how they feel about the failure of the other person (which could range between schadenfreude and sympathy; to

see the emoticon, https://unikoelnpsych.eu.qualtrics.com/jfe/form/SV_b93mXJE1PlyfFQx) and send the emoticon to the other ostensible player. In addition, we measured dominance before and after the competitor's failure. In line with Studies 1 to 4, schadenfreude as expressed with the emoticon was higher in the dominance than in the prestige condition, $F(1, 484) = 72.24, p < .001, \eta_p^2 = .13$. In a mediation analysis testing whether the effect of Condition (1—Prestige, 2—Dominance) on schadenfreude, mediates an effect on the reduction of dominance from after success to after failure, the total effect of condition on dominance was marginally significant, $B = 0.20, SE = 0.10, p = .053$, yet, the indirect effect was not, $ab = -0.012, SE = 0.035, CI95\% [-0.081; 0.058]$. Thus, dominance was marginally more strongly reduced in the dominance than the prestige condition but this was not explained by participants' schadenfreude. We think this happened because, within this study, we were unable to manipulate whether participants' schadenfreude is publicly shared, which is a necessary condition of the effect (see Studies 5 to 7). Because this study investigated an effect not tested in any other study, we report this study at length in the supplementary material (Study S2). Materials and data are on OSF.

We conducted two additional studies in which we investigated effects that are strongly overlapping with other studies. Therefore, we describe them only briefly here. The first was similar to Study 6. It showed the same pattern of results. The study revealed the predicted contrast for prestige, $F(1, 446) = 29.9, p < .001, \eta_p^2 = .06$, yet not the predicted contrast for dominance, $F(1, 446) = 2.44, p = .12, \eta_p^2 = .01$. We used a slightly different manipulation of Expression and deem it possible that it was too weak. The second study tested another downstream consequence of reduced dominance perceptions. In an ostensible competition, a dominant person experienced a misfortune. Another reacted either with schadenfreude or awkward silence. Participants then had the opportunity to distribute rewards. As predicted, following schadenfreude, the participant descriptively distributed less to the initially dominant person compared to an expression of awkward silence. The effect

was not significant, $t(328) = -0.82$, $p = .41$, $g = -0.09$. We think that the manipulation was easily overlooked by participants, reducing its effect. Materials and data of both studies are available on OSF.

General Discussion

The presented evidence corroborates a social-functional approach to schadenfreude—schadenfreude contributes to the regulation of dominance hierarchies in competitive situations. Specifically, (a) schadenfreude was intensified when a misfortune happened to a person who initially displayed dominance after success as compared to prestige or embarrassment (Studies 1 to 3). This effect was mediated via inferiors' malicious envy (as well as disliking und perceived undeservingness; Study 4). Moreover, (b) the public expression of schadenfreude then downregulated the superior's dominance as perceived by observers (Studies 5 and 6) and fostered the choice of hostile action (Study 7). Previous approaches to schadenfreude focused mostly on its intrapersonal function (Van Dijk et al., 2015). The current results complement this research by implying that schadenfreude regulates status hierarchies, emphasizing its social nature. This has several implications for research on schadenfreude at the intrapersonal, interpersonal, and group level.

First, at the intrapersonal level, if schadenfreude is related to the regulation of dominance hierarchies, it might also be more prevalent in individuals who desire status and, in particular, dominance. One personality characteristic that is fueled by a desire for status is grandiose narcissism (Wallace & Baumeister, 2002). Grandiose narcissism has an assertive facet—narcissistic admiration—and an antagonistic facet—narcissistic rivalry (Back et al., 2013). Research supports that narcissistic rivalry, but not narcissistic admiration, predicts malicious envy (Lange, Crusius, & Hagemeyer, 2016). As superiors' dominance led to inferiors' schadenfreude partly as a consequence of malicious envy (Study 4), individuals characterized by narcissistic rivalry might be more prone to experience schadenfreude. However, research on the relation of narcissism and schadenfreude found only weak evidence

for a positive relationship (Porter, Bhanwer, Woodworth, & Black, 2014). We suspect that this is because in this study narcissism was assessed with the Narcissistic Personality Inventory (NPI; Raskin & Terry, 1988). This scale is conceptually and empirically more strongly overlapping with narcissistic admiration than rivalry (Back et al., 2013). Therefore, according to our reasoning, no relationship between narcissism and schadenfreude should emerge.

Second, at the interpersonal level, the expression of schadenfreude may not only decrease the dominance of superior individuals but may also increase the dominance of the laughing person. Recent evidence supports that laughter and the use of humor foster status attainment when confidently displayed in appropriate contexts (Bitterly, Brooks, & Schweitzer, 2017; Oveis et al., 2016). In light of such findings, a social-functional approach to schadenfreude may lead to a reinterpretation of its supposed intrapersonal function. So far theories propose that schadenfreude re-establishes self-worth after threatening situations (Van Dijk et al., 2015). This approach is mostly intrapersonal and may apply primarily to private expressions of schadenfreude. However, if laughing about others increases confidence in the self and is simultaneously publicly expressed, schadenfreude could also foster dominance attainment. This approach would be interpersonal. The re-establishment of self-worth in public situations might therefore actually be an establishment of dominance.

Finally, at the intergroup level, a social-functional account of schadenfreude may predict how competition can affect status relationships among groups. Schadenfreude towards outgroups is intensified when the domain is relevant for the ingroup (Leach et al., 2003) and the ingroup feels inferior (Leach & Spears, 2008). These findings support that schadenfreude may evolve as a group-based emotion. Recent evidence indicates that intergroup schadenfreude predicts negative word-of-mouth (Ouwerkerk, van Dijk, Vonkeman, & Spears, 2016). Such gossiping might decrease the status of outgroups and sustain the status of ingroups (for theoretical reasoning see Wert & Salovey, 2004). Furthermore, it may lead to

outgroup appeasement and could promote cooperation (Feinberg, Willer, Stellar, & Keltner, 2012b) as effective ways to reduce the negative consequences of gossip.

Limitations of the Current Research

The current research supports that the public expression of schadenfreude reduces the initially successful person's dominance when others approve the laughter or even join in. This is realistic as long as the person who suffers the misfortune is perceived to have deserved it (Boecker et al., 2015; Dasborough & Harvey, 2017). This applies to the current context as dominant individuals' success is indeed perceived as undeserved (Lange et al., 2016). However, it is possible that in other contexts, the expression of schadenfreude is not approved. In such situations, the expression of humor backfires and actually decreases the status of the laughing person (Bitterly et al., 2017). Moreover, the dominance of the suffering person could even be strengthened. As the attempt to decrease his or her dominance is socially unshared, others could interpret this hesitation as sustained fear, leading to the attainment of dominance. Thus, the legitimacy of the expression of schadenfreude might be a boundary condition of its social function.

Moreover, Studies 5 to 7 support that the public expression of schadenfreude reduces the initial successful person's dominance. But it remains an open question which information schadenfreude conveys to observers. This would constitute the mediating process behind the effect of schadenfreude on the reduction of dominance. One possible inference on the side of observers may be that those who express schadenfreude no longer take the initially successful person's opinion into account, leading observers to infer that their fear decreased.

Finally, we supported our findings in studies using vignettes and videos, by confronting participants with an ostensibly real newspaper article or yearbook entry, and by letting participants interact with ostensibly real competitors. However, participants never interacted with real persons in face-to-face interactions. Even though evidence supports that imagined scenarios and real situations may lead to similar results (e.g., Robinson & Clore,

2001), they can also diverge in their conclusions (Robinson & Clore, 2002). This should be investigated in future research.

Conclusion

The current studies put forward a social-functional approach to schadenfreude—they imply that schadenfreude contributes to the regulation of dominance hierarchies. The evidence thereby extends the prevalent intrapersonal approach in previous research, opening up new perspectives on schadenfreude. We hope that this ultimately advances our understanding of the explosive mix of emotions in competitions.

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Footnotes

¹ We a priori agreed to exclude participants who could not see the videos we displayed. This led to the exclusion of three participants in Study 1, 11 participants in Study 4, five participants in Study 5, and 10 participants in Study 6. We excluded one participant from Study 2 because of failure to follow instructions (participant did not read the interview). We also a priori agreed to exclude participants who indicated we should not use their data following recommendations (Meade & Craig, 2012). This led to the additional exclusion of 11 participants in Study 3, one participant in Study 4, seven participants in Study 5, and six participants in Study 6. Finally, we also a priori agreed to exclude participants who indicated *neither of these* or a non-pride option on the pride manipulation check following methodological recommendations (Lange & Crusius, 2015a; Tracy & Prehn, 2012). This led to the additional exclusion of seven participants in Study 1 and 19 participants in Study 2. The significance of any finding is unchanged if they are included in the analyses. In Study 7, 10 participants indicated that they do not actively play tennis in a team or at tournaments. These were immediately directed to the end of the survey.

Figure 1. The effect of Display on schadenfreude in Study 1. Error bars represent ± 1 SE of the mean.

Figure 2. The effect of Attribution on schadenfreude in Study 2. Error bars represent ± 1 SE of the mean.

Figure 3. The effect of Status Attainment on schadenfreude in Study 3. Error bars represent ± 1 SE of the mean.

Figure 4. Mediation effect of Pride via benign envy, malicious envy, liking, and deservingness on schadenfreude in Study 4. Depicted path coefficients constitute unstandardized regression weights. * $p < .05$

Figure 5. The effects of Expression and Time on dominance in Study 5. Error bars represent ± 1 SE of the mean.

Figure 6. The effect of Expression on dominance and prestige in Study 6. Error bars represent ± 1 SE of the mean.

Figure 7. The effect of Expression on Decision in Study 7. Error bars represent ± 1 SE of the proportion.

Table 1

Descriptive Statistics and Zero-order Correlations of all Measures in Study 4.

	<i>M (SD)</i>	Benign Envy	Malicious Envy	Pain	Liking	Deservingness	Schadenfreude
Benign Envy ^a	4.68 (1.27)	-					
Malicious Envy ^a	2.83 (1.69)	-.02	-				
Pain ^a	3.11 (1.64)	.15*	.69*	-			
Liking ^a	4.12 (1.82)	.21*	-.71*	-.50*	-		
Deservingness ^a	5.44 (1.65)	.03	-.75*	-.56*	.51*	-	
Schadenfreude ^b	3.43 (1.97)	-.02	.73*	.51*	-.67*	-.67*	-

Note. $N = 495$ ^a Participants responded on a scale from 1 (*not at all*) to 7 (*very much*).^b Participants responded on a scale from 1 (*strongly disagree*) to 7 (*strongly agree*).* $p < .05$

Table 2

The Effect of Pride on Benign Envy, Malicious Envy, Pain, Liking, Deservingness, and Schadenfreude in Study 4

Variable	$M_{\text{Authentic}}(SD)$	$M_{\text{Hubristic}}(SD)$	Univariate Effect
Benign Envy ^a	4.84 (1.31)	4.51 (1.22)	$F(1, 493) = 8.38, p = .004, \eta_p^2 = .02$
Malicious Envy ^a	2.29 (1.51)	3.38 (1.68)	$F(1, 493) = 58.06, p < .001, \eta_p^2 = .11$
Pain ^a	2.85 (1.60)	3.38 (1.65)	$F(1, 493) = 12.79, p < .001, \eta_p^2 = .03$
Liking ^a	4.93 (1.61)	3.29 (1.65)	$F(1, 493) = 126.17, p < .001, \eta_p^2 = .20$
Deservingness ^a	5.76 (1.52)	5.11 (1.72)	$F(1, 493) = 19.57, p < .001, \eta_p^2 = .04$
Schadenfreude ^b	2.86 (1.85)	4.01 (1.93)	$F(1, 493) = 45.73, p < .001, \eta_p^2 = .09$

Note. $n(\text{Authentic}) = 249, n(\text{hubristic}) = 246$.

^a Participants responded on a scale from 1 (*not at all*) to 7 (*very much*).

^b Participants responded on a scale from 1 (*strongly disagree*) to 7 (*strongly agree*).

Supplementary Material

Study S1

The goal of Study S1 was to conduct another test of our proposed mediator, that is, malicious envy. As in Study 4, we predicted that the effect of hubristic pride on schadenfreude is mediated via malicious envy. As a control, we measured benign envy which should be unrelated or even negatively related to schadenfreude.

Method

Participants. Two hundred fifty-one MTurk workers participated in Study S1. Their mean age was 32.53 years ($SD = 10.65$, range: 18 – 67; 146 men). This sample gave us approximately 90% power to detect a mediation effect with paths that constitute medium effect sizes (Fritz & MacKinnon, 2007).

Materials and procedure. Study S1 was similar to Study 4. Participants imagined being part of a seminar in which they had to write exams repeatedly. Hillary/Joe achieved a better grade and displayed either authentic ($n = 127$) or hubristic pride ($n = 124$) using the same videos. Given that Study 1 and previous research (Lange & Crusius, 2015b) supports their validity, we omitted the manipulation check to rule out that it drives the effect. Afterwards, we measured benign ($\alpha = .78$) and malicious envy ($\alpha = .91$) with items taken from Lange and Crusius (2015a). Participants responded on a scale from 1 (*does not apply at all*) to 7 (*applies very much*). Then, participants again learned that Hillary/Joe failed on the subsequent exam and we measured schadenfreude with the scale from Study 1 ($\alpha = .97$).

Results

Descriptive statistics and correlations are displayed in Table S11. We first conducted a MANOVA with Pride (authentic pride vs. hubristic pride) as independent variable and benign envy, malicious envy, and schadenfreude as dependent variables. Our hypotheses were confirmed (see Table S2). Specifically, the multivariate effect of Pride was significant, $F(3, 247) = 19.4, p < .001, \eta_p^2 = .19$. Replicating Lange and Crusius (2015b), authentic pride led to

more benign and less malicious envy than hubristic pride. Moreover, hubristic pride led to more schadenfreude than authentic pride.

We next proceeded to the mediation analyses. Benign and malicious envy served as parallel mediators of the effect of Pride on schadenfreude (see Figure S1). In a mediation analysis with 5,000 bootstrap re-samples and bias-corrected confidence intervals (Preacher & Hayes, 2008), we found an indirect effect of Pride via malicious envy on schadenfreude, $ab = 0.85$, $SE = 0.18$, $CI95\% [0.5; 1.19]$, Sobel $Z = 4.72$, $p < .001$. In contrast, the indirect effect via benign envy was not significant, $ab = 0.04$, $SE = 0.06$, $CI95\% [-0.08; 0.17]$, Sobel $Z = 0.75$, $p = .45$. Pride also had a direct effect on schadenfreude, $B = 0.53$, $SE = 0.16$, $p = .001$.

Discussion

Study S1 first replicates Studies 1 to 3 by supporting that dominance upon success fosters schadenfreude in others after failure. It also replicates Study 4 by supporting that malicious but not benign envy mediates this effect. The direct effect of hubristic pride on schadenfreude was significant, suggesting that other variables in addition to malicious envy contribute to it. Potential other mediators might be liking and deservingness as supported in Study 4.

Study S2

The goal of Study S2 was to investigate both (a) the effect of a person's dominance after success on other's schadenfreude after this person's failure and (b) the effect of schadenfreude after failure on the reduction of the person's dominance. Participants were competing against two ostensible other persons of which one behaved dominant or prestigious after success. Then, the competitor failed. We measured schadenfreude in response to this failure as well as dominance after success and after failure. We predicted that the dominant competitor would elicit more schadenfreude after failure than the prestigious competitor, mediating an effect on the reduction of dominance from after success to after failure. We preregistered our predictions on AsPredicted.org (<https://aspredicted.org/ce4wf.pdf>).

Method

Participants. Five hundred and three MTurk workers participated in Study S2.

Given our preregistered criteria, we excluded four participants because they could not see the emoticon with which we measured schadenfreude and five additional participants because they indicated we should not use their data. Thus, the final sample included four hundred ninety-four participants. Their mean age was 34.77 years ($SD = 9.77$, range: 18 – 78, 259 men). This sample gave us approximately 80% power to detect a mediation effect with small paths (Fritz & MacKinnon, 2007).

Materials and procedure. Participants were invited to an ostensible verbal ability test. They had to give themselves a nickname. Afterwards, they were told that an algorithm would draw two other persons matching in age and gender. As an introduction, we ostensibly connected participants to a chat in which everyone wrote a brief statement. Subsequently, one of the other persons was chosen to start with a training session. The goal of the verbal ability task was to form as many words as possible with letters taken from a string. During the training session, the participant saw the letter string that the competitor was ostensibly working on. Based on a scoring scheme, the competitor achieved 9 out of 10 points. Thus, s/he was very successful. Following this success, we again pretended to connect participants to a chat in which everyone could write a short statement.

During this entire period, we manipulated how dominant or prestigious one of the competitors behaved. In the prestige condition ($n = 243$), the competitor called herself/himself *TurkOn*. S/he introduced herself/himself by stating that s/he is looking forward to the test and s/he attributed success in the training session to effort by explaining “Yeah!! I totally gave my best. Will do so again in the real test!” Therefore, the competitor showed approach tendencies as well as goal engagement and expressed authentic pride, which collectively implies prestige (Carver, Sinclair, & Johnson, 2010; Cheng, Tracy, & Henrich, 2010). In the dominance condition ($n = 251$), the competitor called herself/himself *Master#1*. S/he introduced

herself/himself by stating that s/he is looking forward to beating the participant and the other person and s/he attributed success in the training session to talent by explaining “Yeah!!!Told you, I am a natural talent [nickname of participant]! That was only the training man, noone can stop me. I will go for the 10 points!” Therefore, the competitor slightly threatened the others as well as exaggerated success and expressed hubristic pride, which collectively implies dominance (Carver et al., 2010; Cheng et al., 2010). The third person was always called Alex. To verify the manipulation, we measured dominance with the three items used in Studies 5 and 6. We also included the three prestige items as fillers. Both, the dominance after success ($\alpha = .87$) and prestige after success ($\alpha = .92$) scales were reliable.

Afterwards, in the ostensible actual test, the competitor scored only 3 out of 10 points. Thus, s/he failed. In the subsequent chat, Alex neutrally pointed out that the competitor only received 3 points, leaving open how s/he evaluated this. In response to this, participants had a chance to send an emoticon with which participants familiarized themselves in the beginning of the study. We used this as an unobtrusive measure of schadenfreude (see https://unikoinpsych.eu.qualtrics.com/jfe/form/SV_b93mXJE1PlyfFQx). Specifically, participants could adjust the eyebrows and the shape of the mouth of the emoticon on a scale from 1 to 100. Low values on the eyebrows scale would raise the inner brows, whereas high values would lower them. Low values on the mouth shape scale would turn the corners of the mouth downward, whereas high values would turn them upwards. Thus, low values on both scales corresponded to a sad face which we interpreted as sympathy given that the competitor just failed. In contrast, high values corresponded to a happy face which we interpreted as schadenfreude given that the competitor just failed. Leaving both values at 50 resulted in a neutral face. We averaged the eyebrow and mouth shape values as a measure of schadenfreude, $r(439) = .52, p < .001$. Finally, following the emoticon, participants again rated the competitor’s dominance and prestige on the same scales as before. Both, the dominance after failure ($\alpha = .89$) and prestige after failure ($\alpha = .93$) scales were reliable.

Results

Descriptive statistics and zero-order correlations of all scales are displayed in Table S3. As a first test, we conducted a MANOVA with Condition (prestige vs. dominance) as independent variable and dominance after success, dominance after failure, and schadenfreude as dependent variables. Eight participants were excluded because of missing values for schadenfreude. The multivariate effect of Condition was significant, $F(3, 482) = 42.94, p < .001, \eta_p^2 = .21$. The means and univariate tests are displayed in Table S4. In line with predictions, dominance after success was higher in the dominance than the prestige condition. This constitutes a manipulation check. The effect was also significant for dominance after failure. Replicating Studies 1 to 4 and S1, schadenfreude was higher in the dominance than in the prestige condition. The average emoticons participants produced are depicted in Figure S2. Exploratory post-hoc tests supported that schadenfreude was below the neutral value of 50 in the prestige condition, $t(236) = -5.88, p < .001$, and above 50 in the dominance condition, $t(248) = 6.17, p < .001$, indicating a more sympathetic and schadenfrohen emoticon, respectively. We also confirmed the latter in a separate, preregistered study with $N = 64$ collected from various social media websites. Participants saw both emoticons depicted in Figure S2 in random order and indicated whether they express sympathy or schadenfreude (options were displayed in random order). The emoticon taken from the prestige condition was rated as expressing sympathy in 95% of the cases, whereas the emoticon taken from the dominance condition was rated as expressing schadenfreude in 64% of the cases. This pattern was significant in a McNemar Test with Edwards correction, $\chi^2(1) = 34.23, p < .001, \phi = .73$.

We continued to test the predicted mediation from Condition (1—Prestige, 2—Dominance) via schadenfreude to reductions in dominance. For the latter variable, we subtracted dominance after failure from dominance after success. Therefore, high values indicated a higher reduction in dominance. The mediation effect is displayed in Figure S3. The total effect of Condition on dominance reduction was marginally significant, $B = 0.20, SE$

= 0.10, $p = .053$, supporting that dominance was reduced more strongly in the dominance than the prestige condition. Contrary to predictions, the indirect effect was not significant as tested with 5,000 bootstrap re-samples and bias-corrected confidence intervals (Preacher & Hayes, 2008), $ab = -0.012$, $SE = 0.035$, $CI95\% [-0.081; 0.058]$.

Discussion

Study S2 successfully replicated the effect of dominance displays after success on other's schadenfreude after failure found in Studies 1 to 4 and S1. It extended the former studies as we used an unobtrusive measure of schadenfreude in an ostensible competition. Study S2 provided no support for the hypothesis that this effect on schadenfreude mediates an effect on reductions of dominance from after success to after failure. We think this is because the two effects function on a different level. The effect of dominance displays after success on schadenfreude is intrapersonal. The effect of schadenfreude on reductions in dominance is interpersonal and requires that schadenfreude is publicly expressed and shared with others (see Studies 5 to 7). In the current paradigm, we assumed that participants would consider their emotion as expressed in the emoticon to be shared by others (here Alex), leading to the predicted effect. We deem it likely that this assumption was not true, preventing the effect from occurring.

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Table S1

Descriptive Statistics and Zero-order Correlations of all Measures in Study S1.

	<i>M (SD)</i>	Benign Envy	Malicious Envy	Schadenfreude
Benign Envy ^a	4.79 (1.28)	-		
Malicious Envy ^a	2.66 (1.57)	-.24*	-	
Schadenfreude ^b	3.18 (1.95)	-.26*	.79*	-

Note. $N = 251$.^a Participants responded on a scale from 1 (*does not apply at all*) to 7 (*applies very much*).^b Participants responded on a scale from 1 (*strongly disagree*) to 7 (*strongly agree*).* $p < .05$

Table S2

The Effect of Pride on Benign Envy, Malicious Envy, and Schadenfreude in Study S1

Variable	$M_{\text{Authentic}}(SD)$	$M_{\text{Hubristic}}(SD)$	Univariate Effect
Benign Envy ^a	5.20 (1.21)	4.37 (1.22)	$F(1, 249) = 29.26, p < .001, \eta_p^2 = .11$
Malicious Envy ^a	2.20 (1.38)	3.13 (1.62)	$F(1, 249) = 23.93, p < .001, \eta_p^2 = .09$
Schadenfreude ^b	2.47 (1.69)	3.90 (1.95)	$F(1, 249) = 38.41, p < .001, \eta_p^2 = .13$

Note. $n(\text{Authentic}) = 127, n(\text{hubristic}) = 124$.

^a Participants responded on a scale from 1 (*does not apply at all*) to 7 (*applies very much*).

^b Participants responded on a scale from 1 (*strongly disagree*) to 7 (*strongly agree*)

Table S3

Descriptive Statistics and Zero-order Correlations of all Scales in Study S2

	<i>M (SD)</i>	Dominance after success	Prestige after success	Dominance after failure	Prestige after failure	Schadenfreude
Dominance after success ^a	3.34 (1.68)	-				
Prestige after success ^a	4.06 (1.61)	.18*	-			
Dominance after failure ^a	2.84 (1.56)	.75*	.12*	-		
Prestige after failure ^a	3.22 (1.46)	.20*	.70*	.36*	-	
Schadenfreude ^b	50.70 (22.95)	.16*	-.26*	.15*	-.17*	-

Note. $N = 494$ (eight missing values for schadenfreude).

* $p < .05$

^a Participants responded on a scale from 1 (*not at all*), 4 (*somewhat*) to 7 (*very much*).

^b Participants responded on a scale from 1 to 100.

Table S4

The Effect of Condition on Dominance after Success, Dominance after Failure, and Schadenfreude in Study S2

Variable	$M_{\text{Prestige}} (SD)$	$M_{\text{Dominance}} (SD)$	Univariate Effect
Dominance after success ^a	2.78 (1.46)	3.90 (1.70)	$F(1, 484) = 60.28, p < .001, \eta_p^2 = .11$
Dominance after failure ^a	2.38 (1.32)	3.30 (1.64)	$F(1, 484) = 45.58, p < .001, \eta_p^2 = .09$
Schadenfreude ^b	42.23 (20.36)	58.76 (22.39)	$F(1, 484) = 72.24, p < .001, \eta_p^2 = .13$

Note. $n(\text{Prestige}) = 237, n(\text{Dominance}) = 249$.

^a Participants responded on a scale from 1 (*not at all*), 4 (*somewhat*) to 7 (*very much*).

^b Participants responded on a slider from 1 to 100.

Figure S1. Mediation effect of Pride via benign and malicious envy on schadenfreude in Study 4. Depicted path coefficients constitute unstandardized regression weights. * $p < .05$

Figure S2. Average emoticons sent by participants in the prestige and dominance conditions in Study S2.

Figure S3. Mediation effect of Condition via schadenfreude on reductions in dominance in Study S2. Dom Reduction—Dominance after success minus dominance after failure. * $p < .05$, + $p < .10$