

RESEARCH ARTICLE

Self-image and schadenfreude: Pleasure at others' misfortune enhances satisfaction of basic human needs

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Abstract

The present research tested whether observing the failure of another individual and experiencing schadenfreude (i.e., pleasure at others' misfortune) enhance the satisfaction of basic psychological needs in terms of self-esteem, control, belongingness, and meaningful existence. Considering hypothetical scenarios (Experiments 1 and 4), real-life experiences (Experiment 2), and ostensibly real interactions (Experiment 3), four experiments revealed that individuals reported higher levels of need satisfaction when another's setback occurred in a competitive circumstance rather than in a non-competitive circumstance. Moreover, the increased feeling of schadenfreude accounted for the effect of observing the misfortune befalling a competitor on the subsequent satisfaction of human needs. Results are discussed in terms of their theoretical implications for research on schadenfreude, and future research directions are outlined.

When others suffer a setback, people may experience a range of emotions. Individuals can empathize and have feelings of affection for the other or may feel schadenfreude—pleasure at others' misfortune (Heider, 1958; Smith, 2013; Smith, Powell, Combs, & Schurtz, 2009). Although schadenfreude carries a negative connotation, such an emotional reaction is widespread in interpersonal (Van Dijk, Ouwerkerk, Goslinga, & Nieweg, 2005; Van Dijk, Ouwerkerk, Goslinga, Nieweg, & Gallucci, 2006; Van Dijk, Ouwerkerk, Wesseling, & van Koningsbruggen, 2011) and intergroup (Cikara, Bruneau, Van Bavel, & Saxe, 2014; Cikara & Fiske, 2013; Leach & Spears, 2008, 2009; Leach, Spears, Branscombe, & Doosje, 2003) encounters. Thus, a growing body of research has investigated the determinants of schadenfreude, revealing that it is typically evoked by misfortunes happening in competitive circumstances (Cikara & Fiske, 2012, 2013; Smith et al., 2009) and when observers gain from the misfortune (Smith, Eyre, Powell, & Kim, 2006). In a similar vein, people feel pleased when a setback befalls an envied target (Cikara & Fiske, 2013; Smith et al., 1996; Van Dijk et al., 2006) and when another's misfortune is perceived as deserved (Feather & Sherman, 2002; Van Dijk et al., 2005).

Although the circumstances eliciting schadenfreude have been studied extensively, the effects of such malicious pleasure have received less attention. Indeed, hardly any experimental work has investigated how individuals feel after they experience joy at others' misfortunes. However, to understand why schadenfreude is widespread in everyday life, it is important to consider the consequences of this emotion. Thus, drawing from theory and research on the satisfaction of basic

psychological needs, the present research considered the psychological consequences of schadenfreude by investigating the influence of such malicious pleasure on four basic psychological needs that shape self-image. Specifically, we tested the hypothesis that feeling joy at another's suffering would increase individuals' satisfaction of the basic psychological needs of self-esteem, control, belongingness, and meaningful existence.

Schadenfreude and Self-Image

People's motivation to view themselves positively is an important drive of human behavior (Baumeister, 1991; Sedikides & Strube, 1997; Sherman & Cohen, 2006). A good deal of work has shown that a possible route to a more positive self-image involves comparing themselves with a less fortunate other (Collins, 1996; Wills, 1981; Wood, 1989). Indeed, downward social comparisons remove the basis for painful feelings of envy and increase own sense of social competence and adequacy (Gibbons & Gerrard, 1989; Morse & Gergen, 1970; Wills, 1981). Research has further shown that downward social comparisons elicit a wide array of emotions, including positive emotional states (e.g., schadenfreude) and negative emotional states (e.g., worry and pity; for a review, Smith, 2000). Thus, schadenfreude represents one of the possible outcomes of downward social comparisons. In particular, schadenfreude is the joy evoked by downward social comparisons involving another individual's misfortune, particularly in competitive contexts (Smith, 2013; Smith et al., 2009).

Considering that downward social comparisons promote self-enhancement (Collins, 1996; Gibbons & Gerrard, 1989; Morse & Gergen, 1970; Wills, 1981) and that schadenfreude is an emotional consequence of downward social comparisons (Smith, 2000), one possibility is that schadenfreude might be instrumental in enhancing one's self-view. In line with this reasoning, it has been shown that the feelings of schadenfreude and self-enhancement are inherently linked and that people enjoy others' misfortunes primarily when their personal self-evaluation is chronically or momentarily threatened (Van Dijk, Ouwerkerk, et al., 2011; Van Dijk, Van Koningsbruggen, Ouwerkerk, & Wesseling, 2011; for a review, Van Dijk, Ouwerkerk, Smith, & Cikara, 2015). Thus, individuals who experience a self-evaluation threat have a greater need to protect their self-image and are consequently more likely to experience schadenfreude following another's setback than those who are not under threat (Van Dijk, Ouwerkerk, et al., 2011). In a similar vein, people with low self-esteem who have a chronic need to enhance their self-image experience more joy at the misfortune of other individuals than people with high self-esteem do (Van Dijk, Van Koningsbruggen, et al., 2011). Research on group-based schadenfreude shows similar findings. Indeed, feelings of ingroup inferiority predicted schadenfreude at the failure of a successful outgroup (Leach & Spears, 2008; Leach et al., 2003).

Based on these findings, we aimed to investigate how individuals feel after experiencing schadenfreude. Indeed, most research on schadenfreude has investigated the circumstances that elicit such malicious pleasure, paying less attention to its consequences. Past research has shown that self-evaluation threat and low self-esteem are key factors eliciting schadenfreude (Van Dijk, Ouwerkerk, et al., 2011; Van Dijk, Van Koningsbruggen, et al., 2011). Yet, no prior research has investigated whether individuals have an enhanced self-view after experiencing schadenfreude. However, this issue is key in order to define whether the feeling of schadenfreude and self-enhancement are inherently linked (Van Dijk et al., 2015). Moreover, by exploring the psychological consequences of schadenfreude for self-image, we gain further insight into the effects of schadenfreude on social relations, an issue that has been overlooked by previous research. Our approach further aimed to gain insight into the effects of downward social comparisons. Indeed, while prior studies have shown that downward social comparisons promote self-enhancement (Collins, 1996; Gibbons & Gerrard, 1989; Morse & Gergen, 1970; Wills, 1981), they did not test whether the sense of joy and pleasure induced by others' setbacks (i.e., schadenfreude) might account for the effects of downward social comparisons on self-image.

Basic Psychological Needs

Extending prior findings, we investigated whether people feel better about themselves after experiencing pleasure

at the failure of others. In doing so, we connected the literature on schadenfreude with research on the satisfaction and frustration of basic psychological needs.

Since Maslow (1954) developed his hierarchy of needs, several taxonomies of basic psychological needs have been proposed. In recent years, Williams (Williams, 2009; Williams, Cheung, & Choi, 2000) has proposed a comprehensive model suggesting that social threats can reduce the satisfaction of four specific psychological needs: self-esteem, control, belongingness, and meaningful existence. In making this point, Williams referred to a good deal of work showing that each of these needs is key in shaping an individual's self-image. Indeed, to feel good about themselves, individuals need to enhance their self-esteem (Rosenberg, 1965; Steele, 1988) and view themselves as members of a community (Baumeister & Leary, 1995). Furthermore, it has been shown that the perception of controlling events and influencing others (Burger, 1992; Peterson & Seligman, 1984) and the feeling of being important, useful, and meaningful (Greenberg, Pyszczynski, & Solomon, 1986) are key to maintaining a positive self-view.

Consistent with this reasoning, an increasing amount of research has shown that when the self-evaluation is under threat—when individuals undergo experiences of ostracism, exclusion, and relational devaluation—people are less satisfied with respect to each of the four fundamental needs (Riva, Wirth, & Williams, 2011; van Beest, Williams, & Van Dijk, 2011; Williams, 2009; Williams et al., 2000).

Williams (2009) reviewed the theory and research suggesting that each of the hypothesized four constructs should be considered a fundamental psychological need rather than simply a motive. Accordingly, research has shown that poor self-esteem and lack of meaning are linked to depression (Kreger, 1995; Stern, Lynch, Oates, O'Toole, & Cooney, 1995), which has in turn been associated with physical illness, suicidal behaviors, and reduced life expectancy (Allen & Badcock, 2003; Myoshi, 2001). In a similar vein, accumulating evidence has shown that a frustrated need to belong can be associated with reduced well-being, depression, heart problems, and reduced life expectancy (Sorkin, Rook, & Lu, 2002). Finally, the need for control has been linked with lower levels of psychological well-being and poorer health outcomes (Lachman & Weaver, 1998; Seligman, 1975). Thus, although it is possible to consider other taxonomies (e.g., self-determination theory; Deci & Ryan, 1985, 2000), Williams (2009) cogently argued that each of these constructs is a fundamental need that strongly affects an individual's psychological equilibrium.

The Present Research

The present research seeks to illuminate the psychological consequences of schadenfreude for self-image by investigating whether feeling joy at another's suffering increases individuals' satisfaction of basic psychological needs that shape self-image. Considering that prior

research has proposed that another's suffering may be linked to an enhanced self-image (Van Dijk, Ouwerkerk, et al., 2011; Van Dijk, Van Koningsbruggen, et al., 2011; see also Van Dijk et al., 2015) and considering that self-esteem, control, belongingness, and meaningful experience are key human needs that shape self-image (Williams, 2009; Williams et al., 2000), we anticipated that people would report experiencing enhanced satisfaction of fundamental needs when observing other's misfortune. Our hypothesis is based on the possibility that the misfortunes of others can provide people with social comparison benefits. Thus, such misfortunes could promote downward comparisons, which might protect the self and enhance the feeling of self-worth (Collins, 1996; Wills, 1981).

More in detail, we predicted that observing another person's suffering might enhance the general satisfaction of basic human needs by potentially intervening in the fulfillment of each need. Indeed, the misfortune of another individual may increase self-esteem: By observing a misfortune befalling a competitor, individuals could receive feedback on their sense of social competence or adequacy (compared with the person who incurred the misfortune). In a competitive context, others' misfortunes might also enhance the perceivers' feelings of control or power over the course of events and/or their social environment. Similarly, a person who observes the failure of a competitor may feel more socially connected compared with the victim of the setback. Finally, observing the failure of another individual may also enhance one's sense of purpose or meaning in life: other's misfortune may increase in people the feeling that her or his life is more relevant (or has a greater probability of being relevant) than the life of the person who suffered a setback.

Crucially, considering past accounts suggesting that schadenfreude might be instrumental in protecting and enhancing one's self-view (Van Dijk, Ouwerkerk, et al., 2011; Van Dijk, Van Koningsbruggen, et al., 2011), we predicted that the experience of schadenfreude would be the key mediating mechanism driving the predicted direction of influence from another person's misfortune to enhanced self-view. That is, we expected that feelings of schadenfreude would account for the link between perceiving another's misfortune and the increased satisfaction of basic human needs. Indeed, the sense of relief and joy induced by the other's misfortune might foster self-worth, which should increase basic need satisfaction. We tested these predictions in four studies by considering hypothetical scenarios (Experiments 1 and 4), real-life experiences (Experiment 2), and an ostensibly real schadenfreude-eliciting situation (Experiment 3).¹

¹The studies reported in this paper have been approved by the Ethical Committee at the University of Milano-Bicocca, and informed consent was obtained from all participants. According to the *EJSP's* policy on data archiving, we have archived electronic copies of the anonymized raw data, related coding information, and all materials in a secure data repository (i.e., PsychoScope) provided by the Department of Psychology. Both authors have access to such a repository.

Experiment 1

Experiment 1 was designed as a first test of our hypothesis that people would be satisfied in terms of basic needs after observing the failure of another individual. Moreover, we tested whether schadenfreude would mediate the predicted relationship between another's misfortune and the subsequent reported self-view. Considering that schadenfreude is typically evoked by misfortunes happening under competitive circumstances (Cikara & Fiske, 2012, 2013; Smith et al., 2009), we described a setback that occurred to a competitor (vs. a non-competitor) and then asked participants to report their feelings. We predicted that misfortunes occurring to a competitor would trigger schadenfreude, which would in turn lead to greater satisfaction of human needs.

Method

Participants. An a priori power analysis was conducted for sample size estimation (using GPOWER 3.1; Faul, Erdfelder, Lang, & Buchner, 2007). With an $\alpha = .05$ and power = 0.80, the projected sample size needed to detect a medium to large effect size ($f^2 = 0.25$, Cohen, 1988) is approximately $N = 50$ for a between-groups comparison (multivariate analysis of variance, MANOVA) global effects. Overall, we recruited 68 students² from the University of Milano-Bicocca (51% female; $M_{\text{age}} = 24$; standard deviation, $SD = 3.84$) in an experimental design that was subdivided into two groups.

Materials and procedure. Participants were asked to imagine being involved in a job interview. Next, participants were randomly assigned to one of the two experimental conditions. In the competitive condition ($N = 36$), participants learned that a former university colleague with whom he or she has been always in competition had also been selected for the job interview and that only one candidate will get the job. Moreover, the other candidate (who was the same gender as the respondent) was described as having high potential for achievement and a strong likelihood of being offered the job. In the non-competitive condition ($N = 32$), participants learned that a former university colleague had been selected for a job interview to fill a job position unrelated to the participant's position.

Next, we introduced the misfortune information. Participants learned that the other person missed the job interview because a car accident occurred a couple of hours before the job interview.

²In Studies 1, 2, and 4, participants were sampled online. The surveys were posted online for 1 week in order to reach the total sample size indicated by the power analysis. However, in that amount of time, we collected a larger number of participants than we expected. We decided to retain all the participants we collected even though the sample sizes were larger than those indicated by the power analysis.

Table 1. Means and standard deviations for each human need as a function of the event manipulation (Experiment 1)

Condition	Human needs			
	Self-esteem	Control	Belonging	Meaningful existence
Competitive	3.03 (0.84)a	3.33 (0.71)a	3.85 (0.53)a	4.04 (0.50)a
Non-competitive	2.57 (0.73)b	2.65 (0.56)b	3.46 (0.50)b	3.28 (0.78)b

Note: Means with different letters in a given column are significantly different at $p < .05$. Standard deviations are reported in parentheses.

After reading this description, participants were asked to indicate how they might feel if they were in the situation described in the vignette. In particular, participants indicated the extent to which they would experience schadenfreude (i.e., I would enjoy what happened to that person; I couldn't resist a little smile; What happened to that person would amuse me; I would be happy about what happened; $\alpha = .89$; Van Dijk, Van Koningsbruggen, et al., 2011). Participants provided all their responses on 7-point scales, ranging from 1 (*not at all*) to 7 (*extremely*). Participants further indicated how they would feel in terms of self-esteem (i.e., I feel good about myself; My self-esteem is high; I feel liked; I feel insecure—reverse-scored; I feel satisfied; $\alpha = .79$), control (i.e., I feel powerful; I feel I have control of the events; I feel I have the ability to significantly alter events; I feel the others decided everything in my life—reverse-scored; I feel I am unable to influence the action of others—reverse-scored; $\alpha = .66$), belongingness (i.e., I feel I belong to my community; I feel I interact a lot with people; I feel disconnected—reverse-scored; I felt rejected—reverse-scored; I feel like an outsider—reverse-scored; $\alpha = .47$), and meaningful existence (i.e., I feel invisible—reverse-scored; I feel meaningless—reverse-scored; I feel non-existent—reverse-scored; I feel important; I feel useful; $\alpha = .80$). In particular, participants were asked to indicate how they might feel if they were in the situation described in the vignette. Responses were provided on 5-point scales ranging from 1 (*not at all*) to 5 (*extremely*). Finally, participants were thanked and debriefed.

Results and Discussion

First, a t -test confirmed that participants experienced more schadenfreude in the competitive condition ($M = 2.73$, $SD = 1.51$) than in the non-competitive condition ($M = 1.15$, $SD = 0.35$), $t(66) = 5.78$, $p = .001$, $d = 1.42$, 95% confidence interval (CI) = [0.87, 1.93].³

³To assure that our manipulation triggered only schadenfreude and not any kind of positive emotions, we randomly assigned 50 students ($M_{age} = 23.36$, $SD = 5.45$) to one of the two conditions. After reading this description, participants were asked to indicate how they might feel if they were in the situation described in the vignette in terms of schadenfreude, pride, and admiration. Results showed that participants experienced more schadenfreude in the competitive condition ($M = 2.36$, $SD = 1.02$) than in the non-competitive condition ($M = 1.15$, $SD = 0.45$), $t(48) = 5.79$, $p = .001$. In contrast, our manipulation did not affect either pride, $t < 1$, $p = .77$, or admiration, $t < 1$, $p = .50$. Thus, confirming our expectations, these findings show that the manipulation fostered only schadenfreude rather than any positive emotions.

Further, a MANOVA revealed a multivariate effect of our manipulation on the basic psychological needs, $F(4, 62) = 7.36$, $p < .001$, $\eta_p^2 = 0.32$ (see Table 1 for the means and SD). Thus, at the univariate level, we found that participants reported feeling greater self-esteem in the competitive condition than in the non-competitive condition, $F(1, 65) = 5.55$, $p = .02$, $\eta_p^2 = 0.08$. A greater sense of control over events was reported in the competitive condition than in the non-competitive condition, $F(1, 65) = 18.44$, $p < .001$, $\eta_p^2 = 0.22$. Participants further reported a greater sense of belonging in the competitive condition than in the non-competitive condition, $F(1, 65) = 9.35$, $p = .003$, $\eta_p^2 = 0.13$. Participants also reported a greater perception that their lives are meaningful in the competitive condition than in the non-competitive condition, $F(1, 65) = 23.02$, $p < .001$, $\eta_p^2 = 0.26$.⁴

We next tested the hypothesized mediations considering each basic human need using a bootstrapping procedure (Hayes, 2013; Preacher & Hayes, 2008). We found that our manipulation (coded as *non-competitive* = 0 and *competitive* = 1) predicted self-esteem scores ($B = 0.43$, $SE = 0.19$, $p = .03$). Moreover, our manipulation predicted schadenfreude ($B = 1.54$, $SE = 0.27$, $p < .001$). When schadenfreude scores were included in the regression equation, they predicted self-esteem scores ($B = 0.29$, $SE = 0.07$, $p = .004$), whereas the direct effect of the manipulation on self-esteem was no longer significant ($B = -0.03$, $SE = 0.21$, $p = .87$). The analysis revealed that the indirect effect via the mediator was significant ($B = 0.47$, $SE = 0.14$, 95% CI = [0.22, 0.79], 5000

⁴To provide a more conservative test of our hypothesis (i.e., that observing the failure of a competitor increases needs in comparison to a baseline), we ran a follow up study in which participants ($N = 75$) were randomly exposed either to the competitive condition or to a baseline condition (i.e., participants were not exposed to any manipulation and were asked to report their satisfaction of basic human needs). Results showed that participants reported feeling greater self-esteem in the competitive condition ($M = 3.88$, $SD = 0.67$) than in the baseline condition ($M = 2.97$, $SD = 0.87$), $t(73) = 5.09$, $p < .01$. A greater sense of control over events was reported in the competitive condition ($M = 3.60$, $SD = 0.63$) than in the baseline condition ($M = 3.23$, $SD = 0.63$), $t(72) = 2.78$, $p < .01$. Participants further reported a greater sense of belonging in the competitive condition ($M = 4.53$, $SD = 0.49$) than in the baseline condition ($M = 3.73$, $SD = 0.99$), $t(73) = 4.53$, $p < .01$. Participants also reported a greater perception that their lives are meaningful in the competitive condition ($M = 4.60$, $SD = 0.50$) than in the baseline condition ($M = 4.02$, $SD = 0.93$), $t(73) = 3.78$, $p < .01$. Taken together, these findings suggest that the competitive condition increased people's reports of basic human need satisfaction compared with a baseline.

bootstrap resamples) and that schadenfreude fully mediated the relationship between the misfortune experienced by a competitor and the subsequent reported self-esteem.⁵

We further found that our manipulation predicted the control scores ($B=0.66$, $SE=0.15$, $p=.001$). When schadenfreude scores were included in the regression equation, they predicted control scores ($B=0.30$, $SE=0.06$, $p=.001$), whereas the direct effect of the manipulation on control was no longer significant ($B=0.18$, $SE=0.16$, $p=.28$). The indirect effect via the mediator was significant ($B=0.48$, $SE=0.11$, 95% CI = [0.26, 0.73]), suggesting that schadenfreude fully mediated the relationship between the misfortune befalling a competitor and the subsequent reported sense of control.

Regarding the sense of belonging, the analysis revealed that our manipulation predicted belonging scores ($B=0.37$, $SE=0.12$, $p=.004$). When schadenfreude scores were included in the regression equation, they predicted the participants' belonging scores ($B=0.14$, $SE=0.05$, $p=.01$), whereas the direct effect of the manipulation was no longer significant ($B=0.14$, $SE=0.14$, $p=.31$). Consistent with our predictions, schadenfreude fully mediated the relationship between the misfortune experienced by a competitor and the subsequent reported sense of belonging ($B=0.22$, $SE=0.10$, 95% CI = [0.04, 0.43]). Finally, we found that our manipulation predicted the meaningful existence scores ($B=0.75$, $SE=0.15$, $p<.001$). When schadenfreude scores were included in the regression equation, they predicted the meaningful existence scores ($B=0.17$, $SE=0.06$, $p=.01$), whereas the direct effect of the manipulation was reduced ($B=0.49$, $SE=0.18$, $p=.01$). The indirect effect was significant ($B=0.26$, $SE=0.08$, 95% CI = [0.12, 0.44]), suggesting thus that schadenfreude partially mediated the relationship between the misfortune that occurred to a competitor and the subsequent perception of meaningful existence.

Taken together, these findings showed that participants reported more schadenfreude when a misfortune occurred in a competitive circumstance rather than in a non-competitive circumstance. Our data also showed that a misfortune occurred to a competitor increased people's reports of basic human need satisfaction, in terms of a greater perception of self-esteem, sense of control, belongingness, and meaningful existence. Moreover, schadenfreude mediated the effects of observing a misfortune befalling a competitor on the subsequent satisfaction of human needs.

Experiment 2

Experiment 2 was designed to replicate the findings of Experiment 1 by considering real situations. In particular, we asked a participant to recall an experience in

⁵In each study, we tested alternative models using the basic psychological needs as the potential mediators and schadenfreude as the dependent variable. However, none of these models fitted better than those reported in the manuscript.

which a competitor suffered a misfortune and to report how he or she felt in that specific situation (for a similar procedure, Leach, Spears, & Manstead, 2015). This helped us to go beyond expectations about the feelings associated with others' misfortune and to investigate real feelings experienced by individuals.

Method

Participants. Based on the same a priori power analysis of Study 1, we recruited 81 students from the University of Milano-Bicocca (84% female; $M_{\text{age}}=22.09$, $SD=3.48$) in an experimental design that was subdivided into two groups.

Materials and procedure. As a cover story, participants were asked to participate in a study aimed at defining the memory abilities to remember past events. In the competitive condition ($N=38$), participants were asked to type in a text box the description of an experience in which they were in competition with a peer who suffered a misfortune (i.e., "The present research aims to explore your ability to remember past events. In the space below please describe a recent event in which a peer of yours whom you were competing against suffered a misfortune"). In the non-competitive condition ($N=43$), participants wrote about an experience in which a peer suffered a misfortune (i.e., "[...] In the space below please describe a recent event in which a peer of yours suffered a misfortune"). Next, participants were asked to indicate the extent to which they felt schadenfreude during the recalled circumstance (i.e., I enjoyed what happened to that person; I couldn't resist a little smile; What happened to that person amused me; I was happy about what happened; $\alpha=.94$) using 7-point scales, ranging from 1 (*not at all*) to 7 (*extremely*). Finally, participants indicated how they felt in the recalled episode in terms of self-esteem ($\alpha=.78$), control ($\alpha=.66$), belongingness ($\alpha=.60$), and meaningful existence ($\alpha=.60$) using the measures employed in Experiment 1. Participants provided their responses on 5-point scales, ranging from 1 (*not at all*) to 7 (*extremely*).

Results and Discussion

Preliminary analyses revealed that most participants recalled episodes related to sports or academic achievements. Participants in the non-competitive condition did not mention competitive peers. In line with Experiment 1, we found that participants experienced more schadenfreude in the competitive condition ($M=3.10$, $SD=1.82$) than in the non-competitive condition ($M=1.28$, $SD=0.87$), $t(79)=5.83$, $p=.001$, $d=1.29$, 95% CI = [0.81, 1.77]. Further, a MANOVA revealed a multivariate effect of our manipulation on the basic psychological needs, $F(4, 73)=4.31$, $p=.003$, $\eta_p^2=0.19$ (see Table 2 for the means and SD). Thus, at the univariate level, we found that participants reported a greater

Table 2. Means and standard deviations for each human need as a function of the event manipulation (Experiment 2)

Condition	Human needs			
	Self-esteem	Control	Belonging	Meaningful existence
Competitive	3.37 (0.97)a	3.36 (0.90)a	3.77 (0.69)a	3.83 (0.67)a
Non-competitive	2.68 (0.88)b	2.78 (0.63)b	3.73 (0.67)a	3.45 (0.74)b

Note: Means with different letters in a given column are significantly different at $p < .05$. Standard deviations are reported in parentheses.

self-esteem in the competitive condition than in the non-competitive condition, $F(1, 76) = 10.69$, $p = .002$, $\eta_p^2 = 0.12$. A greater sense of control over events was reported in the competitive condition than in the non-competitive condition, $F(1, 76) = 10.86$, $p = .001$, $\eta_p^2 = 0.13$. However, participants did not report a greater sense of belonging in the competitive condition than in the non-competitive condition, $F < 1$, $p = .80$. In contrast, participants reported a greater perception that their lives are meaningful in the competitive condition than in the non-competitive condition, $F(1, 76) = 5.66$, $p = .02$, $\eta_p^2 = 0.07$.⁶

We next tested the hypothesized mediations considering each basic human needs (Hayes, 2013; Preacher & Hayes, 2008). We found that our manipulation (coded as *non-competitive* = 0 and *competitive* = 1) predicted self-esteem scores ($B = 0.72$, $SE = 0.21$, $p = .001$). Moreover, our manipulation predicted schadenfreude ($B = 1.88$, $SE = 0.32$, $p < .001$). When schadenfreude scores were included in the regression equation, they predicted self-esteem scores ($B = 0.25$, $SE = 0.07$, $p = .001$), whereas the direct effect of the manipulation on self-esteem was no longer significant ($B = 0.25$, $SE = 0.23$, $p = .28$). The analysis revealed that the indirect effect via the mediator was significant ($B = 0.47$, $SE = 0.15$, 95% CI = [0.21, 0.83]) and that schadenfreude fully mediated the relationship between the misfortune that occurred to a competitor and the subsequent reported self-esteem. We further found that our manipulation predicted the control scores ($B = 0.54$, $SE = 0.17$, $p = .002$). When schadenfreude scores were included in the regression equation, they predicted the control scores ($B = 0.28$, $SE = 0.05$, $p = .001$), whereas the direct effect of the manipulation on control was no

longer significant ($B = 0.03$, $SE = 0.17$, $p = .86$). Thus, the indirect effect via the mediator was significant ($B = 0.51$, $SE = 0.14$, 95% CI = [0.27, 0.83]), and schadenfreude fully mediated the relationship between the misfortune that occurred to a competitor and the subsequent reported sense of control.

Regarding the sense of belonging, schadenfreude did not mediate the relationship between the misfortune that occurred to a competitor and the subsequent reported sense of belonging (indirect effect via the mediator, $B = 0.05$, $SE = 0.11$, 95% CI = [-0.20, 0.26]). Finally, we found that our manipulation predicted the meaningful existence scores ($B = 0.34$, $SE = 0.15$, $p = .03$). When schadenfreude scores were included in the regression equation, they predicted the meaningful existence scores ($B = 0.12$, $SE = 0.05$, $p = .03$), whereas the direct effect of the manipulation was no longer significant ($B = 0.12$, $SE = 0.18$, $p = .51$). Schadenfreude fully mediated the relationship between the misfortune befalling a competitor and the subsequent perception of meaningful existence ($B = 0.22$, $SE = 0.10$, 95% CI = [0.05, 0.45]).

Thus, these findings showed that participants experienced more schadenfreude when a misfortune occurred in a competitive circumstance rather than in a non-competitive circumstance. In a similar vein, our data show that a misfortune that occurred to a competitor increased people satisfaction in terms of a greater perception of self-esteem, sense of control, and meaningful existence. Crucially, schadenfreude mediated the effects of observing a misfortune befalling a competitor on the subsequent satisfaction of human needs. In other words, the more someone felt joy at another's misfortune, the more she or he reported a higher satisfaction of basic human needs.

Experiment 3

Experiment 3 was designed to test our predictions by going beyond recalled events and involving an ostensibly real online interaction. Thus, in Experiment 3, we developed a lab paradigm that engaged participants in a task in which a competitor (vs. a non-competitor) suffered a setback.

Method

Participants. Based on the same a priori power analysis, we recruited 50 students from the University of Milano-Bicocca. However, seven participants expressed

⁶An analysis of the content recalled by participants revealed that in the competitive condition, participants recalled either misfortunes that gave them a direct advantage (e.g., a sport competitor suffered an injury during a match) or misfortunes that did not give them any advantage (e.g., a long lasting competitor failed an academic examination that did not involve the participant). Supplementary analyses revealed that participants reported the same level of self-esteem in the misfortune with gain condition and in the misfortune without personal gain condition ($t < 1$, $p = .85$). Similar findings emerged on the control ($t < 1$, $p = .96$), belonging ($t < 1.29$, $p = .20$), and meaningful existence ($t < 1$, $p = .50$) scales. Moreover, a MANOVA including these two competitive conditions and the non-competitive condition revealed a multivariate effect of our manipulation on the basic psychological needs, $F(4, 73) = 2.58$, $p = .01$, $\eta_p^2 = 0.12$. At the univariate level, the effect was significant for self-esteem, $F(2, 75) = 5.38$, $p = .007$, $\eta_p^2 = 0.12$, control, $F(2, 75) = 5.32$, $p = .007$, $\eta_p^2 = 0.12$, and meaningful existence scores, $F(2, 75) = 3.23$, $p = .04$, $\eta_p^2 = 0.07$.

suspicious about the manipulation, and they were removed from the analyses, leaving thus 43 participants aged between 19 and 27 ($M=21.56$, $SD=2.20$).

Materials and procedure. To induce the real on-line interaction, we used a modified version of the competitive reaction time task (Giancola & Parrott, 2008; Giancola & Zeichner, 1995). In the modified version, participants were told they would play a game on reaction times with an opponent. They were also informed that there would be two sets of opponents. Thus, participant's task was to compete with the opponent in her or his own set. The cover story continued by informing participants that the winner of each set would win €5. Participants were informed that they would have to play two rounds of the game with the same opponent. Importantly, the outcomes of the two sets of opponents were independent. Indeed, the sole purpose of including a second set of opponents in the cover story was to implement the control condition. The entire session was video-taped using a webcam that was placed on top of the participant's computer screen.

Participants were then shown the interface of the competitive reaction time game. Following the typical procedure of the task, the experimenter explained to participants that if they lost a trial, they would actually hear a burst of noise through their headphones and the noise level would be set by their opponent. However, if they won a trial, their opponent would hear the burst of noise set by them. Thus, participants knew that they could set the noise level for their opponent and that the opponent could set the noise level for them.

Next, participants were shown the actual screen on which they would play. They were first shown a learning trial. They were told that they had to click on a square on the screen as soon as it turned red. Whoever was the quickest to click the red square (i.e., the participant or the opponent) would win the trial, and whoever clicked second would lose and hear the noise set by the other person. The actual noise levels set by the other person would also appear on the screen; therefore, the participant would always know which noise level was set by the opponent in each trial. Unbeknownst to the participant, there was no real online opponent.

When the participant was ready to start the competition, the experimenter made a fake phone call to make sure that the supposed opponent was ready as well. Then, a connection screen appeared on the participant's screen. On the connection screen, a series of messages appeared in sequence to inform participants that they were connected to the competition as part of the first set of opponents, that their opponent was successfully logged in, and that the two players of the other set of opponents were also connected. Participants were asked to indicate their names. Accordingly, players' names appeared on the connection screen, so that participants could see that their opponent was always of the same sex.

Then, participants could play the first round of nine trials. The task was pre-programmed to make the participant lose five of nine trials. At the end of the first round of competition, the ranking showing the results of the first round of competition appeared on the screen. Participants were shown the actual scores, and they were informed that they had lost the first round of competition against the competitor. Then, a second connection screen appeared on the screen, ostensibly to reconnect all participants in the second round of competition. Participants could see that they were successfully logged into the competition.

Next, participants were randomly assigned to one of two experimental conditions. In the competitive condition, a message appeared saying that the participant's opponent could not be connected to the game owing to a technical problem on his or her computer. Thus, the failure of Internet connection represented a clear misfortune because the opponent lost the chance to win the money. In the non-competitive condition, a similar message reported that one of the two players of the other set of opponents could not be logged on. At this point, the experimenter approached the participant and read the messages on the computer screen. The experimenter informed the actual participants that they would have to stop for a short while to determine how to manage the issue, as all players (of both sets of opponents) should be connected before proceeding.

However, before leaving the experimental room, the experimenter asked participants if they would be willing to complete a short questionnaire for another study. In this questionnaire, participants were asked to indicate how they currently felt in terms of self-esteem ($\alpha=.76$), control ($\alpha=.50$), belongingness ($\alpha=.78$), and meaningful existence ($\alpha=.66$) using the same items employed in Experiments 1 and 2. To accomplish the cover story and avoid having participants guess the purpose of the experiment, we did not include any item measuring schadenfreude in this study. Indeed, the inclusion of items such as "I enjoyed what happened to the other student" would have been perceived as suspicious by participants, and the misfortune would have appeared unrealistic. After a few minutes, the experimenter returned to the room to collect the questionnaire, and participants were fully debriefed about the aim of the experiment.

Results and Discussion

First, to test whether our new manipulation was able to induce feelings of schadenfreude, we asked two independent judges, who were blind to the hypotheses and to the experimental conditions, to watch the videos (without any audio) and to report the extent to which each participant appeared to be enjoying himself or herself and smiling (i.e., looking at the video, please report the extent to which the person in the video is enjoying himself or herself; looking at the video, please report the extent to which the person in the video is smiling). Participants provided their answers on 7-point scales

Table 3. Means and standard deviations for each human need as a function of the event manipulation (Experiment 3)

Condition	Human needs			
	Self-esteem	Control	Belonging	Meaningful existence
Competitive	3.88 (0.59)a	3.40 (0.34)a	4.26 (0.74)a	4.36 (0.37)a
Non-competitive	3.21 (0.56)b	3.06 (0.50)b	3.84 (0.66)b	3.97 (0.41)b

Note: Means with different letters in a given column are significantly different at $p < .05$. For the belonging scale, $p = .06$. Standard deviations are reported in parentheses.

ranging from 1 (*not at all*) to 7 (*extremely*). We used these items ($r = .80$, $p < .001$) as an index of schadenfreude (Boecker, Likowski, Pauli, & Weyers, 2015). In particular, the two judges analyzed only the section of each video (60 seconds long) in which the manipulation occurred on the participants' screen (i.e., when the participant realized the other's misfortune). The evaluations of the two judges have been averaged ($r = .67$, $p < .001$). The analysis revealed that participants were judged to experience more schadenfreude when the misfortune occurred in a competitive circumstance ($M = 3.17$, $SD = 1.20$) than in the non-competitive condition ($M = 2.42$, $SD = 0.85$), $t(36)^7 = 2.39$, $p = .03$, $d = 0.72$, 95% CI = [0.06, 1.38].

Next, in line with the findings reported in our prior experiments, a MANOVA revealed a multivariate effect of our manipulation on the basic psychological needs, $F(4, 36) = 4.48$, $p = .005$, $\eta_p^2 = 0.33$ (see Table 3 for the means and SD). Thus, at the univariate level, we found that participants reported greater self-esteem in the competitive condition than in the non-competitive condition, $F(1, 39) = 13.52$, $p = .001$, $\eta_p^2 = 0.25$. A greater sense of control over events was reported in the competitive condition than in the non-competitive condition, $F(1, 39) = 5.93$, $p = .02$, $\eta_p^2 = 0.13$. Moreover, participants reported a marginally greater sense of belonging in the competitive condition than in the non-competitive condition, $F(1, 39) = 3.63$, $p = .06$, $\eta_p^2 = 0.08$. Finally, participants reported a greater perception that their lives are meaningful in the competitive condition than in the non-competitive condition, $F(1, 39) = 9.91$, $p = .003$, $\eta_p^2 = 0.20$.

Although our findings confirmed that our manipulation elicited schadenfreude, in Experiment 3, we did not find that such a score of schadenfreude mediated the effects of observing a misfortune befalling a competitor on the subsequent satisfaction of human needs. This might be due to the fact that in Study 3, schadenfreude was not reported by the participants themselves (thus accounting for their self-reported basic needs) but was inferred by third-party observers who rated each participant's facial expression. Indeed, observers might not have been accurate enough to rate participants' subtle smiling in order to account for the participants' subsequent basic need satisfaction. The possibility that participants' facial expression could account for basic need

satisfaction elicited by our manipulation remains an interesting topic; however, physiological recording of participants' smiling (electromyography) should convey a more precise test of this relationship.

Overall, these findings confirmed that a misfortune that occurred to a competitor in an ostensibly real online interaction elicited schadenfreude and increased people satisfaction in terms of a greater perception of self-esteem, sense of control, belonging, and meaningful existence.

Experiment 4

Experiment 4 was designed to test whether the effects we found in previous experiments arise from a misfortune that benefits the observer or if they occur even when the misfortune does not give the observer any direct advantage. Indeed, in the first three experiments, the competitor's failure could have implied the participant's victory. Therefore, the greater fulfillment of basic needs and the greater schadenfreude we found in the competitive condition might be due to the participants' expectation of winning rather than the participants' expectation of the other individual losing. To address this issue, in Experiment 4, we described a setback that did not benefit the observer occurred to a competitive (vs. non-competitive) peer and observed changes in schadenfreude and need satisfaction.

Method

Participants. Based on the same a priori power analysis, we recruited 73 students from the University of Milano-Bicocca (57 female; $M_{age} = 21.92$, $SD = 4.48$) in an experimental design that was subdivided into two groups.

Materials and procedure. Following the procedure of Experiment 1, we employed two hypothetical scenarios. In the competitive condition ($N = 42$), participants learned that a former university colleague with whom they have been always in competition has been selected for a job interview. Differently from Experiment 1, the participant was not involved in the job interview and did not compete directly with the other individual to get the job. In the non-competitive condition ($N = 31$), participants learned that a former university colleague has been selected for a job interview to fill a job position. In this condition, we did not

⁷Owing to a technical problem, the webcam did not record five experimental sessions.

mention that the participant and the target person have been in competition in the past. Next, we introduced the misfortune information. Participants learned that the other person missed the job interview because of a car accident that occurred a couple of hours before the job interview. Importantly, such a misfortune did not give the observer any direct advantage because he or she was not involved in any job interview. After reading this description, we assessed participants' reactions to this misfortune in terms of schadenfreude ($\alpha = .88$), self-esteem ($\alpha = .81$), control ($\alpha = .84$), belongingness ($\alpha = .50$), and meaningful existence ($\alpha = .78$) following the procedure of the previous three experiments.

Results and Discussion

First, we found that participants experienced more schadenfreude in the competitive condition ($M = 3.66$, $SD = 1.42$) than in the non-competitive condition ($M = 1.70$, $SD = 0.94$), $t(69) = 6.54$, $p = .001$, $d = 1.57$, 95% CI = [1.02, 2.10]. Furthermore, a MANOVA revealed a multivariate effect of our manipulation on the basic psychological needs, $F(4, 67) = 2.79$, $p = .03$, $\eta_p^2 = 0.14$ (see Table 4 for the means and SD). Thus, at the univariate level, we found that participants reported greater self-esteem in the competitive condition than in the non-competitive condition, $F(1, 70) = 10.12$, $p = .002$, $\eta_p^2 = 0.12$. A greater sense of control over events was reported in the competitive condition than in the non-competitive condition, $F(1, 70) = 7.14$, $p = .009$, $\eta_p^2 = 0.09$. However, participants did not report a greater sense of belonging in the competitive condition than in the non-competitive condition, $F < 1.59$, $p = .21$. In contrast, participants reported a greater perception that their lives are meaningful in the competitive condition than in the non-competitive condition, $F(1, 70) = 3.91$, $p = .05$, $\eta_p^2 = 0.05$.

We next tested the hypothesized mediations considering each basic human needs (Hayes, 2013; Preacher & Hayes, 2008). We found that our manipulation (coded as *control* = 0 and *experimental* = 1) predicted self-esteem scores ($B = 0.63$, $SE = 0.19$, $p = .002$). Moreover, our manipulation predicted schadenfreude ($B = 1.95$, $SE = 0.29$, $p < .001$). When schadenfreude scores were included in the regression equation, they predicted self-esteem scores ($B = 0.32$, $SE = 0.02$, $p = .001$), whereas the direct effect of the manipulation on self-esteem was no longer significant ($B = -0.01$, $SE = 0.22$, $p = .93$). The analysis revealed that the indirect effect via the mediator was significant ($B = 0.62$, $SE = 0.17$,

95% CI = [0.32, 1.02]) and that schadenfreude fully mediated the relationship between the misfortune that occurred to a competitor and the subsequent reported self-esteem. We further found that our manipulation predicted the control scores ($B = 0.48$, $SE = 0.18$, $p = .009$). When schadenfreude scores were included in the regression equation, they predicted the control scores ($B = 0.17$, $SE = 0.07$, $p = .02$), whereas the direct effect of the manipulation on control was no longer significant ($B = 0.15$, $SE = 0.23$, $p = .50$). Thus, the indirect effect via the mediator was significant ($B = 0.32$, $SE = 0.16$, 95% CI = [0.04, 0.67]), and schadenfreude fully mediated the relationship between the misfortune that occurred to a competitor and the subsequent reported sense of control. Regarding the sense of belonging, schadenfreude mediated the relationship between the misfortune that occurred to a competitor and the subsequent reported sense of belonging (indirect effect via the mediator, $B = 0.18$, $SE = 0.08$, 95% CI = [0.03, 0.35]) even if we did not find that our manipulation affected the sense of belonging (Hayes, 2013). Finally, we found that our manipulation predicted the meaningful existence scores ($B = 0.37$, $SE = 0.18$, $p = .05$). When schadenfreude scores were included in the regression equation, they predicted the meaningful existence scores ($B = 0.17$, $SE = 0.07$, $p = .02$), whereas the direct effect of the manipulation was no longer significant ($B = 0.04$, $SE = 0.23$, $p = .85$). Schadenfreude fully mediated the relationship between the misfortune befalling a competitor and the subsequent perception of meaningful existence ($B = 0.33$, $SE = 0.16$, 95% CI = [0.02, 0.70]). Overall, these findings showed that a misfortune that occurred to a competitor increased schadenfreude and the fulfillment of basic needs, even when such a misfortune did not provide any direct advantage for the observer.

General Discussion

The word "schadenfreude" captures the malicious pleasure that people may feel when other individuals and groups suffer a misfortune (Cikara & Fiske, 2013; Heider, 1958; Smith et al., 2009). Because extant research in this area has investigated the circumstances that elicit schadenfreude, our understanding of the consequences of such malicious pleasure is limited. Across four studies, we investigated the psychological consequences of schadenfreude on four basic human needs shaping self-image: self-esteem, sense of control, belongingness, and meaningful existence. Experiment 1 revealed that when

Table 4. Means and standard deviations for each human need as a function of the event manipulation (Experiment 4)

Condition	Human needs			
	Self-esteem	Control	Belonging	Meaningful existence
Competitive	2.43 (0.90)a	2.00 (0.89)a	3.58 (0.51)a	2.17 (0.89)a
Non-competitive	1.81 (0.69)b	1.51 (0.55)b	3.41 (0.61)a	1.80 (0.61)b

Note: Means with different letters in a given column are significantly different at $p < .05$. Standard deviations are reported in parentheses.

a competitor incurred a misfortune, people reported increased overall feelings of satisfaction of basic needs. Specifically, individuals reported greater self-esteem, an enhanced sense of control, a greater sense of belonging, and a greater perception that their lives are meaningful. Moreover, Experiment 1 showed that schadenfreude mediated the relationship between another person's suffering and the subsequent enhanced self-view of the observer. Thus, misfortune befalling a competitor increased schadenfreude, which in turn led to a higher level of satisfaction of the need for self-esteem, control, belonging, and meaningful existence. Experiment 2 further corroborated these findings by considering a different context. While Experiment 1 considered hypothetical scenarios (see van de Ven et al., 2015; Smith et al., 2009), Experiment 2 considered real situations. In particular, we asked participants to report how they felt after recalling an experience in which a competitor suffered a misfortune (Leach et al., 2015). Results of this study offer further support of our hypothesis. Indeed, recalling a misfortune that occurred under competitive circumstances rather than non-competitive circumstances raised schadenfreude, which in turn led to a greater satisfaction of human needs in terms of self-esteem, control, and meaningful existence in particular. In line with Experiment 1, we found that the experience of schadenfreude mediated the relationship between another person's suffering and the subsequent reported self-view. Experiment 3 corroborated that people felt schadenfreude and were satisfied in terms of fundamental needs after observing the failure of another individual by considering a lab paradigm in which a misfortune occurred to an ostensibly online competitor. Finally, Experiment 4 showed that when a misfortune befell a competitor, schadenfreude and the fulfillment of basic needs increased, even when the misfortune did not provide any direct advantage for the observer.

Experiments 2 and 4 did not reveal a direct link between another person's suffering and the sense of belonging. Indeed, Experiment 2 showed that recalling another individual's misfortune did not lead to a greater perception of being connected to one's community or to an enhanced sense of belonging. In a similar vein, Experiment 4 showed that imagining the failure of a long-lasting competitor did not enhance the sense of belonging (although schadenfreude mediated the relationship between our manipulation and the sense of belonging). Even if we found such a link in the other two studies, the pattern that we found in Experiments 2 and 4 suggests that the relationship between downward comparison, schadenfreude, and the sense of belonging should be interpreted cautiously. The lack of effect on belonging could reflect a possible dissociation among the four psychological needs that we considered. Indeed, there is an ongoing debate regarding the degree of interdependency between these constructs (Williams, 2009). Scholars have argued that these four needs are intrinsically connected to one another. For instance, theory and research have shown that self-esteem may simply reflect the degree of social connection that an

individual perceives (Leary et al., 1995). For that reason, the four basic psychological needs are usually highly correlated to one another (Williams, 2009). Although it is outside the scope of the current investigation to settle this matter, downward social comparison and schadenfreude might be cases in which some of these psychological needs go hand in hand (i.e., self-esteem, control, and meaningful existence), whereas others do not (i.e., the need to belong). It should also be noted that we considered an interpersonal context rather than a group context. Given that the basic need for belonging is closely connected to being part of a group and a community (Williams, 2009), it is possible that such a basic need would be more affected by the group forms of downward comparison and schadenfreude. This possibility might also explain why the reliability of the scale used in Experiments 1 and 4 was not fully satisfactory. Moreover, prior studies also reported low alphas in relation with some of the subscales of the basic needs satisfaction (e.g., Ren, Wesselmann, & Williams, 2013). Thus, future studies may address this issue by adopting different measures of basic needs satisfaction and/or comparing interpersonal and group-based schadenfreude.

Taken together, these findings advance our understanding of the psychological consequences of schadenfreude. Indeed, our studies are the first to show that schadenfreude increases satisfaction of the psychological basic needs that shape self-image. Although past research revealed that self-evaluation threats and low self-esteem are key factors contributing to schadenfreude (Van Dijk, Ouwerkerk, et al., 2011; Van Dijk, Van Koningsbruggen, et al., 2011), no prior work has investigated whether individuals have a stronger self-image after experiencing schadenfreude. Thus, complementing prior evidence, we showed that feeling pleased after another person experiences a setback increases one's self-esteem, which is a crucial component of self-image (Williams, 2009). Going beyond self-esteem, we further revealed that the malicious pleasure following another's misfortune affected other aspects of self-image. First, feeling pleased about another person's setback increases the perception of feeling meaningful and important. We showed that in a competitive setting, observing a competitor's misfortune causes people to perceive that their lives are more meaningful. Second, we found that observing the failure of another individual and feeling joy about his or her misfortune affect one's sense of power and the perception of influencing events. Thus, schadenfreude leads people to perceive greater feelings of control. Third, we found that observing the failure of another individual tends to increase the feeling of being socially connected and enhances the sense of belonging. In sum, extending prior findings that have mainly considered the circumstances eliciting schadenfreude, we showed how such malicious pleasure affects social relations. In a similar vein, by showing that feeling pleasure at others' misfortune positively influences one's self-image, we may have partially explained why this emotion is commonly felt in interpersonal and intergroup

relations. In considering the effects of schadenfreude on the basic human needs that shape self-image, our research not only extends prior findings on the consequences of schadenfreude but also connects the literature on this emotion with theory and research on the satisfaction and frustration of basic psychological needs.

As they stand, our findings have also implications for the self-enhancement literature. Indeed, a good deal of work has shown that personal success and positive social emotions (e.g., pride) increase self-image, including self-esteem (Williams & DeSteno, 2008; Williams & DeSteno, 2009). Our findings complement such prior evidence by showing that a less social desirable emotion resulting from the misfortune of another individual (i.e., schadenfreude) has a similar self-enhancement function. Based on this, an interesting avenue for future research would be to explore whether the increased self-worth resulting from personal success and by another setback might promote similar or different long term effects.

More generally, our findings provide a novel contribution to the literature on downward social comparison. Indeed, while a good deal of work has shown that downward social comparisons promote self-enhancement (Collins, 1996; Gibbons & Gerrard, 1989; Morse & Gergen, 1970; Wills, 1981), our data are the first showing that schadenfreude is one factor driving the effects of downward social comparisons evoked by another's misfortune on self-image.

We acknowledge that our findings are based on measures that were largely developed and framed to investigate how social threats—such as ostracism, social exclusion, rejection, and loneliness—can frustrate attempts to achieve basic psychological needs (Gerber & Wheeler, 2009). Nevertheless, past research has shown that other type of threats (i.e., physical pain) can affect the satisfaction of this set of basic needs (e.g., Riva et al., 2011). In line with previous theorization (Williams, 2009), we contend that this set of basic needs, although it may not represent an exhaustive description of the full range of psychological human needs, represents the core of fundamental needs of human psychology. Furthermore, it is noteworthy that past research has primarily focused on how situational factors can frustrate attempts to satisfy these four needs (for a meta-analysis, see Gerber & Wheeler, 2009). In contrast, our findings suggest one situational factor that enhances the satisfaction of these four needs. Future research should further investigate the psychological consequences of schadenfreude by considering a different and/or larger set of basic human needs (e.g., “safety” or “predictability”) and a larger variety of responses. In a similar vein, it would be beneficial to investigate the long-lasting effects of schadenfreude on self-image, even comparing how negative and positive events that befall a competitor affect an individual's self-worth over time. Indeed, our studies are the first investigating the psychological consequences of schadenfreude and systematically show how such malicious pleasure affects self-image. Clearly, more research is needed to further

investigate the influence of schadenfreude on social relationships, and we hope that the present data will be a step on that path.

References

- Allen, A. B., & Badcock, P. B. (2003). The social risk hypothesis of depression: Evolutionary, psychosocial, and neurobiological perspectives. *Psychological Bulletin*, *129*, 887–913.
- Baumeister, R. F. (1991). *The meaning of life*. New York, NY: Guilford.
- Baumeister, R. F., & Leary, M. R. (1995). The need to belong: Desire for interpersonal attachments as a fundamental human motivation. *Psychological Bulletin*, *117*, 497–529.
- Boecker, L., Likowski, K. U., Pauli, P., & Weyers, P. (2015). The face of schadenfreude: Differentiation of joy and schadenfreude by electromyography. *Cognition and Emotion*, *29*, 1117–1125.
- Burger, J. M. (1992). *Desire for control: Personality, social, and clinical perspectives*. New York, NY: Plenum.
- Cikara, M., Bruneau, E., Van Bavel, J. J., & Saxe, R. (2014). Their pain gives us pleasure: How intergroup dynamics shape empathic failures and counter-empathic responses. *Journal of Experimental Social Psychology*, *55*, 110–125.
- Cikara, M., & Fiske, S. T. (2012). Stereotypes and schadenfreude: Behavioral and physiological markers of pleasure at others' misfortunes. *Social Psychological and Personality Science*, *3*, 63–71.
- Cikara, M., & Fiske, S. T. (2013). Their pain, our pleasure: Stereotype content and schadenfreude. *Annals of the New York Academy of Sciences*, *1299*, 52–59.
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Erlbaum.
- Collins, R. L. (1996). For better or worse: The impact of upward social comparison on self-evaluations. *Psychological Bulletin*, *119*, 51–69.
- Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behaviour*. New York, NY: Plenum.
- Deci, E. L., & Ryan, R. M. (2000). The ‘what’ and ‘why’ of goal pursuits: Human needs and the self-determination of behaviour. *Psychological Inquiry*, *11*, 227–268.
- Faul, F., Erdfelder, E., Lang, A.-G., & Buchner, A. (2007). G*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods*, *39*, 175–191.
- Feather, N. T., & Sherman, R. (2002). Envy, resentment, schadenfreude, and sympathy: Reactions to deserved and undeserved achievement and subsequent failure. *Personality and Social Psychology Bulletin*, *28*, 953–961.
- Gerber, J. & Wheeler, L. (2009). On being rejected: A meta-analysis of experimental research on rejection. *Perspectives on Psychological Science*, *4*, 468–488.
- Giancola, P., & Parrott, D. (2008). Further evidence for the validity of the Taylor aggression paradigm. *Aggressive Behavior*, *34*, 214–229.
- Giancola, P. R., & Zeichner, A. (1995). Construct validity of a competitive reaction-time aggression paradigm. *Aggressive Behavior*, *21*, 199–204.
- Gibbons, F. X., & Gerrard, M. (1989). Effects of upward and downward social comparison on mood states. *Journal of Social and Clinical Psychology*, *8*, 14–31.

- Greenberg, J., Pyszczynski, T., & Solomon, S. (1986). The causes and consequences of the need for self-esteem: A terror management theory. In R. F. Baumeister (Ed.), *Public Self and Private Self* (pp. 189–212). New York, NY: Springer-Verlag.
- Heider, F. (1958). *The Psychology of Interpersonal Relations*. New York, NY: Wiley.
- Hayes, A. F. (2013). *An introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. New York, NY: Guilford Press.
- Kreger, D. W. (1995). Self-esteem, stress, and depression among graduate students. *Psychological Reports*, *76*, 345–346.
- Lachman, M. E., & Weaver, S. L. (1998). The sense of control as a moderator of social class differences in health and well-being. *Journal of Personality and Social Psychology*, *74*, 763–773.
- Myoshi, K. (2001). Depression associated with physical illness. *Japanese Medical Association Journal*, *44*, 279–282.
- Morse, S., & Gergen, K. J. (1970). Social comparison, self-consistency, and the concept of self. *Journal of Personality and Social Psychology*, *40*, 624–634.
- Leach, C. W., & Spears, R. (2008). A vengefulness of the impotent: The pain of ingroup inferiority and *schadenfreude* toward a successful outgroup. *Journal of Personality and Social Psychology*, *95*, 1383–1396.
- Leach, C. W., & Spears, R. (2009). Dejection at in-group defeat and *schadenfreude* toward second- and third-party out-groups. *Emotion*, *9*, 659–665.
- Leach, C. W., Spears, R., & Manstead, A. S. R. (2015). Parsing (malicious) pleasures: *Schadenfreude* and gloating at others' adversity. *Frontiers in Psychology*, *6*.
- Leach, C. W., Spears, R., Branscombe, N. R., & Doosje, B. (2003). Malicious pleasure: *Schadenfreude* at the suffering of another group. *Journal of Personality and Social Psychology*, *84*, 923–943.
- Leary, M. R., Tambor, E. S., Terdal, S. K., & Downs, D. L. (1995). Self-esteem as an interpersonal monitor: The sociometer hypothesis. *Journal of Personality and Social Psychology*, *68*, 518–530.
- Maslow, A. H. (1954). *Motivation and personality*. New York: Harper.
- Peterson, C., & Seligman, M. E. (1984). Causal explanations as a risk factor for depression: Theory and evidence. *Psychological Review*, *91*, 347–374.
- Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods*, *40*, 879–891.
- Ren, D., Wesselmann, E. D., & Williams, K. D. (2013). Interdependent self-construal moderates coping with (but not the initial pain of) ostracism. *Asian Journal of Social Psychology*, *16*, 320–326.
- Riva, P., Wirth, J., & Williams, K. D. (2011). The consequences of pain: The social and physical pain overlap on psychological responses. *European Journal of Social Psychology*, *41*, 681–687.
- Rosenberg, M. (1965). *Society and the adolescent self-image*. Princeton, NJ: Princeton University Press.
- Sedikides, C., & Strube, M. J. (1997). Self-evaluation: To thine own self be good, to thine own self be sure, to thine own self be true, and to thine own self be better. In M. P. Zanna (Ed.), *Advances in experimental social psychology* (Vol. 29, pp. 209–269). New York, NY: Academic Press.
- Seligman, M. E. P. (1975). *Helplessness: On depression, development, and death*. San Francisco, CA: Freeman & Co.
- Sherman, D. K., & Cohen, G. L. (2006). The psychology of self-defense: Self-affirmation theory. In M. P. Zanna (Ed.), *Advances in experimental social psychology* (Vol. 38, pp. 183–242). New York, NY: Academic Press.
- Smith, R. H. (2000). Assimilative and contrastive emotional reactions to upward and downward social comparisons. In *Handbook of social comparison* (pp. 173–200). New York, NY: Springer.
- Smith, R. H. (2013). *The joy of pain: Schadenfreude and the dark side of human nature*. New York, NY: Oxford University Press.
- Smith, R. H., Eyre, H. L., Powell, C. A., & Kim, S. H. (2006). Relativistic origins of emotional reactions to events happening to others and to ourselves. *British Journal of Social Psychology*, *45*, 357–371.
- Smith, R. H., Powell, C. A., Combs, D. J. Y., & Schurtz, D. R. (2009). Exploring the when and why of *schadenfreude*. *Social and Personality Psychology Compass*, *3*(4), 530–546.
- Smith, R. H., Turner, T. J., Garonzik, R., Leach, C. W., Urch-Druskat, V., & Weston, C. M. (1996). Envy and *schadenfreude*. *Personality and Social Psychology Bulletin*, *25*, 158–168.
- Sorkin, D., Rook, K. S., & Lu, J. L. (2002). Loneliness, lack of emotional support, lack of companionship, and the likelihood of having a heart condition in an elderly sample. *Annals of Behavioral Medicine*, *24*, 290–298.
- Steele, C. M. (1988). The psychology of self-affirmation: Sustaining the integrity of the self. In L. Berkowitz (Ed.), *Advances in experimental social psychology*. New York, NY: Academic Press.
- Stern, A. E., Lynch, D. L., Oates, R. K., O'Toole, B. I., & Cooney, G. (1995). Self-esteem, depression, behaviour and family functioning in sexually abused children. *Journal of Child Psychology and Psychiatry*, *36*, 1077–1089.
- van de Ven, N., Hoogland, C. E., Smith, R. H., Van Dijk, W. W., Breugelmans, S. M., & Zeelenberg, M. (2015). When envy leads to *schadenfreude*. *Cognition and Emotion*, *29*, 1007–1025.
- van Beest, I., Williams, K. D., & Van Dijk, E. (2011). Cyberbomb: Effects of being ostracized from a death game. *Group Processes & Intergroup Relations*, *14*, 581–596.
- Van Dijk, W. W., Ouwerkerk, J. W., Goslinga, S., & Nieweg, M. (2005). Deservingness and *schadenfreude*. *Cognition & Emotion*, *19*, 933–939.
- Van Dijk, W. W., Ouwerkerk, J. W., Goslinga, S., Nieweg, M., & Gallucci, M. (2006). When people fall from grace: Reconsidering the role of envy in *schadenfreude*. *Emotion*, *6*, 156–160.
- Van Dijk, W. W., Ouwerkerk, J. W., Smith, R. H., & Cikara, M. (2015). The role of self-evaluation and envy in *schadenfreude*. *European Review of Social Psychology*, *26*, 247–282.
- Van Dijk, W. W., Ouwerkerk, J. W., Wesseling, Y. M., & Van Koningsbruggen, G. M. (2011). Towards understanding pleasure at the misfortunes of others: The impact of self-evaluation threat on *schadenfreude*. *Cognition and Emotion*, *25*, 360–368.
- Van Dijk, W. W., Van Koningsbruggen, G. M., Ouwerkerk, J. W., & Wesseling, Y. M. (2011). Self-esteem, self-affirmation, and *schadenfreude*. *Emotion*, *11*, 1145–1149.
- Williams, L. A., & Desteno, D. (2009). Pride: Adaptive social emotion or seventh sin? *Psychological Science*, *20*, 284–288.
- Williams, L. A., & DeSteno, D. (2008). Pride and perseverance: The motivational role of pride. *Journal of Personality and Social Psychology*, *94*, 1007–1017.

- Williams, K. D. (2009). Ostracism: A temporal need-threat model. In M. Zanna (Ed.), *Advances in experimental social psychology* (pp. 279–314). New York, NY: Academic Press.
- Williams, K. D., Cheung, C. K., & Choi, W. (2000). Cyberostracism: Effects of being ignored over the Internet. *Journal of Personality and Social Psychology, 79*, 748–762.
- Wills, T. A. (1981). Downward comparison principles in social psychology. *Psychological Bulletin, 90*, 245–271.
- Wood, J. V. (1989). Theory and research concerning social comparisons of personal attributes. *Psychological Bulletin, 106*, 231–248.