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Schadenfreude for undeserved misfortunes: The unexpected consequences of endorsing a strong belief in a just world☆

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ABSTRACT

When witnessing misfortunes, people sometimes react with schadenfreude—malicious pleasure at another's suffering. Previous research suggests that schadenfreude is elicited for competitors and envied targets, or when misfortunes seem deserved. Six experiments (five pre-registered, $N_{total} = 3324$) support a novel hypothesis that perceivers feel greater schadenfreude for social targets who endorse a strong general belief in a just world (BJW), even when misfortunes occur outside of the typical conditions that elicit schadenfreude. Experiments 1–2 show that people feel schadenfreude at the accidental misfortune of a person who expresses strong BJW, based in part on their misfortune seeming more deserved. Experiment 3 demonstrates the same effect for a wealthy, strong-BJW target who suffers a life-changing misfortune. In Experiment 4, we demonstrate that perceivers infer stronger BJW from a wealthy (vs. poor) person and that these inferences lead to increased perceptions that the misfortune was deserved, resulting in greater schadenfreude. Finally, Experiments 5–6 show that the effect of target BJW on schadenfreude via perceived deservingness is moderated by a target's financial status, such that endorsing strong BJW is particularly consequential for wealthy and middle-income targets. We conclude that even when people are not responsible for their predicaments, perceivers believe the misfortunes of people with strong just-world beliefs are more fitting and therefore derive more pleasure at their expense. The current research builds on and extends both schadenfreude and just-world belief literatures by documenting a unique antecedent of schadenfreude based on perceivers' inferences or knowledge regarding how someone generally views their world.

Schadenfreude is a social emotion characterized by the malicious joy people sometimes feel in response to observing others' misfortunes (Smith, Powell, Combs, & Schurtz, 2009; van Dijk & Ouwerkerk, 2014a). Importantly, schadenfreude is passive and distinct from actions that might cause suffering, such as seeking direct revenge or punishing others by actively inflicting pain (Leach, Spears, & Manstead, 2015). Past research has demonstrated the conditions under which schadenfreude is likely to emerge, such as when a person's suffering or downfall is viewed as deserved (Feather, 2006; Feather & Sherman, 2002; van Dijk, Goslinga, & Ouwerkerk, 2008). For example, people feel schadenfreude when wrongdoers (e.g., cheaters, liars, thieves, hypocrites) are justly punished because people believe that immoral individuals are responsible for their predicament and that they "had it coming" (Berndsen & Tiggemann, 2020; Brambilla & Riva, 2017; Feather, 1989; Powell & Smith, 2013). Schadenfreude may also emerge from observing misfortunes of envied individuals or disliked outgroup members, particularly in zero-sum competitive contexts (Cikara, Bruneau, Van Bavel, & Saxe, 2014; Hudson, Cikara, & Sidanius, 2019; Leach & Spears, 2009; van de Ven et al., 2015; van Dijk, Ouwerkerk, Goslinga, Nieweg, & Gallucci, 2006).

Even if not laudable, the primary reasons for schadenfreude described above seem understandable. People are happy when wrongdoers are brought to justice in one way or another, suffering the consequences of their harmful behavior, or when people have something to gain from others' misfortunes (e.g., the star of a rival team being removed during gameplay). Additionally, when a higher status target outshines the self, that target's subsequent failures may serve to affirm a damaged self-evaluation by fostering the belief that neither is this target better in every way nor will they "win" at everything (Leach & Spears, 2009; van Dijk & Ouwerkerk, 2014b). However, what about those times

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when a person experiences misfortune but has done nothing wrong, is not an envied competitor, and whose group identity is unknown or at least should not provoke immediate hostility? In this case, schadenfreude should be rare, given that it is counter-normative and perceived as immoral to enjoy the pain of the innocent (Gromet, Goodwin, & Goodman, 2016). Yet, we demonstrate that people *do* sometimes feel schadenfreude at others' undeserved misfortunes even when there is no obvious reason to wish for their pain.

Building on the literatures of both schadenfreude and just-world beliefs, we propose and test a novel hypothesis that people feel schadenfreude toward a person whose only "sin" is believing, as many people do, that the world is fundamentally just (Lerner, 1980). To our knowledge, only three published studies have investigated links between schadenfreude and belief in a just world (BJW). In a sample of mostly Australian adults, James, Kavanagh, Jonason, Chonody, and Scrutton (2014) found a positive correlation between schadenfreude toward hypothetical targets and raters' tendency to value justice, which was measured using items sharing conceptual similarity as just-world beliefs (e.g., "I believe in what goes around comes around"). In a sample of U.S. undergraduates, general BJW as measured by the Lipkus (1991) scale, was also correlated with students' schadenfreude in response to hypothetical scenarios; however, BJW did not predict schadenfreude toward an unhelpful confederate during real interactions (Greenier, 2018). Another study conducted in Poland demonstrated that experimentally threatening students' BJW resulted in more time spent reading stories about others' failures (Pietraszkiewicz, 2013). Unlike these works that examined *perceiver* BJW, the current studies uniquely test whether the general just-world beliefs of social *targets* evoke schadenfreude.

1. Brief review of BJW and social perception

Because it reinforces positive coping, believing in a world where one gets what one deserves and deserves what one gets serves an adaptive function when facing challenging circumstances (Bègue & Muller, 2006; Dalbert, 2002; Donat, Wolgast, & Dalbert, 2018; Nesbit, Blankenship, & Murray, 2012). For example, after a failure, it helps in most situations to tell oneself that trying harder will lead to a better outcome next time. People higher in this personal type of BJW tend to be more prosocial, hard-working, successful, and have less stress and higher life satisfaction (Bartholomaeus & Strelan, 2019; Bègue, 2014; Correia, Kamble, & Dalbert, 2009; Nudelman & Otto, 2021; Otto, Glaser, & Dalbert, 2009).[2] Nonetheless, the motivational benefits of endorsing strong BJW quickly become problematic when applied to other people's predicaments. For example, bystanders tend to blame victims of illness or crimes, presumably because of the need to reassure themselves that they inhabit a world where people are punished fairly (Sakallı-Uğurlu, Yalçın, & Glick, 2007; see Hafer & Bègue, 2005 for review). In brief, researchers have examined associations between personal BJW and mostly positive psychological outcomes, and how strong general BJW predicts negative evaluations of victims (Sutton & Douglas, 2005). Less is known, however, about how individuals with strong or weak BJW are perceived by others. Given that individuals differ substantially in the extent to which they explicitly endorse BJW, how perceivers evaluate other people with varying worldviews is important for fully understanding the implications of the just-world theory (Lerner, 1980). Pragmatically, as conversations about one's BJW might arise spontaneously and frequently during social interactions (e.g., when discussing politics, crime, or health policy), understanding potential consequences of these disclosures is important.

[2] We note that although internal locus of control (LOC) is positively associated with personal BJW (Furnham, 2003; Lipkus, 1991), the two constructs are distinct. High internal LOC entails attributing the cause or control of outcomes in one's life to oneself (Spector, 1982), whereas strong personal BJW regards believing that events in one's own life are just and fair (Dalbert, 1999).

Germane to the current research is first describing our conceptualization of BJW. On one end of the spectrum lies a belief in a fully karmic principle in which people invariably get what they deserve and deserve what they get, where hard work consistently pays off, and because the world always or usually follows this rule, it is therefore just and predictable. We refer to this belief as "strong" or "high" BJW. Intuitively, the opposite idea is that the world never or rarely follows this rule (i.e., the world is actively *unjust*). Some prior research has used the label "low" BJW to describe this belief (e.g., Alves et al., 2015), even though low scores on BJW measures (e.g., Dalbert, 1999; Lipkus, 1991) simply indicate lesser belief in a just world and not necessarily a belief that the world is actively unjust. Notably, however, an unjust world is still predictable. For example, if bad people never get punished and good people never get rewarded, one can theoretically behave in the opposite manner to arrive at desired outcomes. Rather than low BJW, our interest is in comparing strong BJW with "weak" or "moderate" BJW—a belief that the world is frequently unpredictable and not particularly fair, where people only sometimes (but not always or necessarily) get what they deserve. Because BJW theoretically provides psychological protection to make sense of painful experiences as humans navigate their unpredictable world (Lerner, 1980), our conceptualization of strong versus weak/moderate BJW is consistent with the just-world theory. Furthermore, we believe that comparing strong BJW to weak/moderate BJW provides a more stringent test than using low BJW, which seems to represent a particularly pessimistic view.

Because we are interested in how social targets are evaluated based on their worldviews, which by definition are general and not limited to specific instances (Clifton et al., 2019), our discussion will focus on general BJW ("people usually get what they deserve") instead of personal BJW ("I usually get what I deserve"), although the self can be included in the former. Over a dozen studies have been conducted on BJW expression, typically concluding that high BJW expression is more socially valued and normative than low BJW (e.g., Alves, Gangloff, & Umlauft, 2018; Alves & Correia, 2008, 2010a; Gangloff, Soudan, & Auzoult, 2014; although see Testé & Perrin, 2013). However, to our knowledge, only two published studies involved evaluations of social targets with *moderate general* BJW. Alves and Correia (2010b, Study 1) found that Portuguese university students attributed similar levels of social desirability (e.g., likability, warmth) and social utility (e.g., competence, hard-working) to both moderate- and strong-BJW targets. In the second study of the same article using the same target BJW manipulation, however, students perceived strong-BJW expression to be less normative than moderate-BJW when directly asked to evaluate the expressed ideas (Alves & Correia, 2010b, Study 2). Given these somewhat inconsistent results and the scarcity of data comparing strong versus moderate general BJW, further investigation is needed. Moreover, although the extensive body of BJW literature encompasses diverse samples, previous BJW *expression* studies have been conducted almost exclusively in Western Europe with relatively small sample sizes primarily consisting of university students. In the current research, we aim for enhanced generalizability and replicability by using methodologically rigorous and pre-registered designs, larger sample sizes, and recruiting samples of ethnically diverse students and age-diverse online workers in the U.S.

2. Why and when would target BJW influence schadenfreude?

The primary question the current research aims to address is: do people feel schadenfreude when strong just-world believers encounter accidental misfortunes? Simply believing that the world is consistently fair does not make a person immoral or especially deserving of harm. In fact, one might attribute positive moral character to just-world believers whose behaviors presumably reflect the principle that the world generally rewards good people for good deeds and punishes bad people for bad behaviors. Despite this, we propose that people might find it amusing when targets with strong BJW suffer misfortunes. We reasoned

that people would find it ironic when just-world believers are confronted with a situation that contradicts their worldview, whereas misfortunes of people with weak BJW present no such irony. This is because when social targets have a weak BJW, the negative outcomes that might befall them are consistent with their worldview and are not completely unexpected. Although they will not welcome the misfortunes, no irony is involved for people with weak BJW who acknowledge that bad things can happen to anyone, including themselves. In contrast, when a strong just-world believer encounters misfortune, they are faced with a unique dilemma: they either must accept that they deserved their misfortune or revise their worldview and admit that the world is not *always* fair and that bad things *can* (and do) happen to the innocent (i.e., themselves). This predicament should be viewed as ironic and even comical because the situation was unexpected, and the logical dilemma that confronts the unfortunate just-world believer was entirely preventable by *not* claiming that the world is just in the first place. Because strong-BJW targets are hoist by their own petards, we hypothesize that perceivers will feel schadenfreude even when targets have done nothing objectively "wrong" that might be deserving of harm.

Moreover, we predict that perceivers will assign greater deservingness to misfortunes of strong-BJW targets relative to weak-BJW targets. Specifically, when perceivers observe a misfortune that obviously contradicts the target's just worldview that bad things happen only to those who deserve it, the incongruence between the outcome and expectation is accentuated. When perceivers notice this inconsistency between the strong-BJW target's idea of how the world functions and how they were actually treated by the world, perceivers may infer that the unfortunate just-world believer is somehow getting exactly what they deserve simply for endorsing a worldview that proved to be "wrong." In contrast, when a target expresses a moderate BJW, perceivers should grasp how accidental misfortunes are perfectly congruent with the target's worldview asserting that accidents can happen unpredictably to anyone. Because there are no inconsistencies to resolve in this case and the target's worldview is not proven "wrong," perceivers should judge that the accidental misfortune was not deserved (Gawronski, 2012; van den Bos & Maas, 2009). In sum, even when reasons such as target's immoral character or behavior that typically increase beliefs about deservingness of negative outcomes (Brambilla & Riva, 2017; Feather, 2014; van Dijk, Ouwerkerk, Goslinga, & Nieweg, 2005) are absent, we suggest that merely endorsing a just worldview—one that happens to contradict the target's experience of an accidental misfortune—is sufficient to increase perceivers' deservingness judgments. Throughout the manuscript, we use "perceived deservingness" to refer to perceivers' judgments about target deserving their misfortunes. Given that perceived deservingness is a critical antecedent of schadenfreude (Feather, 2006; Feather & Sherman, 2002), if the negative outcomes of strong-BJW targets are subjectively viewed as more deserving than weak-BJW targets, then the strong-BJW's misfortune should elicit greater schadenfreude. Hence, we additionally predict that the difference in schadenfreude based on target's BJW will be explained by perceived deservingness.

The current research also tests a boundary condition of the association between strong-BJW expression and schadenfreude. Specifically, in Experiments 5–6, we manipulated both BJW and the target's financial status by describing their family wealth. Because people do not choose which family to be born into, the target is not responsible for their financial situation. Yet, we hypothesized that schadenfreude would be greater toward a wealthy, strong-BJW target than their weak-BJW counterpart but that schadenfreude would not be greater for the strong-BJW target when they are poor. We made this prediction for two reasons. First, evidence suggests that when trying to understand others' mental states, people intuitively associate cues related to greater advantage (e.g., greater wealth) with stronger BJW (Weiner, Watanabe, & Laurent, 2020). Confirming the additional inference perceivers readily make about advantaged targets (i.e., that they have strong BJW) should strengthen the sense of irony when wealthy, strong-BJW targets are faced with their own undeserved misfortunes.

More importantly, because wealth conveys many advantages, a wealthy target's overt insistence that the world is fundamentally just might suggest that the target smugly believes they are entitled to those advantages even if they have not earned them. This may be true even for targets who are not "wealthy" but enjoy a relatively high standard of living. If perceivers make this meta-judgment but disagree with it (i.e., perceivers do not agree or are unsure whether the target is worthy of their advantageous status), this might further increase amusement (Feather & Nairn, 2005; van Dijk, Ouwerkerk, & Goslinga, 2009). In contrast, beyond the lack of irony for weak-BJW targets, a wealthy or middle-class target who acknowledges that the world is not particularly fair might seem humbler and more likeable, decreasing perceived deservingness of their misfortune and increasing sympathy for their plight. Additionally, poor targets who endorse strong BJW might be seen as less smug to begin with, as they are claiming that the world is just even when it obviously has not been fair to *them*. Here, rather than perceiving the poor targets' view as self-defeating (i.e., that the target thinks their poverty is justified), people may interpret the target's insistence on the world being fair as resiliency, where the target optimistically believes that if they work harder, they will be rewarded. This perception should make poor, strong-BJW targets seem less deserving of additional adversity, resulting in less schadenfreude. Finally, with no obvious incongruence between weak-BJW expression and a poor target's unlucky reality, little irony exists when a poor, weak-BJW target suffers accidental misfortunes.

3. The present research

The present research tests a novel hypothesis that people will perceive greater deservingness and feel more schadenfreude toward misfortunes of social targets who endorse strong (vs. weak) BJW. Experiments 1–2 test this hypothesis using targets who experience minor accidental misfortunes. Experiment 3 features a wealthy target experiencing a life-changing misfortune. Experiment 4 examines whether a difference in schadenfreude for wealthy versus poor targets is driven by perceived deservingness of their misfortune. Experiment 5 tests whether the effect of BJW expression on schadenfreude via perceived deservingness is moderated by the target's financial status, such that expressing strong-BJW is particularly costly for wealthy (vs. poor) targets. Finally, Experiment 6 replicates and extends Experiment 5 by including a middle-income target to show that the effect of strong-BJW expression on perceived deservingness and schadenfreude are not simply due to greater dislike of wealthy people.

3.1. Open data and practices

We report all measures, manipulations, and exclusions. Experiment 1's sample size was determined by availability of subject pool credits in one semester with data collection stopping at the semester's end. Sample sizes for Experiments 2–6 were determined a priori. No data were analyzed until data collection for each study was completed. Verbatim study materials including attention check questions, correlations among dependent measures, supplementary variables, and analyses controlling for demographic variables (e.g., gender, age, political ideology) are reported in the Online Supplementary Materials (OSM). Pre-registrations are available at: https://aspredicted.org/UHQ_OVG (Experiment 2), https://aspredicted.org/RNG_DMP (Experiment 3), https://aspredicted.org/UOY_DVM (Experiment 4), https://aspredicted.org/HFH_CLR (Experiment 5), and https://aspredicted.org/W92_D4S (Experiment 6). Deidentified data for all experiments along with analysis scripts are available at https://osf.io/4hbnz/. This research was approved by the Institutional Review Board where data were collected. Informed consent was obtained prior to participation and demographic information was collected at the end of each study (see Table 1). No participant participated in more than one experiment. In Experiments 2–6, which were administered completely online, participants were required to pass a CAPTCHA before starting the study.

Table 1
Demographics (Experiments 1–6).

Variables	Experiment 1	Experiment 2	Experiment 3	Experiment 4	Experiment 5	Experiment 6
Sample Type	Undergraduates	MTurk	MTurk	MTurk	MTurk	MTurk
Total Complete Responses	208	227	451	400	842	1263
Exclusions	11 (5%)	21 (9%)	6 (1%)	8 (2%)	6 (<1%)	15 (1%)
Final Sample Size	197	206	445	392	836	1248
Sensitivity Analysis	$d = 0.40$	$d = 0.39$	$d = 0.32$	$d = 0.28$	$f = 0.15$	$f = 0.12$
Gender (female %)	69.54%	43.20%	52.13%	48.72%	50.54%	53.01%
Age *M* and *SD*	19.17 (1.56)	38.20 (12.18)	38.64 (12.14)	36.82 (12.00)	40.86 (12.25)	40.39 (12.89)
Ideology *M* and *SD*	3.11 (1.29)	3.59 (1.78)	3.44 (1.71)	3.57 (1.75)	3.51 (1.79)	3.62 (1.80)
Ethnicity						
Asian/Asian American	27.92%	11.17%	8.54%	9.95%	5.63%	7.78%
Black/African American	10.15%	5.83%	8.76%	10.97%	7.19%	10.59%
Hispanic/Latino(a)	13.20%	3.88%	3.60%	5.36%	4.19%	5.85%
White/European American	40.61%	75.73%	76.40%	70.15%	80.48%	70.97%
Native American/Pacific Islander	0.00%	0.97%	0.67%	0.51%	0.24%	0.48%
More than one	6.60%	1.94%	0.67%	2.30%	1.32%	2.97%
Other/Prefer not to say	1.52%	0.49%	1.34%	0.77%	0.96%	1.36%

Note. Sensitivity (two-tailed alpha = 0.05, 80% power) was calculated using G*Power 3.1 (Faul, Erdfelder, Buchner, & Lang, 2009) for mean difference between weak-BJW versus strong-BJW conditions (Experiments 1–3) and wealthy versus poor conditions (Experiment 4). For Experiments 5–6, we used a simulation-based power analysis tool in the *SuperPower* R package (Lakens & Caldwell, 2019). For Experiment 5, which used a 2 × 2 between-participant design, we had 98.2% power to detect $f = 0.15$ (simple effect of BJW for wealthy target). For Experiment 6, which used a 2 × 3 between-participant design, we had 100% power to detect $f = 0.19$ (simple effect of BJW for wealthy target) and 98.33% power to detect $f = 0.12$ (simple effect of BJW for middle-income target). Ideology was measured with a 7-point Likert scale where *1 = extremely liberal, 2 = liberal, 3 = slightly liberal, 4 = moderate (middle of the road), 5 = slightly conservative, 6 = conservative,* and *7 = extremely conservative*.

4. Experiment 1

Experiment 1 tested whether a target's BJW influences observers' responses to their misfortune when no financial status information is given for the target, and the misfortune is completely accidental. We expected perceivers to view the strong-BJW target's misfortune as more deserved than the weak-BJW[3] target and hypothesized that schadenfreude would be greater in the strong-BJW (vs. weak-BJW) condition.

4.1. Method

4.1.1. Participants, procedure, and measures

Participants were 208 undergraduate psychology students whose participation partially satisfied course requirements. Sample size was determined by availability of subject pool credits in one semester with data collection stopping at the semester's end. After excluding participants who failed attention checks (see OSM), the final sample consisted of 197 students (see Table 1).

Participants completed the experiment in individual rooms with computers. They were instructed to imagine that they met the target (Alex) on a plane and were randomly assigned to the strong-BJW or weak-BJW condition. Participants in the strong-BJW condition read:

> Alex thinks the world is fundamentally fair and just. According to Alex, people succeed through hard work alone and almost always get what they deserve—good people are usually rewarded for being good, and bad people are usually punished for being bad.

Participants in the weak-BJW condition read:

> Alex thinks the world is fundamentally unpredictable and not particularly fair. According to Alex, although hard work sometimes helps people succeed, people often don't get what they deserve—good people are not necessarily rewarded for being good, and bad people often get away with being bad.

Participants then read about the target's misfortune, which involved sudden turbulence causing a drink to spill on Alex's lap and Alex's luggage being lost by the airline (see OSM). Participants were asked to consider what happened to Alex while responding to dependent measures. Unless noted, all items in all experiments used 7-point scales ranging from 1 = *strongly disagree* to 7 = *strongly agree*. Two items assessed perceived BJW ($r = 0.84$), which served as a manipulation check: "Alex believes the world is a fair and equitable place," and "Alex believes that people deserve what they get." Four items measured perceived deservingness ($\alpha = 0.88$): "Alex deserved what happened," "Alex got what was coming to them," "What happened to Alex felt right," and "Alex's misfortunes seemed fitting." Four items assessed schadenfreude ($\alpha = 0.89$): "I was amused," "I could not resist a smile," "I felt satisfied," and "I laughed a little bit." Similar items have been used in previous research to capture schadenfreude (van Dijk et al., 2006). All participants were debriefed at the end of the study.

4.2. Results and discussion

Table 2 provides condition *M* and *SD* for all variables. Confirming the effectiveness of the manipulation, perceived BJW was greater in the strong-BJW condition than the weak-BJW condition, $t(195) = 31.77$, $p < .001$, $d = 4.53$, 95% CI = [4.40, 4.98]. As hypothesized, perceived deservingness of misfortune was greater in the strong-BJW condition, $t(195) = 4.34$, $p < .001$, $d = 0.62$, 95% CI = [0.41, 1.10], showing that although the target did not cause the negative outcome, perceivers' deservingness judgments differed by the target's worldview *expression*. In addition, participants reported greater schadenfreude toward the strong-BJW (vs. weak-BJW) target, $t(195) = 4.62$, $p < .001$, $d = 0.66$, 95% CI = [0.55, 1.38]. These condition-based differences remained significant controlling for negative affect toward the target (see OSM Tables S3–S4).

We explored a mediation model using the *lavaan* package in R (Rosseel, 2012) to examine whether BJW condition (weak-BJW = 0, strong-BJW = 1) affected schadenfreude by increasing perceptions of deservingness. This model is theoretically consistent with prior research documenting deservingness as an antecedent of schadenfreude (Berndsen, Tiggemann, & Chapman, 2017; Feather, 2006; Feather & Sherman, 2002), as opposed to an alternative model with schadenfreude affecting

[3] As discussed in the Introduction, we use the term "weak-BJW" throughout to connote a belief that the world is not always or necessarily fair, rather than to imply a belief that the world is actively unfair.

Table 2
Means and standard deviations of dependent variables by condition for Experiments 1–3.

	Experiment 1		Experiment 2		Experiment 3		
	Weak BJW	Strong BJW	Weak BJW	Strong BJW	Weak BJW	Control No-BJW	Strong BJW
Variables	*M(SD)*	*M(SD)*	*M(SD)*	*M(SD)*	*M(SD)*	*M(SD)*	*M(SD)*
Perceived BJW	1.73 (1.11)	6.42 (0.95)	2.25 (1.13)	6.27 (0.87)	2.00 (1.28)	5.06 (1.20)	6.61 (0.74)
Envy	–	–	2.93 (1.41)	3.83 (1.58)	4.77 (1.59)	4.84 (1.69)	4.26 (1.72)
Deservingness	2.26 (1.23)	3.02 (1.22)	2.54 (1.40)	3.60 (1.68)	2.00 (1.31)	2.20 (1.39)	3.55 (1.61)
Schadenfreude	2.70 (1.48)	3.67 (1.46)	3.82 (1.71)	4.61 (1.70)	2.09 (1.33)	2.25 (1.47)	3.46 (1.66)
N	99	98	99	107	151	144	150

deservingness. Bias-corrected confidence intervals were estimated with 10,000 bootstrap resamples. In this model, the direct effect of condition on perceived deservingness was significant ($\beta = 0.30$, $SE = 0.07$, $z = 4.35$, $p < .001$, 95% CI = [0.16, 0.43]), as was the direct effect of deservingness on schadenfreude, $\beta = 0.57$, $SE = 0.06$, $z = 10.24$, $p < .001$, 95% CI = [0.46, 0.67]. The indirect effect was also significant ($\beta = 0.17$, $SE = 0.04$, $z = 3.90$, $p < .001$, 95% CI = [0.09, 0.26]), suggesting that perceived deservingness is one important factor underlying why strong just-world believers elicit more schadenfreude. After adjusting for condition-based differences in perceived deservingness, the direct effect of target BJW on schadenfreude remained significant in this model, $\beta = 0.15$, $SE = 0.06$, $z = 2.41$, $p = .016$, 95% CI = [0.03, 0.26].

5. Experiment 2

Experiment 1 provided initial support for the hypothesis that perceivers react with schadenfreude when just-world believers encounter misfortunes, in part because the negative outcome, albeit accidental, seems deserved. Experiment 2 tests the same idea in a different context, and envy toward the target was additionally measured. Like Experiment 1, we provided no financial information about the target, and the misfortune was not caused by the target's behavior. We hypothesized that perceived deservingness and schadenfreude would be greater in the strong-BJW (vs. weak-BJW) condition. However, we expected envy to be similar across conditions.

5.1. Method

5.1.1. Participants, procedure, and measures

To achieve 80% power ($\alpha = 0.05$) to detect an effect size of $d \geq 0.40$, we aimed to collect complete data from 200 participants. To account for potential exclusions, we advertised on CloudResearch (Litman, Robinson, & Abberbock, 2017) for 225 U.S. Amazon Mechanical Turk (MTurk) workers. We placed the following restrictions, aiming for high data quality: 100 or more approved Human Intelligence Tasks (HITs), 97% or higher HIT approval rating, block duplicate IP addresses, block suspicious geocode locations, and verify worker country location. We received 227 total responses, and after applying the pre-registered exclusion criteria (e.g., incomplete responses, incorrect response to attention checks, unusually short responding time), the final sample size was 206 (see Table 1).

Participants were randomly assigned to read one of two descriptions of Alex. As in Experiment 1, the strong-BJW target was described as believing that the world is fundamentally fair and just, good/bad people are usually rewarded/punished, and success comes only through hard work and not through luck. In the weak-BJW condition, Alex was described as believing that the world is fundamentally unpredictable and not particularly fair, good/bad people are not always rewarded/punished, hard work does not invariably lead to success, and that some people are luckier than others (see OSM). Prior to reading about the misfortune, participants reported their envy toward the target ("I would like to be in Alex's position")[4] and responded to three perceived BJW items ($\alpha = 0.95$). Participants then read the target's misfortune: Shortly after cleaning and waxing his car, a bird pooped on it. Participants were instructed to think about what happened to Alex at the end of the story before completing the same perceived deservingness measure ($\alpha = 0.95$) as Experiment 1 and three schadenfreude items ($\alpha = 0.89$). Table S1 in the OSM lists verbatim items for all measures.

5.2. Results and discussion

Table 2 provides condition *M* and *SD* for all variables. As expected, perceived BJW was greater in the strong-BJW condition, $t(204) = 28.89$, $p < .001$, $d = 4.03$, 95% CI = [3.75, 4.30]. Unexpectedly, envy was higher in the strong-BJW condition than the weak-BJW condition, $t(204) = 4.32$, $p < .001$, $d = 0.60$, 95% CI = [0.49, 1.31]. We suspect that this effect may have been due to how envy was measured: by inquiring into participants' desire to be in Alex's position. Although this is related to envy, it does not directly ask about envy. Thus, subsequent experiments included a face-valid measure of envy ("I envy Alex"). Our main hypotheses were supported: relative to weak-BJW, perceived deservingness for the strong-BJW target was greater ($t[204] = 4.88$, $p < .001$, $d = 0.68$, 95% CI = [0.63, 1.48]), as was schadenfreude, $t(204) = 3.32$, $p = .001$, $d = 0.46$, 95% CI = [0.32, 1.26]. These target BJW effects remained significant controlling for envy; however, when target negativity was additionally controlled for, the effect of BJW diminished somewhat (see OSM Tables S6–S7).

Extending Experiment 1's mediation model, we explored a parallel mediation model in which envy toward the target was added as another putative mediator of the effect of BJW on schadenfreude. In this model (see Fig. 1), five direct effects were estimated: the effects of condition (weak BJW = 0, strong BJW = 1) on deservingness, envy, and schadenfreude, deservingness on schadenfreude, and envy on schadenfreude. We also estimated two indirect effects of condition on schadenfreude, independently through deservingness and envy. Replicating Experiment 1, the indirect effect via deservingness was significant, $\beta = 0.21$, $SE = 0.05$, $z = 4.66$, $p < .001$, 95% CI = [0.13, 0.30]. However, the indirect effect via envy was not significant ($\beta = -0.003$, $SE = 0.02$, $z = -0.17$, $p = .861$, 95% CI = [−0.04, 0.03]), suggesting that the condition-based difference in schadenfreude is better explained by increased perceptions of deservingness than by envy toward the target. The direct effect of condition on schadenfreude was not significant, $p = .705$.

[4] A second item, "I'm jealous of Alex," was originally included to measure envy. However, because jealousy refers to situations in which people are afraid of losing something they already possess (usually in a relationship) and is conceptually distinct from envy (e.g., Parrott & Smith, 1993), we retained only the first envy item in our analyses.

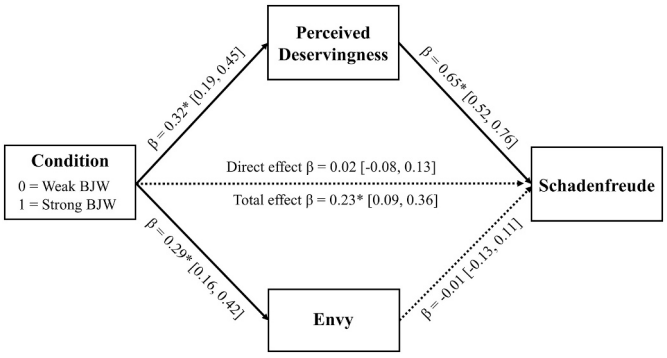

Fig. 1. Parallel mediation model: Indirect effects of target BJW on schadenfreude via perceived deservingness and envy in Experiment 2. Path coefficients are standardized. Values in brackets represent bias-corrected 95% confidence intervals obtained from 10,000 bootstrap resamples. * $p < .001$.

6. Experiment 3

Experiments 1–2 provide evidence for a novel hypothesis that a mere expression of a strong-BJW view can lead to others deriving some joy from the person's misfortune, even without provided knowledge of the person's financial status. Interestingly, perceivers in both experiments reported that strong-BJW (vs. weak-BJW) targets deserved misfortune to a greater extent, even though neither target was responsible for the negative outcome they experienced. In Experiment 3, we described a wealthy target who expresses strong or weak BJW, and further included a comparison condition in which the wealthy target's worldview was not provided. Because misfortunes in Experiments 1 and 2 were relatively minor, potentially making the overall reporting of schadenfreude more likely, Experiment 3 provided a more stringent test by having the target suffer a life-changing misfortune that resulted in loss of their status. As in Experiments 1 and 2, the target was not responsible for the misfortune.[5]

In addition to predicting differences between strong versus weak BJW conditions as in Experiments 1–2, we hypothesized that relative to the no-BJW comparison condition, perceivers would report greater/less deservingness and schadenfreude for the strong-BJW/weak-BJW target. Given the target's wealthy status, we expected envy ratings to be relatively high across conditions, but we remained agnostic as to whether it would vary as a function of manipulated BJW. That is, although differences in envy were unexpectedly observed in Experiment 2, we were unsure whether this effect would replicate when including a more face-valid measure of envy toward the target.

6.1. Method

6.1.1. Participants, procedure, and measures

We aimed to collect complete data from 450 participants (150 per condition). With this sample size, we could detect effects of omnibus $f > 0.14$ and $d > 0.32$ for any single *df* contrast with 80% power ($\alpha = 0.05$). We advertised on CloudResearch (Litman et al., 2017) for 450 U.S. MTurk workers with the same restrictions as Experiment 2. To further ensure data quality, we recruited CloudResearch-approved respondents and designed the study such that respondents who failed simple comprehension checks were prevented from continuing. We received 451 complete responses, and after applying the pre-registered exclusion criteria, the final sample size was 445 (see Table 1).

Participants read about Alex, a wealthy student who lived a luxurious life and was recently admitted to a prestigious college. Participants were then randomly assigned to one of the three BJW conditions. The weak and strong BJW manipulations were similar to the descriptions used in Experiment 2 (see OSM), and no information about Alex's worldview was provided in the no-BJW comparison condition. Three items assessed perceived BJW ($\alpha = 0.97$), and two items assessed envy toward the target ($r = 0.64$): "I would like to be in Alex's position" and "I envy Alex." Participants then read about the misfortune, where due to circumstances beyond his control, Alex became poor and could no longer afford to attend college. Participants were instructed to think about what happened to Alex at the end of the story before responding to the same four perceived deservingness items ($\alpha = 0.96$) and four schadenfreude items ($\alpha = 0.93$) used in Experiments 1–2 (see OSM Table S1).

6.2. Results and discussion

Table 2 provides condition *M* and *SD* for all variables. A series of one-way ANOVAs were conducted to examine the effect of target BJW on dependent measures. There was a significant main effect on perceived BJW, $F(2, 442) = 686.90$, $p < .001$. Confirming our manipulation, perceived BJW was greater in the strong-BJW condition than the no-BJW comparison condition, $t(442) = 12.07$, $p < .001$, $d = 1.55$, 95% CI = [1.30, 1.80] (see Table 2 for *M* and *SD*). Also as expected, perceived BJW in the weak-BJW condition was lower than the comparison condition, $t(442) = -23.95$, $p < .001$, $d = 2.47$, 95% CI = [−3.32, −2.82]. We had no registered hypotheses for envy ratings but found a significant main effect on envy, $F(2, 442) = 5.32$, $p = .005$. Somewhat surprisingly, participants reported less envy toward the strong-BJW target than the weak-BJW target ($t[442] = -2.65$, $p = .008$, $d = 0.31$, 95% CI = [−0.89, −0.13]) and the no-BJW comparison target, $t(442) = -2.97$, $p = .003$, $d = 0.34$, 95% CI = [−0.96, −0.19]. Envy ratings were similar in the weak-BJW and comparison conditions, $t(442) = 0.35$, $p = .723$, $d = 0.04$, 95% CI = [−0.45, 0.31]. Speculatively, although people may generally envy wealthy people, adult online workers may not have envied the strong BJW target because the target's worldview appeared naïve at best and fatuous at worst, especially as the target was a young student. We further discuss the mixed findings on envy in Experiments 5–6.

The main effect of condition on perceived deservingness of the misfortune was significant, $F(2, 442) = 50.92$, $p < .001$. Replicating Experiments 1 and 2, participants reported greater deservingness for the strong-BJW (vs. weak-BJW) target, $t(442) = 9.32$, $p < .001$, $d = 1.06$, 95% CI = [1.22, 1.88]. Relative to the comparison condition, deservingness for the strong-BJW target was also higher, $t(442) = 7.98$, $p < .001$, $d = 0.89$, 95% CI = [1.01, 1.68]. However, participants in the weak-BJW condition did not report less deservingness relative to the comparison condition, $t[442] = -1.23$, $p = .220$, $d = 0.15$, 95% CI = [−0.54, 0.12]. The main effect of condition on schadenfreude was also significant, $F(2, 442) = 37.38$, $p < .001$. We observed the same pattern for schadenfreude: schadenfreude was greater in the strong-BJW condition relative to both the weak-BJW ($t[442] = 7.92$, $p < .001$, $d = 0.91$, 95% CI = [1.03, 1.70]) and comparison conditions, $t(442) = 6.94$, $p < .001$, $d = 0.77$, 95% CI = [0.87, 1.55]. However, the difference between the weak-BJW and no-BJW comparison conditions was not significant ($t[442] = -0.88$, $p = .377$, $d = 0.11$, 95% CI = [−0.50, 0.19]). The results were consistent when performing analyses controlling for envy (see OSM Tables S10–S11). This suggests that expressing weak BJW—at least for wealthy targets—may not reduce schadenfreude or perceived deservingness. Instead, expression of strong BJW seems to increase these reactions.

We explored the same parallel mediation model as Experiment 2 (see Fig. 2). Because schadenfreude and deservingness ratings did not differ

[5] An earlier version of this study was conducted prior to Experiments 1–2. Although the results were mainly consistent with those reported in Experiment 3, the original vignette attributed some implied responsibility to the target for their misfortune, and the BJW manipulation was underdeveloped. We decided to improve and replicate the study, and therefore data for Experiment 3 were collected at a later point in the project process.

between the weak-BJW and comparison conditions, the present model focused solely on the weak- versus strong-BJW conditions.[6] Consistent with Experiment 1 and replicating Experiment 2, the indirect effect via deservingness was significant, $\beta = 0.40$, $SE = 0.05$, $z = 8.70$, $p < .001$, 95% CI = [0.31, 0.50]. Like Experiment 2, the indirect effect via envy was not significant, $\beta = -0.003$, $SE = 0.01$, $z = -0.60$, $p = .546$, 95% CI = [−0.02, 0.01]. Therefore, even for a serious misfortune, the difference in schadenfreude for weak-BJW versus strong-BJW targets can be explained by increased perceptions of deservingness, although other unmeasured variables might also play an intervening role.

7. Experiment 4

When misfortune befalls a strong just-world believer, people infer deservingness and feel schadenfreude whether the target's suffering is minor and incidental or severe and consequential. We showed this effect for a wealthy target (Experiment 3) and when no wealth information was provided (Experiments 1–2). In Experiment 4, we focused on the role of target wealth in relation to BJW, schadenfreude, and perceived deservingness of the misfortune. Specifically, we manipulated target's wealth status without providing any information about their BJW. If people infer stronger BJW based on a target's wealth alone, and if those perceptions of BJW lead to greater deservingness and schadenfreude, this would provide further evidence for the association between target BJW and schadenfreude. Thus, we hypothesized that perceivers would indicate greater perceived BJW, perceived deservingness, and schadenfreude when evaluating a wealthy (vs. poor) target. We also hypothesized that envy would be greater in the wealthy (vs. poor) condition. To increase our ability to generalize beyond only misfortunes involving minor inconveniences or losses of status, the misfortune in Experiment 4 involved the target experiencing physical pain. Additionally, we included a joke evaluation measure, which was unrelated to the stimulus materials but in theory could vary as a consequence of participants experiencing schadenfreude. That is, if people derive greater pleasure from the misfortune of a wealthy (vs. poor) target, their humor appreciation might temporarily improve, leading to rating a joke as funnier. We also pre-registered indirect effects of wealth status on schadenfreude and perceived deservingness via perceived BJW and a serial mediation model in which target wealth status increases perceived BJW, influencing deservingness, which then impacts schadenfreude.

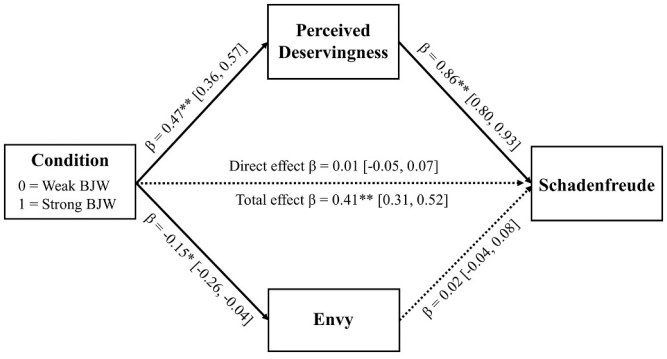

Fig. 2. Parallel mediation model: Indirect effects of target BJW on schadenfreude via perceived deservingness and envy in Experiment 3. Path coefficients are standardized. Values in brackets represent bias-corrected 95% confidence intervals obtained from 10,000 bootstrap resamples. * $p < .01$, ** $p < .001$.

[6] OSM Fig. S3 shows a similar mediation model including all three conditions. Results were consistent with the model reported here.

7.1. Method

7.1.1. Participants, procedure, and measures

Given that none of our previous studies included a misfortune involving physical pain or joke evaluations, we increased the target sample size to achieve higher power to capture potentially smaller effects. To achieve 80% power ($\alpha = 0.05$) to detect an effect size of $d = 0.28$, we recruited 400 CloudResearch-approved U.S. MTurk workers. Recruitment procedures were identical to Experiment 3. After applying the pre-registered exclusion criteria, the final sample size was 392 (see Table 1). Participants were randomly assigned to the wealthy or poor target condition, adapted from Weiner and Laurent (2021). Participants in the wealthy condition read:

> Alex is quite wealthy and lives a very comfortable life. He works but doesn't need to because most of his income comes from a trust fund left to him by his grandparents. Money has never been an issue for Alex, who can usually afford whatever he wants.

Participants in the poor condition read:

> Alex is quite poor and lives a very difficult life. To simply survive, he has to work at several part-time jobs that pay next to nothing. Money has always been an issue for Alex, who often cannot even afford basic necessities.

We assessed perceived BJW ($\alpha = 0.94$) and envy toward Alex ($r = 0.86$) with the same items that were used in Experiment 3. Participants then read about Alex's misfortune, which involved a wasp stinging his lips on the way to have dinner with a woman he liked. Participants read that the dinner went terribly because of Alex's swollen face and that he never got a second date, although he wanted one. Participants then responded to the same perceived deservingness ($\alpha = 0.94$) and schadenfreude ($\alpha = 0.92$) measures used in previous experiments (see Table S1). Lastly, participants were randomly assigned to read one of two jokes. One joke was about karma (BJW-related) and the other was a play on words unrelated to BJW (see OSM). Participants were asked to rate the joke (*1 = not funny at all, 7 = extremely funny*).

7.2. Results and discussion

As expected, there was a substantial difference in envy between the wealthy ($M = 5.14$, $SD = 1.37$) and poor targets ($M = 1.37$, $SD = 0.88$), $t(390) = 32.35$, $p < .001$, $d = 3.27$, 95% CI = [3.54, 4.00]. Unlike previous experiments, target BJW descriptions were not provided in this study. Nonetheless and as hypothesized, the wealthy target ($M = 4.81$, $SD = 1.13$) was perceived to have stronger BJW than the poor target ($M = 2.59$, $SD = 1.20$), $t(390) = 18.92$, $p < .001$, $d = 1.91$, 95% CI = [2.00, 2.46]. This effect of wealth status on perceived BJW remained significant when controlling for envy (see OSM Table S13).

Also as hypothesized, participants perceived that the wealthy target ($M = 2.05$, $SD = 1.32$) was more deserving of the misfortune than the poor target ($M = 1.54$, $SD = 1.05$), $t(390) = 4.22$, $p < .001$, $d = 0.43$, 95% CI = [0.27, 0.75]. Additionally, participants reported greater schadenfreude toward the wealthy target ($M = 2.67$, $SD = 1.66$) than the poor target ($M = 2.08$, $SD = 1.42$), $t(390) = 3.81$, $p < .001$, $d = 0.38$, 95% CI = [0.29, 0.90]. Also consistent with our hypothesis, participants gave higher joke ratings after reading about the wealthy ($M = 4.04$, $SD = 1.79$) than the poor target's pain ($M = 3.45$, $SD = 1.81$). A 2 × 2 ANOVA on joke ratings revealed main effects of wealth status and joke type, $F(1, 388) = 11.04, 8.18$; $p < .001, 0.004$; $d = 0.33, 0.28$; 95% CI = [0.24, 0.95]; [0.16, 0.87], respectively. The play-on-word joke ($M = 4.04$, $SD = 1.79$) had higher ratings than the karma joke ($M = 3.45$, $SD = 1.81$). The wealth status × joke type interaction was not significant, $F(1, 388) = 0.86$, $p = .355$, $\eta^2_g = 0.00$.

Three mediation models were estimated. First, we examined if target's financial status (poor = 0, wealth = 1) affected schadenfreude via

perceived BJW (Model 1). We then tested whether perceived BJW mediated the target wealth effect on deservingness ratings (Model 2). Notably, because perceived BJW was assessed prior to the description of the misfortune, schadenfreude or perceived deservingness could not have influenced BJW ratings. In Model 1, the direct effect of condition on perceived BJW was significant ($\beta = 0.69$, $SE = 0.04$, $z = 19.11$, $p < .001$, 95% CI = [0.62, 0.76]), as was the direct effect of perceived BJW on schadenfreude, $\beta = 0.31$, $SE = 0.08$, $z = 4.14$, $p < .001$, 95% CI = [0.16, 0.46]. The hypothesized indirect effect was also significant, $\beta = 0.22$, $SE = 0.05$, $z = 4.18$, $p < .001$, 95% CI = [0.12, 0.32]. After adjusting for condition-based differences in perceived BJW, the direct effect of target wealth on schadenfreude was no longer significant, $\beta = -0.03$, $SE = 0.07$, $z = -0.40$, $p = .690$, 95% CI = [−0.16, 0.11]. Model 2 provided similar results with significant direct effects of condition on perceived BJW ($\beta = 0.69$, $SE = 0.04$, $z = 19.00$, $p < .001$, 95% CI = [0.62, 0.76]) and perceived BJW on deservingness, $\beta = 0.46$, $SE = 0.09$, $z = 5.00$, $p < .001$, 95% CI = [0.28, 0.64]. The indirect effect was significant ($\beta = 0.32$, $SE = 0.06$, $z = 5.10$, $p < .001$, 95% CI = [0.20, 0.44]), and the direct effect of condition on deservingness was not significant, $\beta = -0.11$, $SE = 0.09$, $z = -1.27$, $p = .206$, 95% CI = [−0.27, 0.06].

Model 3 builds on our findings from Experiments 1–3 and estimates a serial mediation model with target wealth predicting greater perceived BJW, leading to increased deservingness, which in turn increases schadenfreude (see Fig. 3). In this model, perceived BJW and deservingness sequentially mediated the effect of target wealth on schadenfreude, $\beta = 0.20$, $SE = 0.04$, $z = 4.90$, $p < .001$, 95% CI = [0.12, 0.28]. Indirect effects through perceived BJW alone ($\beta = 0.02$, $SE = 0.04$, $z = 0.53$, $p = .595$, 95% CI = [−0.06, 0.10]) and deservingness alone ($\beta = -0.07$, $SE = 0.05$, $z = -1.28$, $p = .200$, 95% CI = [−0.17, 0.03]) were no longer significant in Model 3. These results provide evidence that inferences of strong target BJW resulting from target wealth status increase perceptions that the painful misfortune was deserved, which in turn produces greater schadenfreude.

8. Experiment 5

Experiment 3 showed that perceivers feel schadenfreude toward a wealthy target's misfortune when they express strong BJW, and Experiment 4 further demonstrated that even without explicitly describing BJW, perceivers infer stronger BJW from wealthy targets relative to poor targets, thereby increasing schadenfreude. Furthermore, Experiments 1–4 consistently demonstrated a link between strong-BJW endorsement to perceived deservingness to schadenfreude. Experiment 5 builds on these ideas to test whether target's financial status moderates this relationship. We used a 2 (target BJW: weak vs. strong) × 2 (target wealth status: poor vs. wealthy) between-participant design. We expected main effects of target BJW and wealth on perceived BJW, envy, perceived deservingness, and schadenfreude. Importantly, we hypothesized a BJW × wealth interaction such that when targets were described as poor, strong-BJW (vs. weak-BJW) expression would lead to equal or reduced deservingness and schadenfreude. We also pre-registered an indirect effect of target BJW on schadenfreude via perceived deservingness and tested whether this indirect effect was moderated by the target's wealth status. Specifically, we expected perceived deservingness to mediate the relationship between BJW expression and schadenfreude for the wealthy target but that this indirect association would be much weaker for the poor target (see Fig. 4).

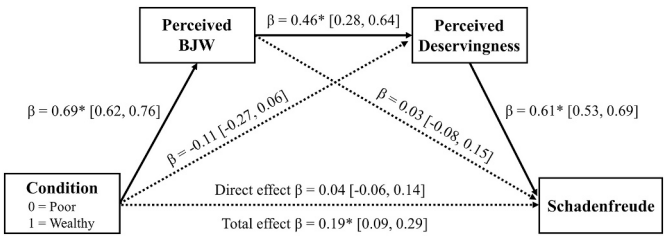

Fig. 3. Serial mediation model: Indirect effect of target wealth on schadenfreude via perceived BJW and deservingness in Experiment 4. Path coefficients are standardized. Values in brackets represent bias-corrected 95% confidence intervals obtained from 10,000 bootstrap resamples. * $p < .001$.

8.1. Method

8.1.1. Participants, procedure, and measures

Because Experiment 5 used the same misfortune story as Experiment 2, we conservatively estimated the effect of the BJW manipulation on schadenfreude to be $d = 0.45$ (i.e., based on results from Experiment 2). To find this effect again in a new sample, we would need 105 participants per cell for 90% power with alpha = 0.05 (two-tailed). To ensure adequate power to find the target BJW × wealth status interaction in the 2 × 2 design, we doubled our cell size to 210. This is because we expected an attenuated interaction in which the BJW effect is present in the wealthy condition but absent (or less present) in the poor condition. To detect this type of interaction, studies require as least twice as many participants per cell to achieve the same statistical power as a study designed to detect a main effect in an "effect-present" condition (see Blake & Gangestad, 2020; Giner-Sorolla, 2018). With four conditions, we aimed to collect complete data from 840 U.S. MTurk workers and received 842 complete responses.

Recruitment procedures were identical to Experiments 3–4, except we used the "block low quality participants" feature instead of recruiting only from CloudResearch-approved participants because our target sample size was relatively large with specific qualifications (e.g., not having participated in previous experiments). After applying the preregistered exclusion criteria, the final sample size was 836 (see Table 1). Simulation results using the *SuperPower* R package (Lakens & Caldwell, 2019) showed that with $\alpha = 0.05$, this sample size was sensitive enough to detect a main effect of target BJW ($\eta^2_p = 0.01$ at 87% power), main effect of wealth ($\eta^2_p = 0.14$ at 100% power), and BJW × wealth interaction ($\eta^2_p = 0.01$ at 80% power).

Participants were randomly assigned to one of the four descriptions of Alex, presented as either wealthy or poor and as having either weak or strong BJW. Target wealth descriptions were identical to Experiment 4, and BJW information was similar to Experiments 1–3 (see OSM). Participants then responded to the same perceived BJW ($\alpha = 0.98$) and envy measures ($r = 0.81$) used in Experiment 3–4. Finally, participants read the misfortune story from Experiment 2 (i.e., Alex's clean car getting soiled) and completed perceived deservingness ($\alpha = 0.92$) and schadenfreude ($\alpha = 0.94$) measures that were identical to those used in Experiment 4 (see OSM Table S1).

8.2. Results and discussion

A series of 2 (target BJW: weak vs. strong) × 2 (wealth status: poor vs. wealthy) ANOVAs were conducted. Table 3 provides *M* and *SD* for all variables.

8.2.1. Perceived BJW and envy

For perceived BJW, the expected main effect of BJW was observed, $F(1, 832) = 6477.33$, $p < .001$, $d = 5.55$, 95% CI = [4.56, 4.79]. The main effect of target wealth also emerged, $F(1, 832) = 4.37$, $p = .037$, $d = 0.05$, 95% CI = [0.01, 0.24]. There was an unexpected BJW × wealth interaction: $F(1, 832) = 4.31$, $p = .038$, $\eta^2_g = 0.01$; however, the expected differences between weak-BJW versus strong-BJW targets were observed in both poor ($t[832] = 58.31$, $p < .001$, $d = 6.17$, 95% CI = [4.63, 4.96]) and wealthy conditions ($t[832] = 55.51$, $p < .001$, $d = 5.07$, 95% CI = [4.39, 4.71]). Thus, although differences in perceived BJW between the two BJW conditions were somewhat greater when the

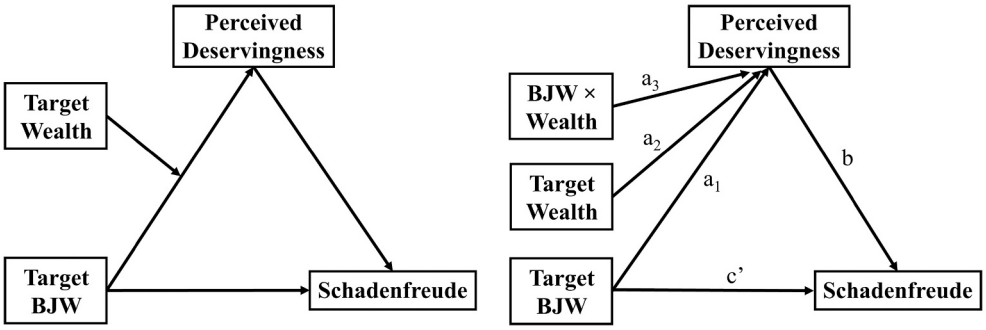

Fig. 4. Conceptual (left) and statistical (right) models of the moderated mediation effect in Experiment 5.

Table 3
Condition means and standard deviations of dependent variables for Experiment 5.

	Poor		Wealthy	
	Weak-BJW	Strong-BJW	Weak-BJW	Strong-BJW
Variables	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)
Perceived BJW	1.61 (0.81)	6.41 (0.75)	1.85 (1.00)	6.41 (0.79)
Envy	1.39 (0.74)	1.76 (1.01)	5.03 (1.44)	4.64 (1.55)
Deservingness	1.57 (0.86)	1.67 (1.04)	1.91 (1.17)	2.84 (1.39)
Schadenfreude	2.28 (1.63)	2.31 (1.50)	3.31 (1.79)	3.99 (1.70)
N	208	209	208	211

target was wealthy, the simple main effects confirm that the BJW manipulation was successful within both wealth conditions.

As predicted, there was a main effect of target wealth on envy, $F(1, 832) = 1468.35$, $p < .001$, $d = 2.62$, 95% CI = [3.09, 3.43]. However, contrary to our expectation, the main effect of target BJW was not significant, $F(1, 832) = 0.02$, $p = .884$, $d = 0.00$, 95% CI = [−0.18, 0.15]. Additionally, there was an unexpected BJW × wealth interaction: $F(1, 832) = 20.09$, $p < .001$, $\eta^2_g = 0.02$. Participants envied the strong-BJW target more than the weak-BJW target in the poor condition, $t(832) = 3.06$, $p = .002$, $d = 0.42$, 95% CI = [0.13, 0.61]. When the target was wealthy, however, the strong-BJW target was envied *less* than the weak-BJW target, $t(832) = -3.28$, $p = .001$, $d = 0.26$, 95% CI = [−0.63, −0.16]. In Experiment 3, which featured a wealthy target, participants also reported less envy toward the strong-BJW (vs. weak-BJW) target. Together, these results suggest that participants may have interpreted "envy" as a more benign type that represents admiration or emulation of another rather than the malicious type characterized by hostility and resentment (Lange, Weidman, & Crusius, 2018). For example, people may admire and envy a poor person who can maintain a strong-BJW amidst hardship and adversities. Similarly, people may respect and envy a wealthy person who can recognize that the world is not always just, even though it has treated them quite well. We examine the role of malicious envy in Experiment 6.

8.2.2. Perceived deservingness and schadenfreude

Importantly, we found support for our primary hypotheses. We found a main effect of target BJW on perceived deservingness: $F(1, 832) = 42.76$, $p < .001$, $d = 0.43$, 95% CI = [0.36, 0.67]; a main effect of target wealth: $F(1, 832) = 92.74$, $p < .001$, $d = 0.64$, 95% CI = [0.60, 0.91]; and notably, a BJW × wealth interaction, $F(1, 832) = 28.34$, $p < .001$, $\eta^2_g = 0.03$. Having strong (vs. weak) BJW led to greater perceived deservingness when the target was wealthy, $t(832) = 8.40$, $p < .001$, $d = 0.72$, 95% CI = [0.71, 1.15]. However, participants perceived similar levels of deservingness for the poor target regardless of their BJW, $t(832) = 0.86$, $p = .391$, $d = 0.10$, 95% CI = [−0.12, 0.31].

Consistent with Experiments 1–3, schadenfreude was higher on average for the strong-BJW target than the weak-BJW target, $F(1, 832) = 9.43$, $p = .002$, $d = 0.20$, 95% CI = [0.13, 0.58]. Also as hypothesized and consistent with Experiment 4, average schadenfreude was higher toward the wealthy (vs. poor) target, $F(1, 832) = 140.55$, $p < .001$, $d = 0.81$, 95% CI = [1.13, 1.58]. Importantly, the expected BJW × wealth interaction was observed, $F(1, 832) = 8.14$, $p = .004$, $\eta^2_g = 0.01$. As predicted, endorsing strong (vs. weak) BJW led to greater schadenfreude for the wealthy target, $t(832) = 4.19$, $p < .001$, $d = 0.39$, 95% CI = [0.36, 1.00]. However, also as predicted, this effect failed to emerge for the poor target, $t(832) = 0.15$, $p = .878$, $d = 0.02$, 95% CI = [−0.29, 0.34]. The results were consistent when performing analyses controlling for envy (see OSM Tables S17-S18). These findings suggest that perceivers believe that people who endorse strong BJW deserve accidental misfortunes more than people whose endorsement of BJW is weak, also feeling greater schadenfreude for these targets, particularly when they are wealthy.

8.2.3. Mediation analyses

Prior to testing the moderated mediation hypothesis, we first estimated a simple mediation model to examine the indirect effect of target BJW (weak-BJW = 0, strong-BJW = 1) on schadenfreude via perceived deservingness. The direct effect from target BJW to deservingness was significant ($\beta = 0.21$, $SE = 0.03$, $z = 6.18$, $p < .001$, 95% CI = [0.14, 0.27]), as was the direct effect of deservingness on schadenfreude, $\beta = 0.58$, $SE = 0.02$, $z = 23.52$, $p < .001$, 95% CI = [0.53, 0.63]. The hypothesized indirect effect was also significant, $\beta = 0.12$, $SE = 0.02$, $z = 5.87$, $p < .001$, 95% CI = [0.08, 0.16]. After adjusting for differences in perceived deservingness due to target BJW, the direct effect of BJW on schadenfreude was not significant, $\beta = -0.02$, $SE = 0.03$, $z = -0.76$, $p = .448$, 95% CI = [−0.08, 0.03].

We then examined whether wealth status moderated this indirect association (see Fig. 5). Consistent with our expectations, we found that the index of moderated mediation (Hayes, 2015) was significant, index

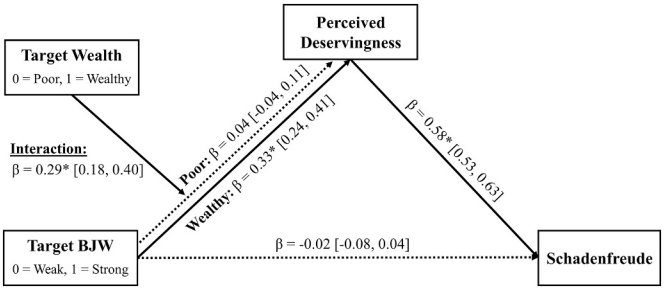

Fig. 5. Moderated mediation model: Conditional indirect effects of target BJW on schadenfreude via perceived deservingness for the poor and wealthy targets in Experiment 5. The dotted and solid lines from target BJW to perceived deservingness represent the simple slopes for the poor and wealthy targets, respectively. Path coefficients are standardized. Values in brackets represent bias-corrected 95% confidence intervals obtained from 10,000 bootstrap resamples. * $p < .001$.

= 0.17, *SE* = 0.03, *z* = 5.11, *p* < .001, 95% CI = [0.11, 0.24]. The conditional indirect effect through deservingness was significant for the wealthy target, $\beta = 0.19$, *SE* = 0.03, *z* = 7.00, *p* < .001, 95% CI = [0.14, 0.25]. However, this was not observed for the poor target, $\beta = 0.02$, *SE* = 0.02, *z* = 1.01, *p* = .312, 95% CI = [−0.02, 0.07]. This suggests that endorsing strong BJW leads to greater schadenfreude when the target is wealthy because participants think the target is more deserving of the misfortune. In contrast, target BJW does not seem to influence deservingness judgments when a poor target suffers the same misfortune, leading to similar levels of schadenfreude.

9. Experiment 6

In Experiments 1–3, we consistently observed differences in deservingness and schadenfreude based on target's BJW, but we found in Experiment 5 that this effect was moderated by target's wealth. Our final experiment was designed to address several lingering questions. First, the effect of target BJW on perceived deservingness and schadenfreude may be explained by greater dislike of the wealthy target. Although the target's financial status was not given in Experiments 1–2, perceivers may have assumed that the strong-BJW target was wealthier than the weak-BJW target, and this general disliking of wealthy people may have driven the effect. Thus, we included a measure of perceived wealth in Experiment 6 to test whether it would vary as a function of target BJW. Moreover, Experiment 5 had only two levels of target financial status (i.e., poor vs. wealthy); in Experiment 6, we improved the design by including a middle-income condition. If greater deservingness and schadenfreude are observed for the strong-BJW target who is explicitly described as neither poor nor wealthy, then we can be more confident that the strong-BJW expression, not dislike toward wealthy people, per se, influences how perceivers view others' misfortunes. Relatedly, we included a measure assessing target dislike in Experiment 6 because we do not know whether target (dis)likeability plays a role in relation to target BJW and wealth, although the main results of Experiments 1–2 mostly hold while controlling for negative affect toward the target (see OSM Tables S3–4 and S6–7).

The second concern is that although participants reported, as expected, greater envy toward the wealthy (vs. poor) target in Experiments 4–5, findings regarding the effect of target BJW on envy were mixed in Experiments 2, 3, and 5. Specifically, envy was greater toward the strong-BJW target in Experiment 2 when the target's wealth information was not given but the opposite pattern was observed in Experiment 3 when the target was a wealthy student. In Experiment 5, the main effect of target BJW on envy was not significant. However, we found a significant BJW × wealth interaction where, consistent with Experiment 3, a strong-BJW (vs. weak-BJW) target was envied less when they were wealthy, while greater envy was observed for the strong-BJW (vs. weak-BJW) target when they were poor. Additionally, envy did not mediate the relationship between target BJW and schadenfreude in Experiments 2–3. One limitation making these findings difficult to interpret is that the envy items assessed general or benign envy. A recent meta-analysis found that envy is more positively associated with schadenfreude when it is operationalized as malicious rather than benign (Lange et al., 2018). Therefore, a measure of malicious envy was included in Experiment 6.

One last improvement made in Experiment 6 was including a measure of perceived irony to test whether it helps explain the relationship between target BJW, deservingness, and schadenfreude. In sum, Experiment 6 replicates Experiment 5 using a 2 (target BJW: weak vs. strong) × 3 (target wealth status: poor vs. middle-income vs. wealthy) between-participant design, with perceived wealth, irony, and target dislike additionally measured, and envy items changed to assess malicious envy. Because the design was more complex and included additional variables, we summarize the pre-registered hypotheses in the next section.

9.1. Hypotheses

9.1.1. Main effects of target BJW

We hypothesized that perceived BJW (manipulation check), perceived deservingness, schadenfreude, irony, and dislike would be greater for the strong BJW target than the weak BJW target. However, we expected no differences in perceived wealth between weak and strong BJW conditions. In addition, we registered that the main effect of BJW on malicious envy would be examined and considered exploratory.

9.1.2. Main effects of target wealth

We hypothesized that perceived wealth, BJW, deservingness, schadenfreude, and malicious envy would differ across the three wealth conditions. For perceived wealth (manipulation check) and malicious envy, we expected to find differences in all three levels of wealth status, with the wealthy target being rated as wealthier and envied more than both the middle-income and poor targets, and the middle-income perceived as wealthier and envied more than the poor target. We also predicted that perceived BJW, deservingness, and schadenfreude would be greater for the wealthy target than both the middle-income and poor targets. However, we had no strong hypothesis about differences between the middle-income vs. poor conditions on these measures. We registered that the main effects of target wealth on irony and dislike would also be examined but that results would be considered exploratory.

9.1.3. BJW × wealth interaction

We hypothesized that the effect of BJW on perceived deservingness and schadenfreude would be moderated by wealth status such that for the wealthy and middle-income targets, strong (vs. weak) BJW would result in greater deservingness and schadenfreude, but for the poor target, endorsing strong BJW would result in similar deservingness and schadenfreude. We also expected a similar interaction effect for irony such that for the wealthy and middle-income targets, strong (vs. weak) BJW would result in greater irony, but for the poor target, endorsing strong BJW would result in equal or less irony. We note that we were less confident about the simple main effect predictions for the middle-income target because no prior experiments included this condition. Additionally, although there was an unexpected BJW × wealth interaction effect on perceived BJW in Experiment 5, we did not hypothesize this for Experiment 6 because we were unsure whether this effect would be replicated. Similarly, we had no hypothesis regarding BJW × wealth interaction effect on perceived wealth, dislike, or malicious envy.

9.1.4. Mediation

As in Experiment 5, we pre-registered a moderated mediation effect: We expected perceived deservingness to mediate the relationship between target BJW and schadenfreude but that the path from BJW to deservingness would be moderated by target wealth.

9.2. Method

9.2.1. Participants and procedure

Because hypothesized BJW × wealth interaction effects were observed in Experiment 5, the same method was used to determine the sample size. In Experiment 5, we recruited roughly 210 participants in each cell of the design. Because we had two additional cells in the current study (i.e., middle-income weak BJW and middle-income strong BJW), we aimed to collect complete data from 1260 participants (210 per cell × 6 cells). We advertised for 1260 HITs and received 1263 complete responses. Recruitment procedures were identical to Experiment 5, except only CloudResearch-approved participants were allowed to participate because the platform no longer offered the "block low quality participants" feature. After excluding respondents who took the study more than once, the final sample size was 1248 (see Table 1). Simulation results using the *SuperPower* R package (Lakens & Caldwell,

2019) showed that with α = 0.05, this sample size was sensitive enough to detect a main effect of target BJW ($\eta^2_p = 0.04$ at 100% power), main effect of wealth ($\eta^2_p = 0.11$ at 100% power), and BJW × wealth interaction ($\eta^2_p = 0.01$ at 97% power).

Procedures were similar to Experiment 5, except participants were randomly assigned to one of three target wealth conditions. The middle-income target was described as follows:

> Alex was born into a middle-income family that is neither poor nor wealthy. As a 38-year-old, Alex is still neither poor nor wealthy and lives a quite average life. Like most people, Alex works and earns a reasonable living. Although there are some financial struggles at times, money has rarely been a serious issue for Alex, who can usually afford the things he needs but not always afford the things he wants.

The poor and wealthy manipulations were nearly identical to the descriptions used in Experiment 5, except we modified minor details to match the middle-income condition's sentence structure (see OSM). The BJW descriptions were also almost identical to those used in Experiment 5, except we used shorter sentences to make reading easier (see OSM). Participants then responded to dislike, malicious envy, perceived wealth, and perceived BJW measures (see measures) before reading about the misfortune, which was identical to Experiment 5. Participants then completed perceived deservingness, schadenfreude, and irony measures.

9.2.2. Measures

Unless noted, all items used 7-point scales ranging from 1 = *strongly disagree* to 7 = *strongly agree*. Perceived BJW (α = 0.98), deservingness (α = 0.94), and schadenfreude (α = 0.93) measures were identical to Experiment 5. To assess perceived wealth of the target, we used the MacArthur Scale of Subjective Social Status (Adler, Epel, Castellazzo, & Ickovics, 2000). The scale shows a symbolic ladder where the top/bottom positions represent people who have the most/least money and the most/least respected jobs (see OSM). Participants were asked to indicate what rung the target stood relative to other people in the U.S. (*1 = the bottom and lowest rung, 10 = the top and highest rung*). Irony was measured with three items (α = 0.90): "What happened to Alex was quite ironic," "what happened to Alex was a good example of irony," and "I found the story ironic because what happened to Alex was unexpected." Target dislike was measured with three items (α = 0.84): "I dislike people like Alex," "I would enjoy spending time with Alex" (reversed), and "Alex is the sort of person I despise." For malicious envy (α = 0.94), we used one face-valid item ("I maliciously envy Alex") and three items adapted from the malicious subscale of the Benign and Malicious Envy Scale[7] (Lange & Crusius, 2015): "If Alex has something that I want for myself, I wish to take it away from him," "I feel ill will toward Alex because I envy him," and "seeing Alex's achievements would make me resent him" (*1 = does not apply at all, 7 = applies very much*).

9.3. Results and discussion

A series of 2 (target BJW: weak vs. strong) × 3 (wealth status: poor vs. middle-income vs. wealthy) ANOVAs were conducted to examine effects on dependent measures. Table 4 provides *M* and *SD* for all variables.

9.3.1. Perceived BJW and perceived wealth

Confirming that the BJW manipulation was successful, the expected main effect of target BJW was observed on perceived BJW, $F(1, 1242) = 5699.36$, $p < .001$, $d = 4.22$, 95% CI = [4.35, 4.58]. The main effect of target wealth also emerged as predicted, $F(2, 1242) = 9.05$, $p < .001$. As hypothesized and replicating Experiment 5, perceived BJW was slightly greater for the wealthy target than the poor target, $t(1242) = 2.64$, $p = .008$, $d = 0.08$, 95% CI = [0.05, 0.33]. Perceived BJW for the middle-income target was also greater than the poor target, $t(1242) = 4.21$, $p < .001$, $d = 0.14$, 95% CI = [0.16, 0.45]. Unexpectedly, participants reported slightly less perceived BJW for the wealthy target than the middle-income target, but this difference was not significant, $t(1242) = -1.57$, $p = .117$, $d = 0.06$, 95% CI = [−0.26, 0.03]. We again observed a target BJW × wealth interaction on perceived BJW: $F(2, 1242) = 9.77$, $p < .001$, $\eta^2_g = 0.02$. As in Experiment 5, however, the BJW manipulation was successful within all levels of target wealth. That is, the expected differences between weak-BJW versus strong-BJW targets were observed in poor ($t[1242] = 46.91$, $p < .001$, $d = 5.21$, 95% CI = [4.58, 4.98]), middle income ($t[1242] = 40.08$, $p < .001$, $d = 3.73$, 95% CI = [3.93, 4.34]), and wealthy conditions ($t[1242] = 43.82$, $p < .001$, $d = 4.07$, 95% CI = [4.28, 4.68]).

As expected, the main effect of target wealth on perceived wealth was significant, $F(2, 1242) = 1075.49$, $p < .001$. Consistent with our prediction and confirming the effectiveness of the wealth manipulation, the wealthy target was placed higher on the social status ladder than both the poor ($t[1242] = 46.38$, $p < .001$, $d = 2.91$, 95% CI = [4.91, 5.34]), and the middle-income targets, $t(1242) = 23.36$, $p < .001$, $d = 1.61$, 95% CI = [2.38, 2.82]. Also as predicted, the middle-income target was placed higher on the ladder than the poor target, $t(1242) = 22.76$, $p < .001$, $d = 1.81$, 95% CI = [2.31, 2.74]. We expected to find no differences in perceived wealth between the two BJW conditions. Consistent with this, the main effect of target BJW was not significant, $F(1, 1242) = 0.01$, $p = .915$, $d = 0.00$, 95% CI = [−0.17, 0.19]. The BJW × wealth interaction was not significant for perceived wealth, $F(2, 1242) = 1.02$, $p = .360$, $\eta^2_g = 0.00$. Thus, no difference in perceived wealth emerged as a function of target BJW in any of the three wealth conditions. This suggests that any differences in the main dependent measures as a function of target BJW are not attributable to perceivers inferring greater wealth status from the strong-BJW target than the weak-BJW target.

Table 4
Condition means and standard deviations of dependent variables for Experiment 6.

	Poor		Middle-Income		Wealthy	
	Weak-BJW	Strong-BJW	Weak-BJW	Strong-BJW	Weak-BJW	Strong-BJW
Variables	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)
Perceived BJW	1.62 (0.98)	6.40 (0.84)	2.24 (1.35)	6.38 (0.81)	1.96 (1.26)	6.44 (0.92)
Perceived Wealth	2.72 (1.48)	2.82 (1.64)	5.24 (1.17)	5.34 (1.22)	7.98 (1.95)	7.80 (1.93)
Deservingness	1.77 (1.09)	1.82 (1.18)	1.95 (1.27)	2.66 (1.48)	2.26 (1.42)	3.32 (1.55)
Schadenfreude	2.31 (1.49)	2.48 (1.57)	3.03 (1.62)	3.71 (1.81)	3.21 (1.68)	4.31 (1.74)
Irony	3.39 (1.65)	3.57 (1.86)	3.79 (1.72)	4.45 (1.63)	3.75 (1.74)	4.37 (1.72)
Dislike	2.59 (1.12)	2.45 (1.16)	2.41 (1.01)	2.76 (1.29)	2.67 (1.17)	3.83 (1.60)
Malicious Envy	1.32 (0.78)	1.34 (0.86)	1.49 (1.12)	1.51 (1.03)	1.91 (1.18)	2.27 (1.49)
N	211	210	202	208	209	208

9.3.2. Perceived deservingness and schadenfreude

We again found support for our primary hypotheses. Consistent with prior experiments, we found a main effect of target BJW on perceived deservingness, $F(1, 1242) = 64.13$, $p < .001$, $d = 0.43$, 95% CI = [0.46, 0.76]. As hypothesized, we also found a main effect of target wealth: $F(2,$

[7] The Benign and Malicious Envy Scale has two other malicious envy items ("I wish that superior people lose their advantage" and "envious feelings cause me to dislike the other person"), but we did not use these because the first item would not make sense in the poor condition and the second item mentions dislike, which we separately measured.

1242) = 57.66, $p < .001$. Averaged across BJW conditions, participants perceived greatest deservingness of the misfortune in the wealthy condition, followed by the middle-income, followed by the poor condition. Replicating Experiment 5, the wealthy versus poor difference was significant, $t(1242) = 10.74$, $p < .001$, $d = 0.72$, 95% CI = [0.81, 1.18]. Also consistent with our prediction, the difference between the wealthy and middle-income was significant, $t(1242) = 5.24$, $p < .001$, $d = 0.32$, 95% CI = [0.31, 0.67]. The middle-income versus poor difference in deservingness was also significant, $t(1242) = 5.44$, $p < .001$, $d = 0.40$, 95% CI = [0.32, 0.69]. Moreover, the hypothesized BJW × wealth interaction on perceived deservingness emerged, $F(2, 1242) = 15.21$, $p < .001$, $\eta^2_g = 0.02$. Specifically, having strong (vs. weak) BJW led to greater perceived deservingness for the wealthy target ($t[1242] = 8.07$, $p < .001$, $d = 0.71$, 95% CI = [0.80, 1.32]) and the middle-income target, $t(1242) = 5.36$, $p < .001$, $d = 0.52$, 95% CI = [0.45, 0.97]. However, participants perceived similar levels of deservingness for the poor target regardless of their BJW, $t(1242) = 0.41$, $p = .682$, $d = 0.05$, 95% CI = [−0.20, 0.31].

Our hypotheses regarding schadenfreude were also supported. A main effect of target BJW was found, indicating that average schadenfreude was higher for the strong-BJW (vs. weak-BJW) target, $F(1, 1242) = 48.06$, $p < .001$, $d = 0.37$, 95% CI = [0.47, 0.83]. The main effect of target wealth on schadenfreude was also significant, $F(2, 1242) = 76.42$, $p < .001$. Across BJW conditions, average schadenfreude was greatest toward the wealthy, followed by the middle-income, followed by the poor target. As hypothesized and consistent with Experiments 4–5, the wealthy versus poor difference in schadenfreude was significant, $t(1242) = 11.99$, $p < .001$, $d = 0.82$, 95% CI = [1.15, 1.60]. Consistent with our prediction, the wealthy versus middle-income difference was also significant, $t(1242) = 3.38$, $p < .001$, $d = 0.22$, 95% CI = [0.16, 0.62]. Moreover, the middle-income versus poor difference was significant, $t(1242) = 8.55$, $p < .001$, $d = 0.60$, 95% CI = [0.76, 1.21]. Importantly, the expected BJW × wealth interaction was observed, $F(2, 1242) = 8.37$, $p < .001$, $\eta^2_g = 0.01$. As hypothesized, endorsing strong (vs. weak) BJW led to greater schadenfreude for both the wealthy target ($t[1242] = 6.80$, $p < .001$, $d = 0.65$, 95% CI = [0.78, 1.42]), and the middle-income target, $t(1242) = 4.15$, $p < .001$, $d = 0.39$, 95% CI = [0.36, 1.00]. However, as predicted, this effect did not emerge for the poor target, $t(1242) = 1.04$, $p = .298$, $d = 0.11$, 95% CI = [−0.15, 0.48].

We acknowledge that effect sizes were small for BJW × wealth interaction in Experiments 5–6. However, like many social science studies, the observed effect sizes may be underestimated for interaction effects due to design and statistical artifacts (Aguinis, Beaty, Boik, & Pierce, 2005; Aguinis & Stone-Romero, 1997). We additionally note that for our dependent measures of interest (i.e., perceived deservingness and schadenfreude), hypothesized main effects and simple main effects of target BJW had effect sizes ranging from $d = 0.20$ to $d = 0.72$, which are non-negligible. Moreover, these interaction effects were robust when performing analyses controlling for malicious envy and dislike (see OSM Tables S20-S21). Thus, Experiment 6 replicated Experiment 5 and further showed that for both wealthy and middle-income (but not for poor) targets, endorsing strong BJW leads people to perceive greater deservingness and feel greater schadenfreude for accidental misfortunes. Notably, the BJW effect emerged for the middle-income target described as neither poor nor wealthy, suggesting that strong-BJW expression, not dislike or envy toward the wealthy, per se, influences how perceivers view others' misfortunes.

9.3.3. Putative mediators

9.3.3.1. Irony. We hypothesized that the misfortune would be viewed as more ironic when it happened to the strong-BJW target than the weak-BJW target. Consistent with this, we found a main effect of BJW on irony, $F(1, 1242) = 24.74$, $p < .001$, $d = 0.28$, 95% CI = [0.29, 0.68]. In addition, there was a significant main effect of target wealth, $F(2, 1242) = 17.39$, $p < .001$. Relative to the poor target, irony was greater for both the wealthy ($t[1242] = 4.85$, $p < .001$, $d = 0.33$, 95% CI = [0.34, 0.81]), and middle-income targets, $t(1242) = 5.32$, $p < .001$, $d = 0.37$, 95% CI = [0.40, 0.87]. However, irony ratings were similar for the wealthy and middle-income targets, $t(1242) = -0.48$, $p = .628$, $d = 0.04$, 95% CI = [−0.29, 0.18].

The BJW × wealth interaction effect on irony did not reach significance, $F(2, 1242) = 2.38$, $p = .093$, $\eta^2_g = 0.00$. Although the interaction was not significant, we examined whether the data were consistent with the pattern of simple main effects we pre-registered. As hypothesized, endorsing strong (vs. weak) BJW resulted in greater irony when the target was wealthy, $t(1242) = 3.63$, $p < .001$, $d = 0.35$, 95% CI = [0.28, 0.94]. Moreover, even when the target was explicitly described as "neither poor nor wealthy," expressing strong (vs. weak) BJW led to higher irony ratings, $t(1242) = 3.86$, $p < .001$, $d = 0.39$, 95% CI = [0.32, 0.99]. When the target was poor, however, the difference in irony between the two BJW conditions was not significant, $t(1242) = 1.11$, $p = .268$, $d = 0.11$, 95% CI = [−0.14, 0.52]. Thus, although the BJW × wealth interaction was not statistically significant, we observed a similar hypothesized pattern for irony as for perceived deservingness and schadenfreude. Later, we describe an analysis examining whether irony mediates the relationship between target BJW and schadenfreude.

9.3.3.2. Dislike. Consistent with our hypothesis that the strong-BJW target would be more disliked than the weak-BJW target, there was a significant main effect of target BJW on dislike, $F(1, 1242) = 41.69$, $p < .001$, $d = 0.34$, 95% CI = [0.32, 0.59]. The main effect of target wealth was also significant, $F(2, 1242) = 44.18$, $p < .001$. The wealthy target was disliked more than both the poor ($t[1242] = 8.51$, $p < .001$, $d = 0.54$, 95% CI = [0.56, 0.90]) and the middle-income targets, $t(1242) = 7.70$, $p < .001$, $d = 0.49$, 95% CI = [0.50, 0.83]. Dislike ratings were similar for the poor and middle-income targets, $t(1242) = 0.76$, $p = .449$, $d = 0.06$, 95% CI = [−0.10, 0.23]. This finding aids in confirming that the impact of BJW on deservingness and schadenfreude is not directly linked to target dislike, in that the middle-income (vs. poor) target was seen as more deserving of the misfortune and participants reported greater schadenfreude at the misfortune, yet no differences in dislike emerged across these two conditions.

Additionally, there was a significant BJW × wealth interaction on dislike, $F(2, 1242) = 29.35$, $p < .001$, $\eta^2_g = 0.05$. Dislike toward the strong-BJW (vs. weak-BJW) target was greater when the targets were wealthy, $t(1242) = 9.52$, $p < .001$, $d = 0.83$, 95% CI = [0.92, 1.40]. Similarly, the middle-income target with strong BJW (vs. weak BJW) was more disliked, $t(1242) = 2.85$, $p = .004$, $d = 0.30$, 95% CI = [0.11, 0.59]. In contrast, participants indicated less dislike for the strong-BJW target when they were poor, but this difference was not significant, $t(1242) = -1.20$, $p = .231$, $d = 0.13$, 95% CI = [−0.38, 0.09]. We later describe an analysis examining whether dislike mediates the relationship between target BJW and schadenfreude.

9.3.3.3. Malicious envy. As hypothesized, the main effect of target wealth on malicious envy was significant, $F(2, 1242) = 55.04$, $p < .001$. Consistent with our prediction, more envy was reported for the wealthy target than both the poor ($t[1242] = 10.01$, $p < .001$, $d = 0.68$, 95% CI = [0.61, 0.91]), and the middle-income targets, $t(1242) = 7.71$, $p < .001$, $d = 0.48$, 95% CI = [0.44, 0.74]. Also as predicted, envy was greater toward the middle-income than the poor target, $t(1242) = 2.24$, $p = .026$, $d = 0.18$, 95% CI = [0.02, 0.32]. The main effect of BJW was also significant such that the strong-BJW target was envied slightly more than the weak-BJW target, $F(1, 1242) = 4.74$, $p = .030$, $d = 0.12$, 95% CI = [0.01, 0.26].

The BJW × wealth interaction was also significant for malicious envy, $F(2, 1242) = 3.38$, $p = .034$, $\eta^2_g = 0.01$. Malicious envy toward the strong-BJW target (vs. weak-BJW) was greater only when the target was wealthy, $t(1242) = 3.38$, $p < .001$, $d = 0.27$, 95% CI = [0.15, 0.58].

There were no significant differences in malicious envy based on target BJW for the middle-income (t[1242] = 0.15, p = .884, d = 0.01, 95% CI = [−0.20, 0.23]) and poor targets, t(1242) = 0.25, p = .805, d = 0.03, 95% CI = [−0.18, 0.24]. This also helps confirm that differences in perceived deservingness and schadenfreude as a function of target BJW and wealth are not simply due to malicious envy. That is, higher schadenfreude and perceived deservingness were observed for both middle-income and wealthy targets who had strong (vs. weak) BJW; however, no differences in malicious envy were found for the middle-income target as a function of BJW. Also of note, these results are different from what we found in Experiments 3 and 5, where envy ratings were greater for the weak-BJW target (vs. strong-BJW) when they were wealthy, and the strong-BJW target was envied more than the weak-BJW when they were poor. Likely, the envy items used in the earlier experiments assessed benign envy. For example, for their ability to maintain a humble worldview despite their advantage, perceivers may have felt benign envy for wealthy targets with weak-BJW, whereas malicious envy might be evoked toward wealthy strong-BJW targets for attributing their success to themselves and neglecting the role of luck. Similarly, people may benignly (but not maliciously) envy a person who can maintain a just worldview despite their economic disadvantage. Experiment 6 demonstrates the importance of how envy is operationalized when studying its relationship with schadenfreude (Lange et al., 2018; van de Ven, 2014). In the next section, we examine whether malicious envy mediates the relationship between target BJW and schadenfreude.

9.3.4. Mediation

9.3.4.1. Moderated mediation. We pre-registered the same moderated mediation model as in Experiment 5, where the effect of BJW on schadenfreude via perceived deservingness is moderated by target's financial status (see Fig. 4). Because there were three levels of target wealth, for simplicity, we analyzed two separate models. Model 1 examined the indirect effects for the wealthy (vs. poor) target, and Model 2 examined the indirect effects for the middle-income (vs. poor) target. For Model 1 (see Fig. 6), the index of moderated mediation was significant, index = 0.20, SE = 0.04, z = 5.40, p < .001, 95% CI = [0.13, 0.27]. The conditional indirect effect through deservingness was significant for the wealthy target, β = 0.21, SE = 0.03, z = 7.03, p < .001, 95% CI = [0.15, 0.27]. This was not observed for the poor target, β = 0.01, SE = 0.03, z = 0.48, p = .631, 95% CI = [−0.04, 0.06].

Similar results were found in Model 2 (see Fig. 7). The index of moderated mediation was again significant, index = 0.13, SE = 0.04, z = 3.66, p < .001, 95% CI = [0.06, 0.21], and the conditional indirect effect through deservingness was significant for the middle-income target (β = 0.15, SE = 0.03, z = 5.08, p < .001, 95% CI = [0.09, 0.20]), but not for the poor target, β = 0.01, SE = 0.03, z = 0.49, p = .622, 95% CI = [−0.04, 0.06]. These results replicate and extend Experiment 5's findings, providing further support that for wealthy and middle-income (but not poor) targets, endorsing strong BJW increases perceptions that they are more deserving of a misfortune, which in turn leads to greater schadenfreude.

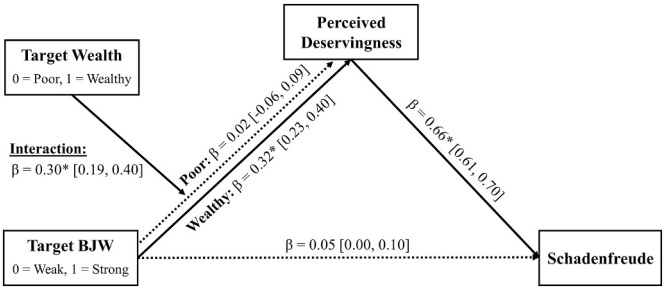

Fig. 6. Model 1: Conditional indirect effects of target BJW on schadenfreude via perceived deservingness when comparing poor and wealthy targets in Experiment 6. The dotted and solid lines from target BJW to perceived deservingness represent the simple slopes for the poor and wealthy targets, respectively. Path coefficients are standardized. Values in brackets represent bias-corrected 95% confidence intervals obtained from 10,000 bootstrap resamples. * p < .001.

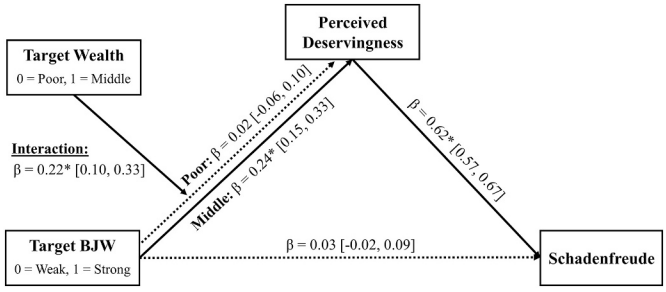

Fig. 7. Model 2: Conditional indirect effects of target BJW on schadenfreude via perceived deservingness when comparing poor and middle-income targets in Experiment 6. The dotted and solid lines from target BJW to perceived deservingness represent the simple slopes for the poor and middle-income targets, respectively. Path coefficients are standardized. Values in brackets represent bias-corrected 95% confidence intervals obtained from 10,000 bootstrap resamples. * p < .001.

9.3.4.2. The roles of irony, deservingness, envy, and dislike. One purpose of Experiment 6 was to examine whether irony is related to deservingness and schadenfreude in the context of our studies. We pre-registered a serial mediation model in which strong (vs. weak) BJW predicts greater irony, leading to increased perceived deservingness, which in turn increases schadenfreude. A supplementary goal of Experiment 6 was to test whether target dislike or malicious envy (as opposed to benign envy) would explain the effect of target BJW and schadenfreude. Thus, we examined a third model (see Fig. 8) which estimated five indirect effects of BJW condition on schadenfreude: 1) via perceived deservingness only, 2) via irony only, 3) via irony and deservingness, 4) via malicious envy only, and 5) via dislike only. Because target BJW did not influence deservingness judgments or schadenfreude for the poor target, and the goal of this analysis was to explore why strong-BJW expression leads to schadenfreude, we included only the wealthy and middle-income conditions for Model 3.

Consistent with prior experiments, the indirect effect via perceived deservingness alone was significant, β = 0.11, SE = 0.02, z = 6.08, p < .001, 95% CI = [0.07, 0.15]. The indirect effect via irony alone was also significant, β = 0.05, SE = 0.01, z = 4.16, p < .001, 95% CI = [0.03, 0.07]. Moreover, the indirect effect via irony and deservingness was also

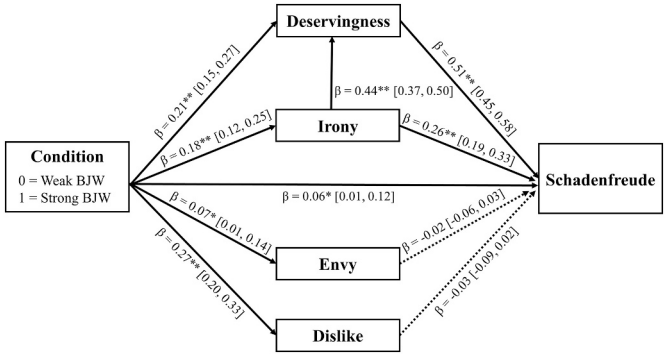

Fig. 8. Model 3: Indirect effects of target BJW on schadenfreude via irony, perceived deservingness, envy, and dislike in Experiment 6. Path coefficients are standardized. Values in brackets represent bias-corrected 95% confidence intervals obtained from 10,000 bootstrap resamples. * p < .05, ** p < .001.

significant, $\beta = 0.04$, $SE = 0.01$, $z = 4.84$, $p < .001$, 95% CI = [0.03, 0.06]. However, consistent with our findings in Experiments 2–3, the indirect effect via malicious envy was not significant, $\beta = -0.001$, $SE = 0.002$, $z = -0.56$, $p = .576$, 95% CI = [−0.01, 0.00]. Similarly, the indirect effect via dislike was not significant, $\beta = -0.01$, $SE = 0.01$, $z = -1.08$, $p = .282$, 95% CI = [−0.02, 0.01]. The direct effect of BJW condition on schadenfreude was significant, $\beta = 0.06$, $SE = 0.03$, $z = 2.21$, $p = .027$, 95% CI = [0.01, 0.12].

Taken together, these results suggest that irony and perceived deservingness help explain why perceivers feel greater schadenfreude when a person with strong-BJW encounters a misfortune. However, target dislike and envy—even when operationalized as malicious—do not seem to capture why the difference in schadenfreude between the two BJW conditions occur, with evidence for this conclusion drawn from both ANOVA and indirect effects analyses. In prior studies where a target behaved in a manner that made them unlikable (e.g., making fun of others, borrowing an item and losing it), dislike uniquely predicted schadenfreude (Hareli & Weiner, 2003). In the current research, however, the target does not perform any obviously disliked behaviors. Hence, finding an indirect effect via target dislike seemed less probable.

10. General discussion

Taking pleasure in another's suffering is socially unacceptable, but this is exactly how people react sometimes. Previous research has shown how schadenfreude arises during intergroup competition or when envied, disliked, or immoral social targets are believed to be getting what they deserve (Feather, 2014; Hareli & Weiner, 2003; Smith et al., 2009). The current research, however, proposed and found support for a novel hypothesis that the accidental misfortunes of people with strong just-world beliefs elicit schadenfreude and that even when these people are not at all responsible for their predicament, perceivers subjectively assign greater deservingness to their misfortunes. Moreover, although strong BJW expression has previously been associated with greater social normativity and utility compared to the *low* BJW view of an unjust world (e.g., Alves & Correia, 2008, 2013), participants from six experiments consistently reported here that misfortunes seemed more fitting for strong-BJW targets relative to *weak/moderate*-BJW targets who believed that the world was unpredictable and not particularly fair. Notably, when strong BJW was pitted against a weak BJW position and a no-BJW information control condition in Experiment 3 (where the wealthy target lost his status), we found that the strong-BJW target elicited greater deservingness and schadenfreude relative to both weak BJW and control, but the weak-BJW target did not significantly differ from control. These results support our proposition that there is something ironic about misfortunes befalling those who endorse strong BJW that perceivers find particularly amusing.

The differences in perceived deservingness and schadenfreude between strong-BJW and weak-BJW expression were observed when targets were introduced as ordinary people (Experiments 1–2) and as wealthy (Experiments 3 & 5–6). However, in Experiments 5–6, we demonstrated limits to this effect, as manipulated BJW did not impact deservingness or schadenfreude for targets described as poor, suggesting that BJW expression matters for schadenfreude when targets are wealthy, middle-income (neither poor nor wealthy), or when their financial status is not described. Notably, these findings emerged when participants imagined interacting with the target (Experiment 1) or evaluated targets from a distant perspective (Experiments 2–3 & 5–6). Moreover, all of these effects held when controlling for demographic variables such as perceivers' gender, age, and political ideology (see OSM). Furthermore, Experiment 4 also demonstrated that even without explicit BJW information, participants infer stronger BJW in wealthy (vs. poor) targets, and this inferred BJW leads to greater perceived deservingness and schadenfreude, as it did in studies when target BJW was experimentally manipulated. Additionally, in Experiment 4, participants were more amused by unrelated jokes after reading about a wealthy target and inferring strong-BJW. Thus, some tentative evidence exists that the observed differences in schadenfreude have at least temporary impacts on humor appreciation.

Across all six experiments, perceived deservingness mediated the association between target BJW and schadenfreude. Consistent with our hypothesis that people would find it ironic when a just-world believer is confronted with a situation that contradicts their worldview (i.e., by encountering an accidental misfortune), Experiment 6 also showed that irony helped mediate the effect of strong BJW expression on schadenfreude. That is, Experiment 6 provided evidence that if a person strongly endorses a just worldview, perceivers think the person's predicament is ironic, leading them to infer greater deservingness of the misfortune, which results in greater schadenfreude. The associations between target BJW, perceived deservingness, and schadenfreude were robust across a variety of misfortunes. Specifically, the current studies featured misfortunes that were relatively minor (Experiments 1–2 & 5–6), consequential (Experiment 3), and involved physical pain and emotional disappointment (Experiment 4), suggesting that the findings are not limited to silly or funny scenarios.

In addition to demonstrating a previously unknown antecedent of schadenfreude (i.e., target BJW), an important contribution of our work is in understanding person-perception based on a social target's fundamental worldview. Without other descriptions such as target's morality, misconduct, specific mental states, or group membership, we have shown that simply being aware of another person's general belief about the world is sufficient to alter how perceivers feel about that person. Whereas schadenfreude for undeserved misfortunes has previously been studied featuring envied or otherwise disliked targets (Berndsen et al., 2017; van de Ven et al., 2015; van Dijk, Ouwerkerk, Smith, & Cikara, 2015), to our knowledge, the current work is the first to document that schadenfreude can emerge when targets are essentially innocent and not reprehensible in any obvious way.

This social-cognitive approach is also relevant for expanding the BJW literature. Although extensive research has examined BJW as an individual difference variable or a motivational construct hypothesized to cause victim-blaming (Bartholomaeus & Strelan, 2019; Hafer & Bègue, 2005), the consequences of BJW expression and its influence on social perception is relatively understudied. Even less known is how perceivers evaluate moderate general BJW expression. Past BJW expression research has predominantly contrasted strong BJW with low BJW (i.e., belief that the world is consistently *unjust*) and concluded that strong-BJW expression is socially valued, especially when applied to the self (e.g., "I feel that I mostly get what I deserve"). The current research extends this prior work by manipulating BJW expression with strong, moderate, and no-BJW information as comparisons. Moreover, all previous, published BJW *expression* studies were conducted exclusively in Western Europe with relatively small sample sizes primarily consisting of university students. The current research addressed this limitation by recruiting larger samples of student and non-student participants from the U.S.

Although the current research aimed for greater generalizability by including U.S. participants, we note that our student or MTurk samples are not nationally-representative (Arditte, Çek, Shaw, & Timpano, 2016), albeit both being subsets of the general U.S. population. In addition, future research should test whether our findings would replicate in non-Western populations. For example, given that karma is an important tenet of Buddhism and Hinduism, greater general BJW expression may be more normative in Eastern cultures, which may influence justice attributions and affective responses (Reich & Wang, 2015; Taylor, Clutterbuck, Player, Shah, & Callan, 2020). For example, karmic beliefs allow people to make sense of misfortunes that currently seem undeserved but presumably follow a metaphysical principle that operates across lifetimes (White & Norenzayan, 2019). In addition, future research might examine whether the effect of target BJW on schadenfreude is moderated by participants' dispositional BJW. If an innocent ingroup victim threatens perceivers' BJW more than an

outgroup victim (Correia, Vala, & Aguiar, 2007), whether or not a perceiver's own worldview is congruent with a target's BJW may potentially influence subsequent reactions to target's misfortune. Lastly, although we employed hypothetical scenarios to easily manipulate the BJW information, future research might assess people's real-world reactions to the misfortunes of strong-BJW targets and employ behavioral or physiological measures of schadenfreude in addition to self-reported ratings.

Ultimately, the findings presented here provide a somewhat unexpected and cautionary note. BJW serves as an adaptive mechanism, protecting us from fears of an uncertain world, helping us believe our efforts will pay off, and discouraging us from transgressing. However, it might be best to keep these views to ourselves—at least as they apply to people other than the self—lest others believe we are more deserving of an unfortunate twist of fate.

Open practices

The experiments in this article earned Open Materials, Open Data, and Pre-registered badges for transparent practices. Verbatim materials for all experiments are available in the Online Supplementary Materials. Deidentified data for all experiments along with analysis scripts are available at https://osf.io/4hbnz/. Pre-registrations are available at: https://aspredicted.org/UHQ_OVG (Experiment 2), https://aspredicted.org/RNG_DMP (Experiment 3), https://aspredicted.org/UOY_DVM (Experiment 4), https://aspredicted.org/HFH_CLR (Experiment 5), and https://aspredicted.org/W92_D4S (Experiment 6).

Declaration of Competing Interest

We have no known conflict of interest to disclose.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jesp.2022.104336.

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