Supplemental Online Material-A: Additional Analyses Experiments 1–6

E1 – Experiment 1

Table S1

Summary Table of the Omnibus ANOVA of Experiment 1

Within-Subjects Effects	***F***	***df*s**	**Error *df*s**	***p***	η_p^2
Comparison Direction	22.38	2	215	< .001	.17
(Mis)Fortune	13.13	1	216	< .001	.06
Comparison Direction × (Mis)Fortune	6.01	2	215	.003	.05
Comparison Direction × Emotion	27.91	6	432	< .001	.28
(Mis)Fortune × Emotion	145.96	3	216	< .001	.67
Comparison Direction × (Mis)Fortune × Emotion	23.62	6	432	< .001	.25
Between-Subjects Effects					
Emotion	91.43	3	216	< .001	.56

Envy

To test whether the effect of comparison direction was more pronounced in the win compared to the (theoretically less relevant) loss condition, we computed a linear contrast for the win as well as the loss condition and coded the lateral comparison condition as 0 (also done for the other emotions and experiments). We found a significant Comparison Direction × (Mis)Fortune interaction, $F(1, 61) = 30.40$, $p < .001$, $\eta_p^2 = .33$, showing that the difference in envy in response to upward-versus-downward others was larger in the win condition, $t(61) = 9.64$, $p < .001$, $g = 1.21$, compared to the loss condition, $t(61) = 6.56$, $p < .001$, $g = 0.82$, as we expected. All differences between downward, lateral, and upward comparisons were also significant in the less crucial condition in which comparison standards lost money (see white bars Figure 4a), $ts(61) \geq 3.62$, $ps < .001$, smallest $g = 0.45$.

Happy-for-ness

There was a significant Comparison Direction × (Mis)Fortune interaction, $F(1, 48) = 37.26$, $p < .001$, $\eta_p^2 = .61$, showing that the difference in happy-for-ness in response to upward-versus-downward others was present in the loss condition, $t(49) = 11.32$, $p < .001$, $g = 1.58$, but not in the win condition, $t(49) = 0.61$ $p = .551$, $g = 0.08$. When others experienced a misfortune and lost money (see white bars, Figure 4b), participants were most happy for those who had received the most start money, namely upward standards ($M = 3.84$, $SE = 0.21$), followed by lateral ($M = 2.80$, $SE = 0.16$), and downward standards ($M = 1.79$, $SE = 0.11$).

Schadenfreude

There was a significant Comparison Direction × (Mis)Fortune interaction, $F(1, 53) = 14.33$, $p < .001$, $\eta_p^2 = .21$, showing that the difference in schadenfreude in response to upward-versus-downward others was present in the crucial loss condition, $t(53) = 4.54$, $p < .001$, $g = 0.61$, but not in the win condition (see grey bars Figure 4c), $t(53) = 0.16$, $p = .875$, $g = 0.02$.

Sympathy

There was a significant interaction between the linear contrast for comparison direction and the (mis)fortune, $F(1, 53) = 53.89$, $p < .001$, $\eta_p^2 = .52$, showing that the difference in sympathy in response to upward-versus-downward others was larger in the loss, $t(53) = –11.20$, $p < .001$, $g = –1.50$, compared to the win condition, $t(53) = –4.71$, $p < .001$, $g = –0.63$. All differences between downward, lateral, and upward comparisons were also significant in the less crucial condition in which comparison standards won money (see grey bars Figure 4d), $ts(53) \geq –2.25$, $ps \leq .015$, smallest $g = –0.34$.

Additionally Measured Variables

At the end of Experiment 1, participants indicated their start money satisfaction (“How satisfied were you with your start money?“; 1 = *not satisfied at all*, 7 = *very satisfied*), their ease

of perspective-taking ("I have been able to put myself in the position of the persons who took part in the lottery") and potential doubts regarding the lottery ("I doubt that the presented outcomes are real") on scales ranging from 1 (*not at all*) to 7 (*very much*). The data revealed that participants were, on average, satisfied with their start money ($M = 5.24$, $SD = 1.79$), significantly more than the neutral scale mean [4], $t(219) = 17.43$, $p < .001$, $d = 0.69$. It was fairly easy for them to put themselves into others' shoes ($M = 4.44$, $SD = 1.79$), again significantly more than the scale mean, $t(219) = 3.63$, $p < .001$, $d = 0.25$, and participants reported little doubt that the presented lottery outcomes were real ($M = 3.22$, $SD = 2.03$), significantly less than the scale mean, $t(219) = 5.72$, $p < .001$, $d = 0.38$.

E4a – Experiment 4a

Table S2

Summary Table of the Omnibus ANOVA of Experiment 4a

Within-Subjects Effects	***F***	***df*s**	**Error *df*s**	***p***	η_p^2
Relevance	33.11	1	233	< .001	.12
Relevance × Emotion	15.66	3	233	< .001	.17
Comparison Direction	16.73	2	232	< .001	.13
Comparison Direction × Emotion	22.32	6	466	< .001	.22
(Mis)Fortune	1.17	1	233	.280	.01
(Mis)Fortune × Emotion	114.34	3	233	< .001	.60
Relevance × Comparison Direction	5.75	2	232	.004	.05
Relevance × Comparison Direction × Emotion	4.97	6	466	< .001	.06
Relevance × (Mis)Fortune	14.06	1	233	< .001	.06
Relevance × (Mis)Fortune × Emotion	36.08	3	233	< .001	.32
Comparison Direction × (Mis)Fortune	5.66	2	232	.004	.05
Comparison Direction × (Mis)Fortune × Emotion	17.67	6	466	< .001	.19
Relevance × Comparison Direction × (Mis)Fortune	0.93	2	232	.396	.01

Relevance × Comparison Direction × (Mis)Fortune × Emotion	1.92	6	466	.077	.02
Between-Subjects Effects					
Emotion	60.49	3	233	< .001	.44

Envy

Comparison Direction and Mis/Fortune

Replicating the previous experiments, there was a significant main effect of (mis)fortune, $F(1, 58) = 53.68$, $p < .001$, $\eta_p^2 = .48$, comparison direction, $F(2, 57) = 26.63$, $p < .001$, $\eta_p^2 = .48$, and a Comparison Direction × (Mis)Fortune interaction, $F(2, 57) = 19.52$, $p < .001$, $\eta_p^2 = .41$. These effects show that 1) participants experienced stronger envy when others won than when others lost and 2) that the predicted linear effect of comparison direction (downward < lateral < upward) was significantly more pronounced in the win compared to the loss condition. The significant Comparison Direction × (Mis)Fortune interaction, $F(1, 58) = 28.87$, $p < .001$, $\eta_p^2 = .33$, showed that the difference between upward and downward comparison standards was larger in the win condition, $t(58) = 7.67$, $p < .001$, $g = 0.99$, compared to the loss condition, $t(58) = 6.04$, $p < .001$, $g = 0.78$. All differences between downward, lateral, and upward standards who won money were significant (all ts ≥ 3.10, ps $\leq .003$).

Happy-for-ness

Comparison Direction and Mis/Fortune

Replicating our previous experiments, there was a significant main effect of (mis)fortune, $F(1, 58) = 80.77$, $p < .001$, $\eta_p^2 = .58$, comparison direction, $F(2, 57) = 13.40$, $p < .001$, $\eta_p^2 = .32$, and a Comparison Direction × (Mis)Fortune interaction, $F(2, 57) = 11.85$, $p < .001$, $\eta_p^2 = .29$. These effects show that 1) participants experienced stronger happy-for-ness when others won than when others lost and 2) that comparison direction only had an effect in the conditions in

which the comparison standards lost money (downward < lateral < upward). The significant Comparison Direction × (Mis)Fortune interaction, $F(1, 58) = 24.03$, $p < .001$, $\eta_p^2 = .29$, showed that the difference between upward and downward comparison standards was only significant in the loss condition, $t(58) = 8.46$, $p < .001$, $g = 1.09$, and not in the win condition, $t(58) = 1.16$, $p = .251$, $g = 0.15$. Note that in the high relevance condition, the effect of comparison direction was small (but not significant) in the win condition between upward and downward standards who won money ($t = 1.94$, $p = .057$; all other comparisons in the high and low relevance condition with ts ≤ 1.60, ps $\geq .116$; see Figure 5b).

Schadenfreude

Comparison Direction and (Mis)Fortune

Replicating previous experiments, there was a significant main effect of (mis)fortune, $F(1, 58) = 79.64$, $p < .001$, $\eta_p^2 = .57$, comparison direction, $F(2, 57) = 7.50$, $p = .001$, $\eta_p^2 = .21$, and a Comparison Direction × (Mis)Fortune interaction, $F(2, 57) = 7.34$, $p = .001$, $\eta_p^2 = .20$. These effects show that 1) participants experienced stronger schadenfreude when others lost than when others won and 2) that the predicted linear effect of comparison direction (downward < lateral < upward) was only present in the condition in which the comparison standards lost money. The significant Comparison Direction × (Mis)Fortune interaction, $F(1, 58) = 18.60$, $p < .001$, $\eta_p^2 = .47$, showed that the difference between upward and downward comparison standards was significant in the loss condition, $t(60) = 4.11$, $p < .001$, $g = 0.55$, but not in the win condition, $t(60) = 0.60$ $p = .553$, $g = 0.01$. All pairwise comparisons between downward, lateral, and upward standards who lost money were significant (all ts ≥ 2.84, ps $\leq .006$).

Sympathy

Comparison Direction and (Mis)Fortune

Replicating previous experiments, there was a significant main effect of (mis)fortune, $F(1,$

59) = 134.65, $p < .001$, $\eta_p^2 = .70$, comparison direction, $F(2, 58) = 49.39$, $p < .001$, $\eta_p^2 = .63$, and a Comparison Direction × (Mis)Fortune interaction, $F(2, 58) = 20.12$, $p < .001$, $\eta_p^2 = .41$. These effects show that 1) participants experienced stronger sympathy when others lost than when others won and 2) that the predicted linear effect of comparison direction (downward > lateral > upward) was more pronounced in the loss condition compared to the win condition. The significant Comparison Direction × (Mis)Fortune interaction, $F(1, 59) = 39.39$, $p < .001$, $\eta_p^2 = .40$, showed that the difference between upward and downward comparison standards was larger in the loss, $t(59) = –9.87$, $p < .001$, $g = –1.26$, compared to the win condition, $t(59) = –4.99$, $p < .001$, $g = –0.64$. All differences between downward, lateral, and upward comparison standards who lost money were significant (all ts ≥ –6.66, ps ≤ .001).

The Magnitudes of Others' Movements

Supporting the predictions of our framework, correlations again revealed that emotional reactions intensified, the more others moved along the vertical comparison dimension (i.e., larger wins and larger losses). Envy and happy-for-ness intensified, the more others won ($r_{envy} = .16$, $p < .001$; $r_{happy\text{-}for\text{-}ness} = .07$, $p = .006$), whereas schadenfreude and sympathy intensified the more others lost ($r_{schadenfreude} = .13$, $p < .001$; $r_{sympathy} = .23$, $p < .001$).

E4b – Experiment 4b

Table S3

Summary Table of the Omnibus ANOVA of Experiment 4b

Within-Subjects Effects	***F***	***df*s**	**Error *df*s**	***p***	η_p^2
Relevance	34.64	1	207	< .001	.14
Relevance × Emotion	7.72	3	207	< .001	.10
Comparison Direction	13.02	2	206	< .001	.11
Comparison Direction × Emotion	20.65	6	414	< .001	.23

(Mis)Fortune	11.26	1	207	.001	.05
(Mis)Fortune × Emotion	147.73	3	307	< .001	.68
Relevance × Comparison Direction	6.91	2	206	.001	.06
Relevance × Comparison Direction × Emotion	13.12	6	414	< .001	.16
Relevance × (Mis)Fortune	0.37	1	207	.544	.00
Relevance × (Mis)Fortune × Emotion	25.78	3	207	< .001	.27
Comparison Direction × (Mis)Fortune	7.22	2	206	.001	.07
Comparison Direction × (Mis)Fortune × Emotion	17.47	6	414	< .001	.20
Relevance × Comparison Direction × (Mis)Fortune	0.45	2	206	.636	.00
Relevance × Comparison Direction × (Mis)Fortune × Emotion	7.19	6	414	< .001	.09
Between-Subjects Effects					
Emotion	45.16	3	207	< .001	.40

Envy

Comparison Direction and (Mis)Fortune

Replicating previous experiments, we found a significant main effect of (mis)fortune, $F(1, 53) = 99.66$, $p < .001$, $\eta_p^2 = .65$, comparison direction, $F(2, 52) = 46.57$, $p < .001$, $\eta_p^2 = .64$, and an interaction between both factors, $F(2, 52) = 31.41$, $p < .001$, $\eta_p^2 = .55$. These effects show that 1) participants experienced stronger envy when others won than when others lost and 2) that the predicted linear effect of comparison direction (downward < lateral < upward) was more pronounced in the win compared to the loss condition. The significant Comparison Direction × (Mis)Fortune interaction, $F(1, 53) = 49.06$, $p < .001$, $\eta_p^2 = .48$, showed that the difference between upward and downward comparison standards was larger in the win, $t(53) = 10.15$, $p < .001$, $g = 1.36$, compared to the loss condition, $t(53) = 7.45$, $p < .001$, $g = 1.00$. All differences between downward, lateral, and upward standards who won money were significant (all ts ≥ 7.17, ps $\leq .001$).

Happy-for-ness

Comparison Direction and (Mis)Fortune

Replicating previous experiments, there was a significant main effect of (mis)fortune, $F(1, 49) = 178.20$, $p < .001$, $\eta_p^2 = .78$, comparison direction, $F(2, 48) = 7.51$, $p = .001$, $\eta_p^2 = .24$, and a significant interaction between comparison direction and (mis)fortune, $F(2, 48) = 21.82$, $p < .001$, $\eta_p^2 = .15$. These effects show that 1) participants experienced stronger happy-for-ness when others won than when others lost and 2) that comparison direction (downward < lateral < upward) had an effect when comparison standards lost money. The significant Comparison Direction × (Mis)Fortune interaction, $F(1, 49) = 38.38$, $p < .001$, $\eta_p^2 = .44$, showed that the difference between upward and downward comparison standards was significant in the loss condition, $t(49) = 6.66$, $p < .001$, $g = 0.93$, but not in the win condition, $t(49) = –0.36$, $p = .717$, $g = 0.05$. All differences between downward, lateral, and upward standards who lost money were significant (all ts ≥ 5.25 ps $\leq .001$).

Schadenfreude

Comparison Direction and (Mis)Fortune

We observed a main effect of (mis)fortune, $F(1, 52) = 37.23$, $p < .001$, $\eta_p^2 = .42$, and an Comparison Direction × Mis/Fortune interaction, $F(2, 51) = 4.97$, $p = .011$, $\eta_p^2 = .16$. These effects show that 1) participants experienced stronger schadenfreude when others lost than when others won and 2) that the predicted linear effect of comparison direction (downward < lateral < upward) had an effect in the crucial loss (but not the win) condition. The difference between downward and lateral standards who lost money was not significant ($t = 0.51$, $p = .616$), but the difference between lateral ($M = 2.13$, $SE = 0.17$) and upward standards who lost money was ($M = 2.32$, $SE = 0.16$), $t(52) = 2.29$, $p = .026$.

Sympathy

Comparison Direction and (Mis)Fortune

There was a significant main effect of (mis)fortune, $F(1, 53) = 95.26$, $p < .001$, $\eta_p^2 = .64$, comparison direction, $F(2, 52) = 13.87$, $p < .001$, $\eta_p^2 = .35$, and a significant interaction between comparison direction and (mis)fortune, $F(2, 52) = 20.49$, $p < .001$, $\eta_p^2 = .44$. These effects show that 1) participants experienced stronger sympathy when others lost than when others won and 2) that the predicted linear effect of comparison direction (downward > lateral > upward) was more pronounced in the relevant loss condition compared to the win condition. The significant Comparison Direction × (Mis)Fortune interaction, $F(1, 49) = 41.50$, $p < .001$, $\eta_p^2 = .44$, showed that the difference between upward and downward comparison standards was larger in the loss condition, $t(53) = –6.26$, $p < .001$, $g = –0.84$, compared to the win condition, $t(53) = –2.58$, $p = .013$, $g = –0.34$. All differences between downward, lateral, and upward standards who lost money were significant (all ts ≥ 5.11, ps $\leq .001$).

The Magnitudes of Others' Movements

Supporting our prediction, again correlations on the trial-level revealed that emotional reactions intensified the more others won or lost, respectively. Envy and happy-for-ness intensified the more money others won ($r_{envy} = .14$, $p < .001$; $r_{happy\text{-}for\text{-}ness} = .15$, $p < .001$), whereas schadenfreude and sympathy intensified the more others lost ($r_{schadenfreude} = .15$, $p < .001$; $r_{sympathy} = .18$, $p < .001$).

E4c – Experiment 4c

Table S4

Summary Table of the Omnibus ANOVA of Experiment 4c

Within-Subjects Effects	***F***	***df*s**	**Error *df*s**	***p***	**η_p^2**
Comparison Direction	27.40	2	481	< .001	.10

Comparison Direction × Emotion	39.95	6	964	< .001	.20
Comparison Direction × Relevance	8.44	2	481	< .001	.03
Comparison Direction × Emotion × Relevance	10.52	6	964	< .001	.06
(Mis)Fortune	9.02	1	482	.003	.02
(Mis)Fortune × Emotion	313.77	3	482	< .001	.66
(Mis)Fortune × Relevance	4.66	1	482	.031	.01
(Mis)Fortune × Emotion × Relevance	2.07	3	482	.104	.01
Comparison Direction × (Mis)Fortune	3.50	2	481	.031	.01
Comparison Direction × (Mis)Fortune × Emotion	40.21	6	964	< .001	.20
Comparison Direction × (Mis)Fortune × Relevance	3.63	2	481	.027	.02
Comparison Direction × (Mis)Fortune × Emotion × Relevance	15.59	6	964	< .001	.09
Between-Subjects Effects					
Emotion	109.48	3	482	< .001	.41
Relevance	4.91	1	482	.027	.01
Emotion × Relevance	1.05	3	482	.368	.01

Envy

Comparison Direction and (Mis)Fortune

Replicating previous results, there was a significant main effect of (mis)fortune, $F(1, 119) = 190.20$, $p < .001$, $\eta_p^2 = .62$, comparison direction, $F(2, 118) = 45.26$, $p < .001$, $\eta_p^2 = .43$, and an interaction between both factors, $F(2, 118) = 22.58$, $p < .001$, $\eta_p^2 = .28$. These effects show that 1) participants experienced stronger envy when others won than when others lost and 2) that the predicted linear effect of comparison direction (downward < lateral < upward) was significantly more pronounced in the win compared to the loss condition. The significant interaction between the linear contrast for comparison direction and the (mis)fortune, $F(1, 120) = 26.27$, $p < .001$, $\eta_p^2 = .18$, showed that the difference between upward and downward comparison standards was

larger in the win condition, $t(120) = 8.88$, $p < .001$, $g = 0.81$, compared to the loss condition, $t(120) = 7.41$, $p < .001$, $g = 0.67$. All differences between downward, lateral, and upward standards who won money were significant (all ts ≥ 7.59, ps $\leq .001$).

Happy-for-ness

Comparison Direction and (Mis)Fortune

There was a significant main effect of (mis)fortune, $F(1, 122) = 288.32$, $p < .001$, $\eta_p^2 = .70$ and comparison direction, $F(2, 121) = 18.98$, $p < .001$, $\eta_p^2 = .24$, which was qualified by a significant interaction between comparison direction and (mis)fortune, $F(2, 121) = 38.89$, $p < .001$, $\eta_p^2 = .39$. These effects show that 1) participants experienced stronger happy-for-ness when others won than when others lost and 2) that comparison direction only had an effect in the conditions in which the comparison standards lost money. The significant Comparison Direction × (Mis)Fortune interaction, $F(1, 123) = 71.20$, $p < .001$, $\eta_p^2 = .37$, showed that the difference between upward and downward comparison standards was significant in the loss condition, $t(123) = 10.63$ $p < .001$, $g = 0.95$, but not in the win condition, $t(123) = 0.32$, $p = .751$, $g = 0.03$. All differences between downward, lateral, and upward standards who lost money were significant (all ts ≥ 8.59, ps $\leq .001$). However, as noted in the main text, the additionally manipulated factor relevance interacted with this pattern showing that participants cared more for equity when they had played the lottery themselves and seemed to be less envious when they had not played the lottery themselves.

Schadenfreude

Comparison Direction and (Mis)Fortune

There was a significant main effect of (mis)fortune, $F(1, 120) = 117.00$, $p < .001$, $\eta_p^2 = .49$, comparison direction, $F(2, 119) = 15.25$, $p < .001$, $\eta_p^2 = .20$, and a significant interaction between comparison direction and (mis)fortune, $F(2, 119) = 13.86$, $p < .001$, $\eta_p^2 = .19$. These

effects show that 1) participants experienced stronger schadenfreude when others lost than when others won and 2) that the predicted linear effect of comparison direction (downward < lateral < upward) was only present in the crucial loss conditions, and not in the win conditions. The significant Comparison Direction × (Mis)Fortune interaction, $F(1, 121) = 23.59$, $p < .001$, $\eta_p^2 = .16$, showed that the difference between upward and downward comparison standards was only significant in the loss condition, $t(121) = 5.01$, $p < .001$, $g = 0.45$, and not in the win condition, $t(120) = 0.43$, $p = .671$, $g = 0.04$. All differences between downward, lateral, and upward standards who lost money were significant (all ts ≥ 3.40, ps $\leq .001$).

Sympathy

Comparison Direction and (Mis)Fortune

There was a significant main effect of (mis)fortune, $F(1, 121) = 270.00$, $p < .001$, $\eta_p^2 = .69$, comparison direction, $F(2, 120) = 79.51$, $p < .001$, $\eta_p^2 = .57$, and a significant interaction between comparison direction and (mis)fortune, $F(2, 120) = 78.03$, $p < .001$, $\eta_p^2 = .57$. These effects show that 1) participants experienced stronger sympathy when others lost than when others won and 2) that the predicted linear effect of comparison direction (downward > lateral > upward) was more pronounced in the relevant loss condition compared to the win condition. The significant Comparison Direction × (Mis)Fortune interaction, $F(1, 122) = 139.28$, $p < .001$, $\eta_p^2 = .53$, showed that the difference between upward and downward comparison standards was larger in the loss condition, $t(122) = –12.78$, $p < .001$, $g = –1.15$, compared to the win condition, $t(122) = –4.77$, $p < .001$, $g = –0.43$. All comparisons between downward, lateral, and upward standard who lost money were significant (all ts $\geq –8.96$, ps $\leq .001$).

The Magnitudes of Others' Movements

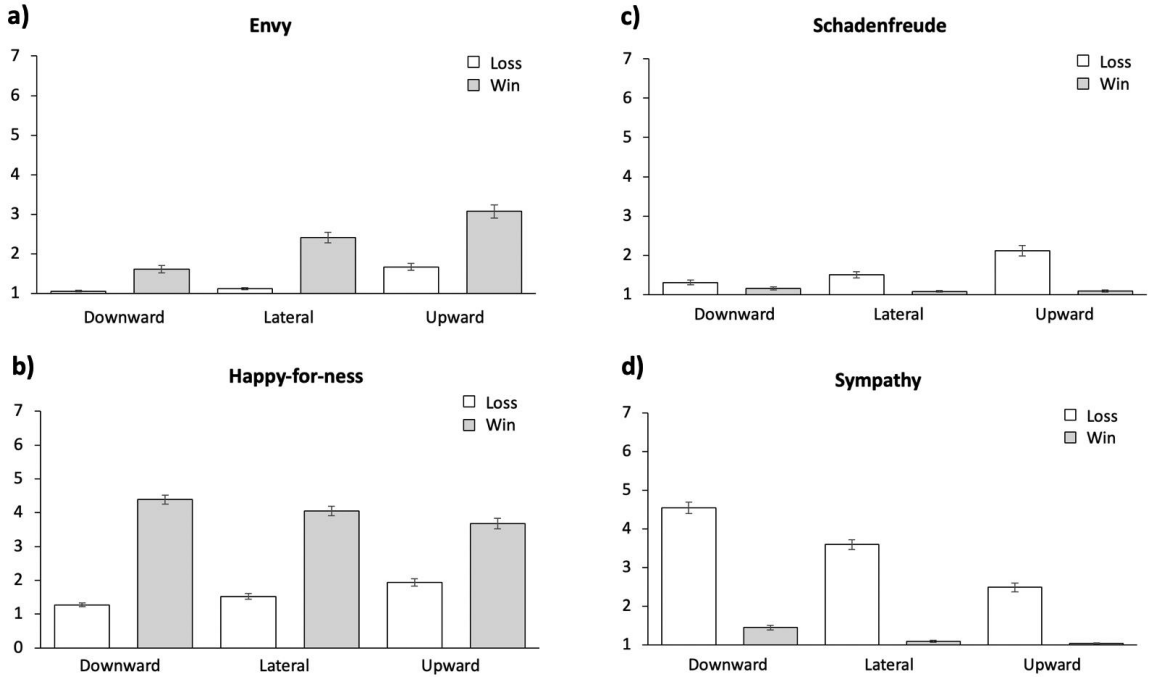
Supporting our prediction, correlations on the trial-level again revealed that emotional reactions intensified the more others won or lost, respectively. Envy and happy-for-ness

intensified the more money others won (r_{envy} = .23, p < .001; $r_{happy\text{-}for\text{-}ness}$ = .21, p < .001), whereas schadenfreude and sympathy intensified the more others lost ($r_{schadenfreude}$ = .16., p < .001; $r_{sympathy}$ = .30, p < .001).

E5 - Experiment 5

Figure S1

Emotion Ratings in Experiment 5



Note. Mean emotion ratings for a) envy, b) happy-for-ness, c) schadenfreude, and d) sympathy as a function of downward, lateral, and upward comparison standards who won versus lost money. Error bars represent ±1 *SEM*

Additional Measures

In Experiment 5, we also assessed participants' SVO and empathy as these constructs could possibly mediate the observed effects. The Triple Dominance Measure (to assesses participants' SVO) assesses dispositional preferences for distributions of outcomes between oneself and another person. Participants allocate points between themselves and others and have to choose between three different self-other payoff combinations (competitive vs. egoistic vs.

cooperative choice). To obtain a continuous participants' SVO measure (prosocial versus proself, Murphy & Ackermann, 2014), we divided the total points that participants allocated to themselves by the points they allocated to the other person. Thus, higher values indicate stronger proself preferences, whereas lower values indicate prosocial preferences (range: 1 to 4.98; see Loschelder et al., 2014; 2016). Second, following Davis' (1983) seminal work, we assessed different components of empathy—empathic concern and personal distress, fantasy, as well as perspective taking (Paulus, 2006). Each component was measured by four items on a scale ranging from 1 (*never*) to 5 (*always*; range: 4-20 points). The subscales can be added up to an overall empathy score (range: 16-80 points), with higher values representing higher empathy. For the correlations between trait empathy, SVO, FOEs, and money allocations, see exploratory analysis further below).

Envy

Comparison Direction and (Mis)Fortune

Replicating previous experiments, we observed a significant main effect of (mis)fortune, $F(1, 128) = 133.27$, $p < .001$, $\eta_p^2 = .51$, comparison direction, $F(2, 127) = 47.42$, $p < .001$, $\eta_p^2 = .43$, and an interaction between both factors, $F(2, 127) = 38.85$, $p < .001$, $\eta_p^2 = .38$. These effects show that 1) participants experienced stronger envy when others won than when others lost and that 2) the predicted linear effect of comparison direction (downward < lateral < upward) was more pronounced in the win compared to the loss condition (for the means, see Figure S1a). All comparisons in the win condition (Figure S1a, grey bars) were significant, all ts ≥ 8.00, ps $< .001$, smallest $g = 0.70$. The significant Comparison Direction × (Mis)Fortune interaction, $F(1, 128) = 73.17$, $p < .001$, $\eta_p^2 = .36$ showed that the difference between upward and downward comparison standards was larger in the win condition, $t(128) = 10.54$, $p < .001$, $g = 0.92$, compared to the loss condition $t(128) = 6.75$, $p < .001$, $g = 0.59$.

Happy-for-ness

Comparison Direction and (Mis)Fortune

There was a significant main effect of (mis)fortune, $F(1, 128) = 370.80$, $p < .001$, $\eta_p^2 = .74$, no main effect of comparison direction, $F(2, 127) = 0.57$, $p = .567$, $\eta_p^2 = .01$, and a significant interaction between comparison direction and (mis)fortune, $F(2, 127) = 56.16$, $p < .001$, $\eta_p^2 = .47$. These effects show that 1) participants experienced stronger happy-for-ness when others won than when others lost and 2) that comparison direction also had an effect in the crucial win condition and not only in the loss condition. As shown in Figure S1b (grey bars), participants seemed to care about equity as they were most happy for downward standards who won money ($M = 4.39$, $SE = 0.13$), followed by lateral standards ($M = 4.05$, $SE = 0.14$), and upward standards ($M = 3.68$, $SE = 0.16$). All comparisons in the win condition were significant, all ts$(128) \geq -3.72$, ps $< .001$, smallest $g = 0.33$. The significant Comparison Direction × (Mis)Fortune interaction, $F(1, 128) = 111.48$, $p < .001$, $\eta_p^2 = .47$ showed that the difference between upward and downward comparison standards was larger in the loss condition, $t(128) = 8.44$, $p < .001$, $g = 0.74$, than in the win condition, $t(128) = -5.43$, $p < .001$, $g = -0.48$.

Schadenfreude

Comparison Direction and (Mis)Fortune

Replicating previous experiments, we observed a main effect of (mis)fortune, $F(1, 128) = 61.03$, $p < .001$, $\eta_p^2 = .32$, comparison direction, $F(2, 127) = 21.12$, $p < .001$, $\eta_p^2 = .25$, and a Comparison Direction × (Mis)Fortune interaction, $F(2, 127) = 25.43$, $p < .001$, $\eta_p^2 = .29$. These effects show that 1) participants experienced stronger schadenfreude when others lost than when others won and 2) that the predicted linear effect of comparison direction (downward < lateral < upward) only had an effect in the crucial loss condition (for the means, see Figure S1c). All comparisons in the loss condition (Figure S1, white bars) were significant, all ts$(128) \geq 3.94$, $p <$

.001, smallest g = 034. The significant Comparison Direction × (Mis)Fortune interaction, $F(1, 128) = 50.83$, $p < .001$, $\eta_p^2 = .28$, showed that the difference between upward and downward comparison standards was only significant in the loss condition, $t(128) = 6.92$, $p < .001$, $g = 0.61$, and not in the win condition, $t(128) = 1.69$, $p = .093$, $g = –0.15$.

Sympathy

Comparison Direction and (Mis)Fortune

Replicating previous experiments, there was a significant main effect of (mis)fortune, $F(1, 128) = 446.13$, $p < .001$, $\eta_p^2 = .78$, comparison direction, $F(2, 127) = 112.84$, $p < .001$, $\eta_p^2 = .64$, and a significant interaction between comparison direction and (mis)fortune, $F(2, 127) = 113.21$, $p < .001$, $\eta_p^2 = .64$ These effects show that 1) participants experienced stronger sympathy when others lost than when others won and 2) that the predicted linear effect of comparison direction (downward > lateral > upward) was more pronounced in the relevant loss condition compared to the win condition (for the means, see Figure S1d). All comparisons in the loss condition (Figure S1d, white bars) were significant, all ts$(128) \geq –11.04$, $p < .001$, smallest $g = –0.97$. The significant Comparison Direction × (Mis)Fortune interaction, $F(1, 128) = 225.16$, $p < .001$, $\eta_p^2 = .64$, showed that the difference between upward and downward comparison standards was larger in the loss condition, $t(128) = –16.35$, $p < .001$, $g = –1.43$, compared to the win condition, $t(128) = –6.73$, $p < .001$, g = –0.59.

The Magnitudes of Others' Movements

Envy and happy-for-ness intensified the more money others won ($r_{envy} = .14$, $p < .001$; $r_{happy\text{-}for\text{-}ness} = .12$, $p < .002$), whereas sympathy intensified the more others lost ($r_{sympathy} = .17$, $p < .001$; $r_{schadenfreude} = .02$, $p = .495$).

Table S5

Results of the Moderated Mediation Analysis of Experiment 5

Interaction between Wins and Losses and Downward, Lateral, and Upward Comparisons

Emotion	*F*	*dfs*	Error *dfs*	*p*
Envy	67.75	2	3736	< .001
Schadenfreude	112.31	2	3736	< .001
Happy-for-ness	117.85	2	3736	< .001
Sympathy	192.30	2	3736	< .001

Conditional Effects of Losses and Wins on Emotions for Downward, Lateral, and Upward Comparisons (Moderation of the a paths)

Emotion	Comparison Direction	β	*SE*	*t*	*p*	95% CI
Envy	downward	0.38	0.04	9.85	< .001	0.30, 0.45
	lateral	0.88	0.04	23.06	< .001	0.81, 0.96
	upward	0.95	0.04	24.96	< .001	0.88, 1.03
Schadenfreude	downward	–0.16	0.04	–3.68	< .001	–0.24, –0.07
	lateral	–0.43	0.04	–10.26	< .001	–0.51, –0.35
	upward	–1.03	0.04	–24.42	< .001	–1.11, –0.94
Happy-for-ness	downward	1.61	0.03	49.43	<.001	1.54, 1.67
	lateral	1.30	0.03	40.01	< .001	1.24, 1.37
	upward	0.90	0.03	27.78	< .001	0.84, 0.97
Sympathy	downward	–1.68	0.03	–51.41	< .001	–1.75, –1.62
	lateral	–1.36	0.03	–41.55	< .001	–1.42, –1.30
	upward	–0.79	0.03	–24.03	< .001	–0.85, –0.72

Conditional Indirect Effects of Losses and Wins on Money Allocation through Emotions for Downward, Lateral, and Upward Comparisons

Emotion	Comparison Direction	β	*SE*	95% CI

Envy	downward	–0.05	0.01	–0.07, –0.04
	lateral	–0.13	0.01	–0.16, –0.11
	upward	–0.14	0.01	–0.16, –0.11
Schadenfreude	downward	0.01	0.002	0.003, 0.01
	lateral	0.02	0.01	0.01, 0.03
	upward	0.04	0.01	0.02, 0.06
Happy-for-ness	downward	0.14	0.02	0.10, 0.18
	lateral	0.12	0.02	0.08, 0.15
	upward	0.08	0.01	0.06, 0.10
Sympathy	downward	–0.31	0.02	–0.36, –0.27
	lateral	–0.25	0.02	–0.29, –0.22
	upward	–0.15	0.01	–0.17, –0.12

Conditional Direct Effects of Losses and Wins on Money Allocation for Downward, Lateral, and Upward Standards (Moderation of the c' path)

Comparison Direction	**β**	***SE***	***t***	***p***	**95% CI**
downward	–0.24	0.04	–6.94	< .001	–0.31, –0.17
lateral	–0.17	0.03	–5.01	< .001	–0.23, –0.10
upward	–0.19	0.03	–6.28	< .001	–0.25, –0.13

Formula Regression Model	**Random Intercept Variance**	**Residual Variance**
Allocation ~ Event	0.70	0.27
Envy ~ (Mis)Fortune* Comparison Direction	0.30	0.47
Schadenfreude ~ (Mis)Fortune* Comparison Direction	0.30	0.57
Happy-for-ness ~ (Mis)Fortune* Comparison Direction	0.24	0.34
Sympathy ~ (Mis)Fortune* Comparison Direction	0.14	0.35
Allocation ~ (Mis)Fortune*Comparison Direction + Mediators	0.62	0.19

Exploratory Analysis

The dispositional measures of trait empathy and SVO were associated with emotional reactions and money allocations. The more proself participants were oriented (rather than prosocial), the more they experienced the incongruent emotions envy and schadenfreude and the less they experienced the congruent emotions happy-for-ness and sympathy in response to others wins and losses, respectively (Table S6). Furthermore, a more pronounced proself orientation also coincided with participants giving less money to others. This finding extends previous studies showing that trait SVO predicts cooperative/competitive behavior in social dilemmas (for a recent meta-analysis, see Pletzer et al., 2018), or negotiations (Van Kleef & Van Lange, 2008; Loschelder et al., 2014; 2016). Different components of trait empathy were also associated with FOE intensities (but not with money allocations). The higher participants scored on empathic concern, the stronger they experienced sympathy; the higher they scored on personal distress, the stronger their envy and schadenfreude, and the higher their trait perspective taking, the more happy-for-ness and the less schadenfreude they experienced. We also replicated that participants with a more proself orientation have lower empathy scores (Declerck & Bogaert, 2008).

Table S6

Descriptive Statistics and Zero-Order Correlations in Experiment 5

	M (*SD*)	Envy	Happyfor ness	Schadenfreude	Sympathy	Allocation	SVO	Empathy	Fantasy	Empathic Concern	Perspective -Taking	Personal Distress
Envy [a]	2.36 (1.32)	-										
Happyforness [a]	4.04 (1.48)	–.07	-									
Schadenfreude [a]	1.64 (.93)	.76**	–.17*	-								
Sympathy [a]	3.54 (1.32)	.29**	.65**	.15*	-							
Allocation[b]	101.82 (151.59)	–.28**	.38**	–.32**	.17*	-						
SVO[c]	1.38 (.63)	.17*	–.30**	.19**	–.18**	–.18**	-					
Empathy[d]	56.26 (7.88)	.02	.18**	–.05	.19**	–.03	–.27**	-				
Fantasy[e]	14.53 (3.07)	–.06	.15*	–.05	.13	.06	–.25**	.79**	-			
Empathic Concern[e]	15.27 (2.79)	–.02	.15	–.07	.23**	–.00	–.28**	.80**	.47**	-		
Perspective-Taking[e]	15.22 (2.79)	–.15*	.31**	–.21**	.11	.02	–.28**	.73**	.32**	.41**	-	
Personal Distress[e]	11.23 (3.27)	.25**	–.11	.18**	.05	–.14	.06	.14	.18**	.26**	–.11	-

Note. $N = 244$ ($n = 195$; for the emoticon). Correlations for envy and happy-for-ness in the win and for schadenfreude and sympathy in the loss condition.

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

b Participants could allocate between –400 and +400 cent.

c Higher values indicate a more proself orientation, lower values a prosocial orientation.

d Higher values indicate a higher score on empathy (total range: 0-80).

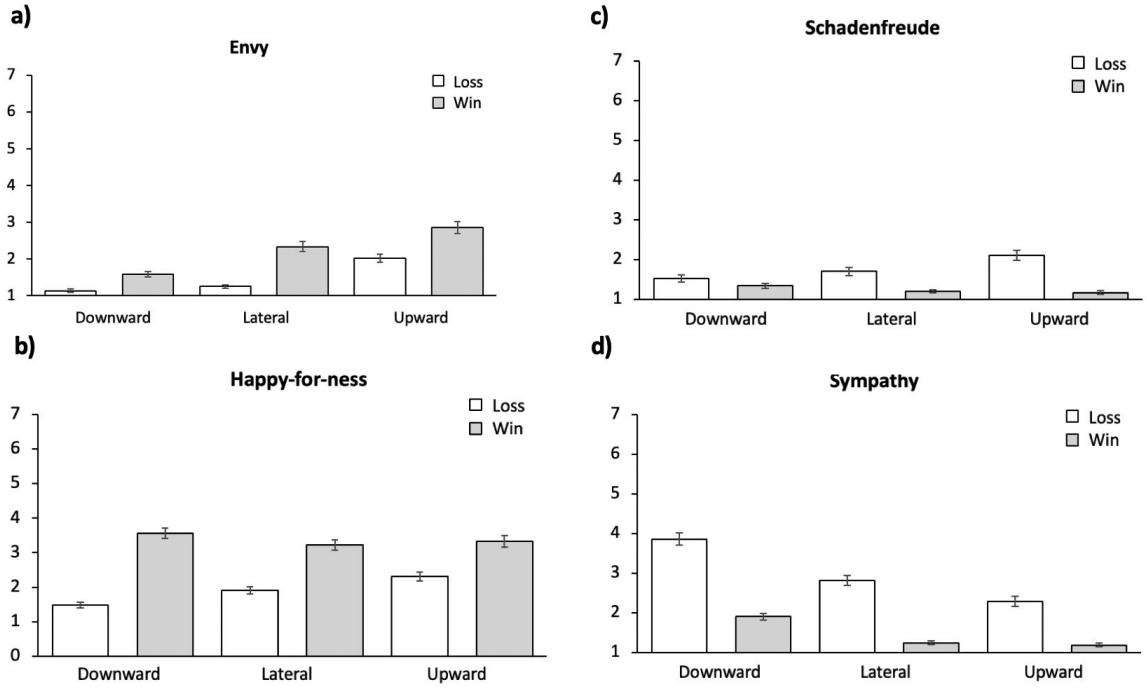
e Higher values indicate a higher score on the respective empathy subscale. Participants responded on a scale from 1 (*never*) to 5 (*always*; total range: 0-20).

** $p < .05$, * $p < .10$

E6 - Experiment 6

Figure S2

Emotion Ratings in Experiment 6



Note. Mean emotion ratings for a) envy, b) happy-for-ness, c) schadenfreude, and d) sympathy as a function of downward, lateral, and upward comparison standards who won versus lost money. Error bars represent ±1 *SEM*

Envy

Comparison Direction and (Mis)Fortune

Replicating previous experiments in an achievement domain, we found a significant main effect of (mis)fortune, $F(1, 121) = 86.74$, $p < .001$, $\eta_p^2 = .42$, comparison direction, $F(2, 120) = 58.57$, $p < .001$, $\eta_p^2 = .45$, and an interaction between both factors, $F(2, 120) = 22.34$, $p < .001$, $\eta_p^2 = .27$. These effects show that 1) participants felt more envy when others won than when others lost and that 2) the predicted linear effect of comparison direction (downward < lateral < upward) was more pronounced in the win compared to the loss condition (for the means, see Figure S2a). All comparisons in the win condition (Figure S2a, grey bars) were significant, all

*t*s(121) ≥ 6.51, $p < .001$, smallest $g = 0.59$. The significant Comparison Direction × (Mis)Fortune interaction, $F(1, 121) = 15.17$, $p < .001$, $\eta_p^2 = .11$ showed that the difference between upward and downward comparison standards was larger in the win condition, $t(121) = 9.40$, $p < .001$, $g = 0.76$, than the loss condition, $t(121) = 8.45$, $p < .001$, $g = 0.85$.

Happy-for-ness

Comparison Direction and (Mis)Fortune

Again, there was a significant main effect of (mis)fortune, $F(1, 120) = 135.11$, $p < .001$, $\eta_p^2 = .53$, a main effect of comparison direction, $F(2, 120) = 8.41$, $p < .001$, $\eta_p^2 = .12$, and a significant interaction between comparison direction and (mis)fortune, $F(2, 10) = 39.39$, $p < .001$, $\eta_p^2 = .40$. These effects show that 1) participants felt more happy-for-ness when others won than when others lost and 2) that comparison direction also had an effect in the crucial win condition. As shown in Figure S2b (grey bars), participants seemed to care about equity as they were most happy for downward standards who won money ($M = 3.56$, $SE = 0.15$), compared to lateral standards ($M = 3.22$, $SE = 0.15$), $t(121) = –3.97$, $p < .001$, $g = –0.36$). The effect was small (but not significant) compared to upward standards ($M = 3.33$, $SE = 0.16$), $t(121) = –1.88$, $p = .062$, $g = –0.17$, and there was no difference between lateral and upward, $t(121) = 1.51$, $p = .135$, $g = –0.14$). The significant Comparison Direction × (Mis)Fortune interaction, $F(1, 121) = 66.97$, $p < .001$, $\eta_p^2 = .36$, showed that the difference between upward and downward comparison standards was larger in the loss condition, $t(121) = 8.12$, $p < .001$, than in the win condition, $t(121) = –1.88$, $p = .062$, $g = –0.17$.

Schadenfreude

Comparison Direction and (Mis)Fortune

Replicating previous experiments in an achievement domain, we observed a main effect of (mis)fortune, $F(1, 121) = 47.25$, $p < .001$, $\eta_p^2 = .28$, comparison direction, $F(2, 120) = 10.79$, p

< .001, η_p^2 = .15, and a Comparison Direction × (Mis)Fortune interaction, $F(2, 120) = 26.46$, $p <$ .001, η_p^2 = .31. These effects show that 1) participants felt more schadenfreude when others lost than when others won and 2) that the predicted linear effect of comparison direction (downward < lateral < upward) was stronger in the crucial loss condition (for the means, see white bars Figure S2c). All comparisons in the crucial loss condition were significant, all ts(121) ≥ 3.53, $p <$ .001, smallest g = 0.32. The significant Comparison Direction × (Mis)Fortune interaction, $F(1, 121) = 50.61$, $p < .001$, η_p^2 = .30, showed that the difference between upward and downward comparison standards was larger in the loss condition, $t(121) = 6.28$, $p < .001$, $g = 0.57$, than in the win condition, $t(121) = 3.03$, $p = .003$, $g = –0.27$.

Sympathy

Comparison Direction and (Mis)Fortune

Replicating previous experiments in an achievement domain, there was a significant main effect of (mis)fortune, $F(1, 121) = 208.53$, $p < .001$, η_p^2 = .63, comparison direction, $F(2, 120) = 74.32$, $p < .001$, η_p^2 = .55, and a significant interaction between comparison direction and (mis)fortune, $F(2, 120) = 23.35$, $p < .001$, η_p^2 = .28 These effects show that 1) participants felt more sympathy when others lost than when others won and 2) that the predicted linear effect of comparison direction (downward > lateral > upward) was more pronounced in the relevant loss condition compared to the win condition (for the means, see Figure S2d). All comparisons in the loss condition (Figure S2d, white bars) were significant, all ts(121) ≥ –5.95, $p < .001$, smallest g = –0.54. The significant Comparison Direction × (Mis)Fortune interaction, $F(1, 124) = 45.38$, $p <$ .001, η_p^2 = .27, showed that the difference between upward and downward comparison standards was larger in the loss condition, $t(121) = –10.96$, $p < .001$, $g = –0.99$, compared to the win condition, $t(121) = –8.80$, $p < .001$, g = –0.79.

The Magnitudes of Others' Movements

In this experiment, we could not vary the (mis)fortune magnitudes to a great extent. Lottery tickets that could be won or lost only ranged between 5 and 14 (and not between 50 199 cents as in the previous studies). Presumably, because of this, we observed no significant bivariate correlations between the amount of lottery tickets losses/wins and emotional intensity (all *p*s > .318).

Table S7

Results of the Moderated Mediation Analysis of Experiment 6

Interaction between Wins and Losses and Downward, Lateral, and Upward Comparisons				
Emotion	***F***	***dfs***	**Error *dfs***	***p***
Envy	28.73	2	3533	< .001
Schadenfreude	63.63	2	3533	< .001
Happy-for-ness	59.70	2	3533	< .001
Sympathy	41.44	2	3533	< .001

Conditional Effects of Losses and Wins on Emotions for Downward, Lateral, and Upward Comparisons (Moderation of the a paths)						
Emotion	**Comparison Direction**	**β**	***SE***	***t***	***p***	**95% CI**
Envy	downward	0.31	0.04	7.55	< .001	0.23, 0.39
	lateral	0.74	0.04	18.17	< .001	0.66, 0.82
	upward	0.57	0.04	14.07	< .001	0.49, 0.65
Schadenfreude	downward	–0.16	0.04	–3.89	< .001	–0.24, –0.08
	lateral	–0.45	0.04	–10.73	< .001	–0.53, –0.37
	upward	–0.83	0.04	–19.79	< .001	–0.91, –0.75
Happy-for-ness	downward	1.13	0.04	29.42	<.001	1.06, 1.21
	lateral	0.72	0.04	18.60	< .001	0.64, 0.79
	upward	0.56	0.04	14.45	< .001	0.48, 0.63

Sympathy	downward	–1.16	0.04	–29.41	< .001	–1.24, –1.09
	lateral	–0.94	0.04	–23.63	< .001	–1.01, –0.86
	upward	–0.66	0.04	–16.55	< .001	–0.73, –0.58

Conditional Indirect Effects of Losses and Wins on Money Allocation through Emotions for Downward, Lateral, and Upward Comparisons

Emotion	Comparison Direction	β	*SE*	95% CI
Envy	downward	–0.03	0.004	–0.03, –0.02
	lateral	–0.06	0.01	–0.07, –0.05
	upward	–0.05	0.01	–0.06, –0.04
Schadenfreude	downward	0.01	0.002	0.003, 0.01
	lateral	0.02	0.004	0.01, 0.03
	upward	0.04	0.01	0.02, 0.05
Happy-for-ness	downward	0.07	0.01	0.05, 0.10
	lateral	0.05	0.01	0.03, 0.06
	upward	0.04	0.01	0.03, 0.05
Sympathy	downward	–0.15	0.01	–0.18, –0.13
	lateral	–0.12	0.01	–0.14, –0.10
	upward	–0.09	0.01	–0.10, –0.07

Conditional Direct Effects of Losses and Wins on Money Allocation for Downward, Lateral, and Upward Standards (Moderation of the c' path)

Comparison Direction	β	*SE*	*t*	*p*	95% CI
downward	–0.26	0.03	–10.52	< .001	–0.31, –0.21
lateral	–0.26	0.02	–10.85	< .001	–0.30, –0.21
upward	–0.29	0.02	–12.35	< .001	–0.34, –0.24

Formula Regression Model	Random Intercept Variance	Residual Variance
Allocation ~ Event	0.80	0.18
Envy ~ (Mis)Fortune* Comparison Direction	0.33	0.50
Schadenfreude ~ (Mis)Fortune* Comparison Direction	0.39	0.53
Happy-for-ness ~ (Mis)Fortune* Comparison Direction	0.37	0.45

Sympathy ~ (Mis)Fortune* Comparison Direction	0.22	0.48
Allocation ~ (Mis)Fortune*Comparison Direction + Mediators	0.72	0.14

Supplemental Online Material-B: Additional Experiments

E3 – Experiment 3

In Experiment 3, we additionally varied the rank of participants on the comparison dimension to explore the framework's prediction that upward (versus downward comparisons) increase the experience of the incongruent emotions envy and schadenfreude. To test this prediction, one group of participants received the least amount of start money (€3 = low rank) whereas another group received the highest amount of start money (€7 = high rank). In both conditions, participants were confronted with the exact same comparison standards, who had received €3, €5, or €7 as start money. Crucially, participants with only €3 start money were in a relatively inferior position, mostly engaging in upward comparisons, because 66% of the comparison standards had received more start money. To the contrary, participants with €7 start money were in a relatively superior position, mostly engaging in downward comparisons, as 66 % of the comparison standards had received *less* money. In line with our FOE framework and based on Experiment 2 findings, we predicted that receiving only €3 and comparing *upwards* should increase incongruent emotions (i.e., envy and schadenfreude) compared to when receiving €7 (and comparing *downwards*).

Method

Participants

Again, we recruited a minimum of 50 participant per between-condition. As we observed a weaker effect of comparison direction for schadenfreude in Experiment 1, we deliberately overpowered the schadenfreude condition and collected a minimum of 80 participants per condition ($n_{\text{schadenfreude}}$ = 168; n_{envy} = 105). In total, N = 273 participants (203 women, 70 men, M_{age} = 22.40, SD = 4.47) were recruited on the campus of the University of {Institution}.

Design

The experiment had a 2 (participants' start money: €3, €7; between) × 3 (comparison direction: downward, lateral, upward; within) × 2 (mis/fortune: win, loss; within) × 2 (emotion: envy, schadenfreude; between) design.

Materials and Procedure

The paradigm was the same as in Experiment 1, with the only difference that participants either received the smallest amount of start money (€3), or the largest amount of start money (€7).

Results

In line with our predictions, the 2 (Start Money) × 3 (Comparison Direction) × 2 (Mis/Fortunes) × 2 (Emotion) ANOVA produced the expected 4-way interaction effect $F(2, 268) = 38.00$, $p < .001$, $\eta_p^2 = .22$ (for the lower effects, see Table S8). To decompose this interaction, we next examined envy and schadenfreude separately.

Table S8

Summary Table of the Omnibus ANOVA of Experiment 3

Within-Subjects Effects	***F***	***df*s**	**Error *df*s**	***p***	**η_p^2**
Comparison Direction	132.13	2	268	< .001	.50
Comparison Direction × Emotion	70.86	2	268	< .001	.35
Comparison Direction × Rank	35.93	2	268	< .001	.21
Comparison Direction × Emotion × Rank	16.96	2	268	< .001	.11
(Mis)Fortune	7.77	1	268	.006	.03
(Mis)Fortune × Emotion	209.93	1	269	< .001	.44
(Mis)Fortune × Rank	0.05	1	269	.944	.00
(Mis)Fortune × Emotion × Rank	6.28	1	269	.013	.02
Comparison Direction × (Mis)Fortune	12.87	2	268	< .001	.09
Comparison Direction × (Mis)Fortune × Emotion	41.27	2	268	< .001	.24
Comparison Direction × (Mis)Fortune × Rank	25.99	2	268	< .001	.16

Comparison Direction × (Mis)Fortune × Emotion × Rank	38.00	2	268	< .001	.22
Between-Subjects Effects					
Emotion	25.99	1	269	< .001	.09
Rank	28.23	1	269	< .001	.10
Emotion × Rank	24.77	1	269	< .001	.08

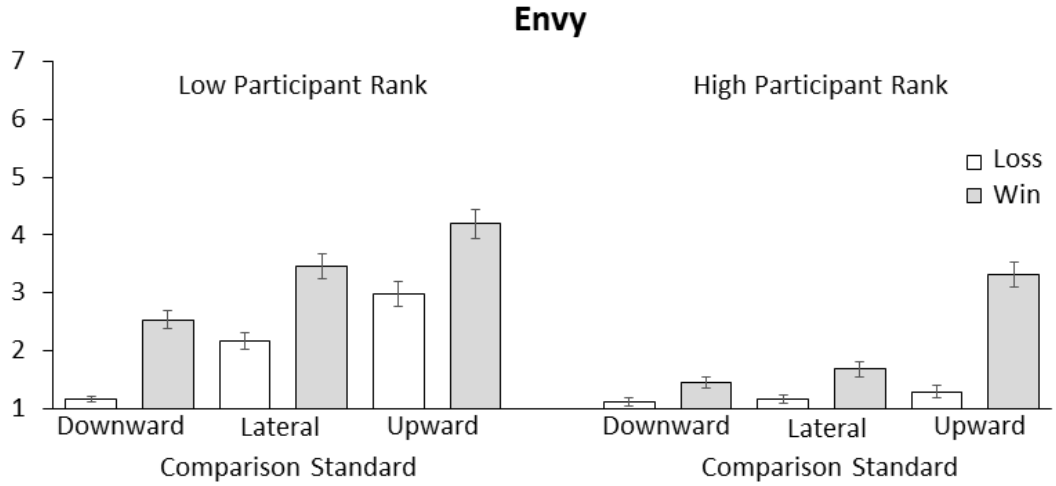
Envy

Replicating previous experiments, we found a significant main effect of (mis)fortune, $F(1, 103) = 231.89$, $p < .001$, $\eta_p^2 = .69$, comparison direction, $F(2, 102) = 93.94$, $p < .001$, $\eta_p^2 = .65$, and the predicted interaction between comparison direction and (mis)fortune, $F(2, 102) = 26.63$, $p < .001$, $\eta_p^2 = .34$ (see Figure S3). All comparisons in the win condition (Figure S3, grey bars) were significant, all $ts(104) \geq 7.75$, $p < .001$, smallest $g = 0.75$. The significant linear contrast for comparison direction and (mis)fortune, $F(1, 104) = 30.11$, $p < .001$, $\eta_p^2 = .23$, showed that the difference between upward and downward comparison standards was larger in the win condition, $t(104) = 14.03$, $p < .001$, $g = 1.36$, than the loss condition $t(104) = 7.22$, $p < .001$, $g = 0.70$.

Expanding the previous findings, we also observed a main effect of participants' start money, $F(1, 103) = 34.40$, $p < .001$, $\eta_p^2 = .25$, which was qualified by a three-way interaction between participant's start money, comparison direction, and (mis)fortune, $F(2, 102) = 35.14$, $p < .001$, $\eta_p^2 = .41$. Supporting our prediction, participants were more envious when they had received only €3 start money ($M = 3.39$, $SD = 1.43$) compared to €7 start money ($M = 2.15$, $SD = 0.98$) when confronted with comparison standards who won money. Comparisons showed that this applied to upward, lateral, and downward standards (left versus right grey panels, Figure S3), $ts(103) \geq 2.60$, $ps \leq .011$, smallest $g = 0.51$.

Figure S3

Emotion Ratings in Experiment 3



Note. Mean envy ratings for comparison standards with €3, €5, or €7 start money who then won money (grey bars) versus lost money (white bars) as a function of participants receiving €3 (left panel) versus €7 (right panel) themselves. Error bars represent 1 *SEM*.

Schadenfreude

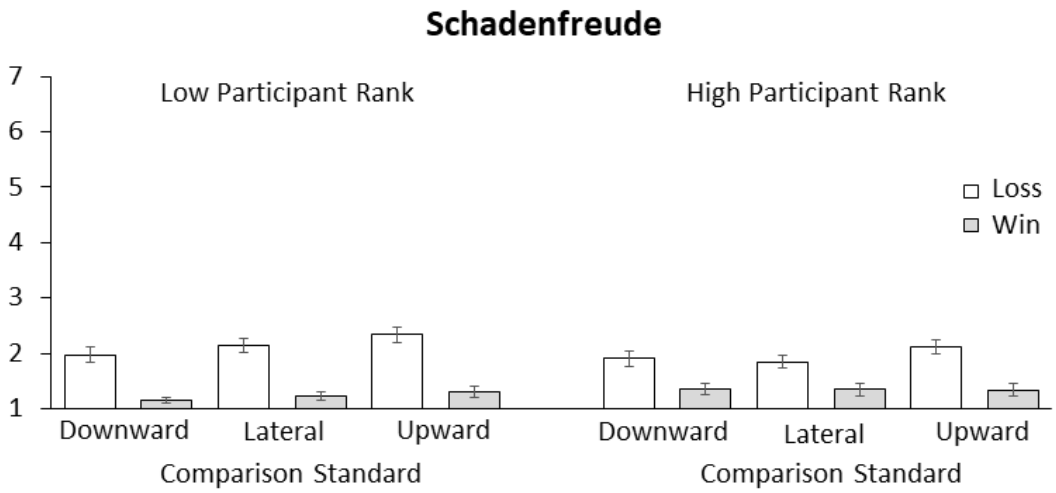
Replicating previous experiments, we observed a significant main effect of (mis)fortune, $F(1, 166) = 68.70$, $p < .001$, $\eta_p^2 = .29$, comparison direction, $F(2, 165) = 13.92$, $p < .001$, $\eta_p^2 = .12$, and the predicted Comparison Direction × Mis/Fortune interaction, $F(2, 165) = 7.99$, $p < .001$, $\eta_p^2 = .09$ (see Figure S4). As in the previous experiments, the significant linear contrast for comparison direction and (mis)fortune, $F(1, 1067) = 6.62$, $p < .001$, $\eta_p^2 = .04$, showed that the difference between upward and downward comparison standards was only significant in the loss condition (Figure S4, white bars), $t(167) = 3.22$, $p = .002$, $g = 0.25$, and not in the win condition $t(167) = 1.78$, $p = .078$, $g = 0.12$.

We observed a small (but not significant) effect revealing stronger schadenfreude when participants had received only €3 start money ($M = 2.15$, $SD = 1.15$) compared to €7 start money

(M = 1.96, SD = 1.05) when they were confronted with comparison standards who had received €5, $t(166) = 1.78$, $p = .078$, $g = 0.27$. We observed no further significant differences between both participant groups, ts ≤ 1.07, ps ≥ .288.

Figure S4

Emotion Ratings in Experiment 3



Note. Mean schadenfreude ratings for comparison standards with €3, €5, or €7 start money who then won money (grey bars) versus lost money (white bars) as a function of participants receiving €3 (left panel) versus €7 (right panel) themselves. Error bars represent 1 *SEM*.

The Magnitudes of Others' Movements

Again, correlations on the trial level revealed that emotional reactions intensified the more others won/lost. Envy intensified the more others won ($r = .149$, $p < .001$), whereas schadenfreude intensified the more others lost ($r = .20$, $p < .001$).

Discussion

The findings for envy illustrate that individuals' emotional experience depends on a personal reference point. In the €3 and €7 start money condition, participants were confronted with exact same lottery outcomes, but envy was much stronger when participants themselves had a low(er) compared to high(er) rank—and thus socially compared upwards. The findings for

schadenfreude show that this emotion was much less affected by our manipulation of participants' rank. One explanation is that assigning a low rank is not enough to observe stronger schadenfreude towards higher-ranking others; it might need a relevant self-threat (as done in the study by Van Dijk et al., 2011). Another explanation is that schadenfreude is elicited not only by upward, but also by downward comparisons (Smith, 2000) because it provides oneself with a comparison benefit (Van Dijk et al., 2015). Participants experienced schadenfreude when others ranked higher prior to a misfortune (which applies to our €3 condition), but also when they could look down on the other person (which applies to our €7 condition; Van Dijk et al., 2015). In all, both effects could have cancelled each other out in the present study.

Experiment S1

This experiment was part of a different project conducted together with [redacted], in which we investigated whether social exclusion vs. inclusion affects emotional reactions to others' (mis)fortunes (for more details, please see OSF link). Participants had to imagine a situation in which they were socially excluded or included (between participants). We then let participants play a lottery and presented them ostensible lottery outcomes of other people. In response to others' lottery wins, participants had to indicate how much envy and happiness (not happy-*for*-ness) they experienced. In response to others' lottery losses, they had to indicate how much sympathy and schadenfreude they experienced.

Method

Design

The experiment had a 2 (social exclusion: exclusion, inclusion; between) × 2 (comparison direction: downward, upward; within) × 2 (mis/fortune: win, loss; within) design with envy and happiness as the dependent variables in the win condition and schadenfreude and sympathy as the dependent variables in the loss condition.

Participants

We recruited participants using the online platform Amazon Mechanical Turk. Based on *G*Power* (Faul et al., 2007), the required sample size to detect a small effect of $d = 0.3$ between the independent groups with a power of 0.80 was $N = 176$. We stopped data collection only at the end of the day when reaching the required sample size. $N = 222$ individuals participated in the study. We excluded participants who did not finish the study ($n = 20$), who did want their data to be included ($n = 4$), who did not follow the instructions to write an essay ($n = 5$), and/or who wrote that they did not understood the German term 'schadenfreude' ($n = 5$) resulting in a final sample of $N = 189$ (80 women, 108 men, 1 other, mean age 35.24; $SD = 10.54$).

Materials and Procedure

Participants first completed an imagination task. One group of participants imagined being excluded by new colleagues ($n = 92$) whereas another group of participants imagined being included by this group ($n = 97$) and were asked to write a short essay about this situation. Afterwards, they were told that they could receive a bonus for their participation by playing a lottery. They all received $1 as start money. Afterwards they were presented with the lottery outcomes of 16 ostensible other persons serving as comparison standards. These others were either downward standards who had received only $0.50 start money or upward standards who had received $1.50 start money. With this start money they played a one trial lottery, in which they either lost or won money (¢10, ¢20, ¢30, or ¢40) resulting in 16 trials. All trials were presented in a randomized order. In trials in which participants were presented with a lottery win they were asked to indicate how much envy and happiness they experienced on a scale ranging from 1 (*not at all*) to 7 (*very much*). In trials in which participants were presented with a lottery loss they were asked to indicate how much schadenfreude and sympathy they experienced on a scale ranging from 1 (*not at all*) to 7 (*very much*). At the beginning of the experiment we

explained the term schadenfreude (= pleasure in response to another person's misfortune) to participants as it is a German word that not everyone may know. We excluded participants who wrote that they still did not understand the term (n = 4). After participants had seen the lottery outcomes of others, they played the lottery themselves. Finally, participants had to indicate how they felt using a scale ranging from 1 (*very excluded*) to 7 (*very included*), as well as several demographic questions.

Results

Our manipulation of social exclusion did not affect how participants reacted to comparison standards' wins and losses. There was no main effect of the manipulation in the win and the loss condition (Fs ≤ .40, ps ≥ .530), and the manipulation did not affect how much envy, happiness, schadenfreude, and sympathy participants experienced in response to upward and downward standards (all ts ≤ 1.68, ps ≥ .095). Therefore, we collapsed over the factor social inclusion/exclusion and explored whether the direction of a comparison affected how participants reacted towards comparison standards' fortunes and misfortunes. Replicating our previous experiments, participants experienced more envy when an upward standard won money (M = 3.33, SE = 0.14) compared to a downward standard (M = 2.65, SE = 0.14), $t(188) = 5.35$, $p < .001$, g = 0.38. They also experienced more schadenfreude when an upward standard lost money (M = 2.40, SE = 0.13) compared to a downward standard (M = 2.12, SE = 0.13), $t(188) = 2.63$, $p = .009$, g = 0.19. Last, participants experienced more sympathy when a downward standard lost money (M = 3.93, SE = 0.11) compared to an upward standard (M = 3.45, SE = 0.10), $t(188) = –4.31$, $p < .001$, g = –0.31. Happiness in response to wins was similarly high in response to downward (M = 3.77, SE = 0.10) and upward standards (M = 3.76, SE = 0.12, t = –0.07, p = .942).

Discussion

The present experiment replicates the previously observed effects for envy, schadenfreude, and sympathy in an US-American sample using only very few trials. Note that we did not measure happy-for-ness in this study but only happiness.