Supplemental Materials:

Attitudinal Effects of Stimulus Co-occurrence and Stimulus Relations:

Range and Limits of Intentional Control

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The reported research was supported by National Science Foundation Grant # 1649900 to Bertram Gawronski. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the National Science Foundation. We thank Sarah Carr, Trey Delafosse, Sojung Lee, Katie Musemeche, and Yocelyn Rivera for their help in collecting the data.
Experiment 1

Manipulation Checks

In line with the intended effect of the task-instruction manipulation, participants in the control-instructions condition reported a significantly stronger motivation to avoid being influenced by mere pairings than participants in the standard-instructions condition ($M_s = 4.70$ vs. $3.58$, respectively), $t(410) = 6.89, p < .001, d = 0.68$. However, participants in the two groups did not significantly differ in terms of their motivation to form impressions in line with the depicted causal relations ($M_s = 4.87$ vs. $4.78$, respectively), $t(410) = 0.64, p = .523, d = 0.06$.

ANOVA Results

The choice data were aggregated by calculating the relative proportions of *yes* vs. *no* responses for each of the four categories of CSs within each of the two Task Instructions conditions. Mean proportions and 95% confidence intervals of responses to the four kinds of stimuli in the two task-instruction conditions are presented in Table S1. Submitted to a 2 (US Valence) × 2 (CS-US Relation) × 2 (Task Instructions) mixed ANOVA, choice scores revealed a significant main effect of US Valence, $F(1, 410) = 72.06, p < .001, \eta_g^2 = .149$, and a significant main effect of CS-US Relation, $F(1, 410) = 5.20, p = .023, \eta_g^2 = .013$, which were qualified by a significant two-way interaction between US Valence and CS-US Relation, $F(1, 410) = 182.83, p < .001, \eta_g^2 = .308$. Post-hoc tests showed that, when the CSs were described as causing the USs, CSs paired with positive USs were chosen more frequently than CSs paired with negative USs, $t(411) = 15.10, p < .001, d = 0.744$. Conversely, when the CSs were described as preventing the USs, CSs paired with positive USs were chosen less frequently than CSs paired with negative USs, $t(411) = -6.37, p < .001, d = 0.314$. Moreover, when the CSs were paired with positive USs, CSs that were described as causing the USs were chosen more frequently than CSs that were
described as preventing the USs, $t(411) = 12.12, p < .001, d = 0.596$. Conversely, when the CSs were paired with negative USs, CSs that were described as causing the USs were chosen less frequently than CSs that were described as preventing the USs, $t(411) = -10.53, p < .001, d = 0.519$. The three-way interaction between US Valence, CS-US Relation, and Task Instructions was not statistically significant, $F(1, 410) = 1.61, p = .206, \eta^2_G = .004$.

**RCB Model**

The RCB model was fit to the data with the three parameters varying freely across task-instructions conditions, $G^2(2) = 7.83, p = .020, w = .023$. This model was used as a baseline for tests whether the three model parameters are significantly different across task-instructions conditions. The analyses revealed a significant effect of Task Instructions on the $R$ parameter (see Figure S1), $\Delta G^2(1) = 5.03, p = .025, w = .018$, indicating that relational information had a greater impact on participants’ choices in the control-instructions condition compared to the standard-instructions condition. There were no significant effects of Task Instructions on the $C$ parameter (see Figure S1), $\Delta G^2(1) = 2.34, p = .126, w = .013$, and the $B$ parameter (see Figure S1), $\Delta G^2(1) = 0.46, p = .499, w = .006$.

**Experiment 2**

**Manipulation Checks**

Replicating the asymmetric effects of Task Instructions on self-reported motivations in Experiment 1, participants in the control-instructions condition reported a significantly stronger motivation to avoid being influenced by mere pairings than participants in the standard-instructions condition ($Ms = 5.52$ vs. $3.77$, respectively), $t(378) = 8.97, p < .001, d = 0.92$. However, participants in the two groups did not significantly differ in terms of their motivation
to form impressions in line with the depicted causal relations ($M_s = 5.70$ vs. $5.85$, respectively), $t(378) = 1.06, p = .289, d = 0.11$.

**ANOVA Results**

The choice data were aggregated in line with the procedures in Experiment 1. Mean proportions and 95% confidence intervals of responses to the four kinds of stimuli in the two task-instruction conditions are presented in Table S1. Submitted to a 2 (US Valence) × 2 (CS-US Relation) × 2 (Task Instructions) mixed ANOVA, choice scores revealed a significant main effect of US Valence, $F(1, 378) = 20.28, p < .001, \eta_G^2 = .051$, a significant main effect of Task Instructions, $F(1, 378) = 4.23, p = .040, \eta_G^2 = .011$, and a significant two-way interaction between US Valence and CS-US Relation, $F(1, 378) = 49.37, p < .001, \eta_G^2 = .116$. Post-hoc tests showed that, when the CSs were described as causing the USs, CSs paired with positive USs were chosen more frequently than CSs paired with negative USs, $t(379) = 7.32, p < .001, d = 0.375$. Conversely, when the CSs were described as preventing the USs, CSs paired with positive USs were chosen less frequently than CSs paired with negative USs, $t(379) = -1.86, p = .064, d = 0.095$. Moreover, when the CSs were paired with positive USs, CSs that were described as causing the USs were chosen more frequently than CSs that were described as preventing the USs, $t(379) = 5.61, p < .001, d = 0.288$. Conversely, when the CSs were paired with negative USs, CSs that were described as causing the USs were chosen less frequently than CSs that were described as preventing the USs, $t(379) = -6.08, p < .001, d = 0.312$. The three-way interaction between US Valence, CS-US Relation, and Task Instructions was not statistically significant, $F(1, 378) = 0.84, p = .360, \eta_G^2 = .002$. 
RCB Model

The RCB model fit the data well with the three parameters varying freely across task-instructions conditions, $G^2(2) = 0.17, p = .921, w = .004$. Further analyses revealed a significant effect of Task Instructions on the $B$ parameter (see Figure S2), $\Delta G^2(1) = 16.77, p < .001, w = .037$, indicating that participants in the standard-instructions condition had a stronger response bias to reject the products than participants in the control-instructions condition. There were no significant effects of Task Instructions on the $C$ parameter (see Figure S2), $\Delta G^2(1) = 0.54, p = .462, w = .007$, and the $R$ parameter (see Figure S2), $\Delta G^2(1) = 1.75, p = .186, w = .012$.

Experiment 3

Manipulation Checks

Replicating the asymmetric effects of Task Instructions on self-reported motivations in Experiments 1 and 2, participants in the control-instructions condition reported a significantly stronger motivation to avoid being influenced by mere pairings than participants in the standard-instructions condition ($M_s = 5.49$ vs. $4.03$), $t(360) = 7.62, p < .001, d = 0.80$. However, participants in the two groups did not significantly differ in terms of their motivation to form impressions in line with the depicted causal relations ($M_s = 5.74$ vs. $5.86$), $t(360) = 0.82, p = .412, d = 0.09$.

ANOVA Results

The choice data were aggregated in line with the procedures in Experiments 1 and 2. Mean proportions and 95% confidence intervals of responses to the four kinds of stimuli in the two task-instruction conditions are presented in Table S1. Submitted to a 2 (US Valence) $\times$ 2 (CS-US Relation) $\times$ 2 (Task Instructions) mixed ANOVA, choice scores revealed a significant main effect of US Valence, $F(1, 360) = 9.76, p = .002, \eta^2_g = .026$, a significant main effect of
Task Instructions, \(F(1, 360) = 8.71, p = .003, \eta^2 = .024\), and a significant two-way interaction between US Valence and CS-US Relation, \(F(1, 360) = 45.22, p < .001, \eta^2 = .112\). Post-hoc tests showed that, when the CSs were described as causing the USs, CSs paired with positive USs were chosen more frequently than CSs paired with negative USs, \(t(361) = 6.71, p < .001, d = 0.353\). Conversely, when the CSs were described as preventing the USs, CSs paired with positive USs were chosen less frequently than CSs paired with negative USs, \(t(361) = -2.46, p = .014, d = 0.129\). Moreover, when the CSs were paired with positive USs, CSs that were described as causing the USs were chosen more frequently than CSs that were described as preventing the USs, \(t(361) = 5.89, p < .001, d = 0.294\). Conversely, when the CSs were paired with negative USs, CSs that were described as causing the USs were chosen less frequently than CSs that were described as preventing the USs, \(t(361) = -5.58, p < .001, d = 0.293\). The three-way interaction between US Valence, CS-US Relation, and Task Instructions was not statistically significant, \(F(1, 360) = 1.42, p = .234, \eta^2 = .004\).

**RCB Model**

The RCB model fit the data well with the three parameters varying freely across task-instructions conditions, \(G^2(2) = 1.98, p = .371, w = .013\). Further analyses revealed a significant effect of Task Instructions on the \(B\) parameter (see Figure S3), \(\Delta G^2(1) = 39.41, p < .001, w = .058\), indicating that participants in the standard-instructions condition had a response bias to reject the products whereas participants in the control-instructions condition had a response bias to accept the products. More importantly, there was a significant effect of Task Instructions on the \(R\) parameter (see Figure S3), \(\Delta G^2(1) = 4.35, p = .037, w = .019\), indicating that relational information had a greater impact on participants’ choices in the control-instructions condition compared to the standard-instructions condition. The \(C\) parameter showed a marginal effect of
Task Instructions in a direction that was opposite to the instructions (see Figure S3), $\Delta G^2(1) = 3.02, p = .082, w = .016$, in that mere occurrence tended to have a greater impact on participants’ choices in the control-instructions condition compared to the standard-instructions condition.
Table S1. Mean proportions and 95% confidence intervals of choice responses (yes vs. no) as a function of valence of co-occurring stimulus (positive vs. negative) and relation to co-occurring stimulus (stimulus causes vs. prevents co-occurring stimulus).

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**Figure S1.** Parameter estimates without model restrictions as a function of instructions (standard-instructions vs. control-instructions), Experiment 1.

*Note.* The $R$ parameter captures effects of stimulus relations; the $C$ parameter captures effects of stimulus co-occurrence; the $B$ parameter captures general response biases. The neutral reference point for $R$ and $C$ is 0; the neutral reference point for $B$ is 0.5, with scores higher than 0.5 reflecting a general bias toward positive responses and scores lower than 0.5 reflecting a general bias toward negative responses. Error bars depict 95% confidence intervals.
**Figure S2.** Parameter estimates without model restrictions as a function of instructions (standard.instructions vs. control.instructions), Experiment 2.

*Note.* The $R$ parameter captures effects of stimulus relations; the $C$ parameter captures effects of stimulus co-occurrence; the $B$ parameter captures general response biases. The neutral reference point for $R$ and $C$ is 0; the neutral reference point for $B$ is 0.5, with scores higher than 0.5 reflecting a general bias toward positive responses and scores lower than 0.5 reflecting a general bias toward negative responses. Error bars depict 95% confidence intervals.
**Figure S3.** Parameter estimates without model restrictions as a function of instructions (standard-instructions vs. control-instructions), Experiment 3.

*Note.* The $R$ parameter captures effects of stimulus relations; the $C$ parameter captures effects of stimulus co-occurrence; the $B$ parameter captures general response biases. The neutral reference point for $R$ and $C$ is 0; the neutral reference point for $B$ is 0.5, with scores higher than 0.5 reflecting a general bias toward positive responses and scores lower than 0.5 reflecting a general bias toward negative responses. Error bars depict 95% confidence intervals.