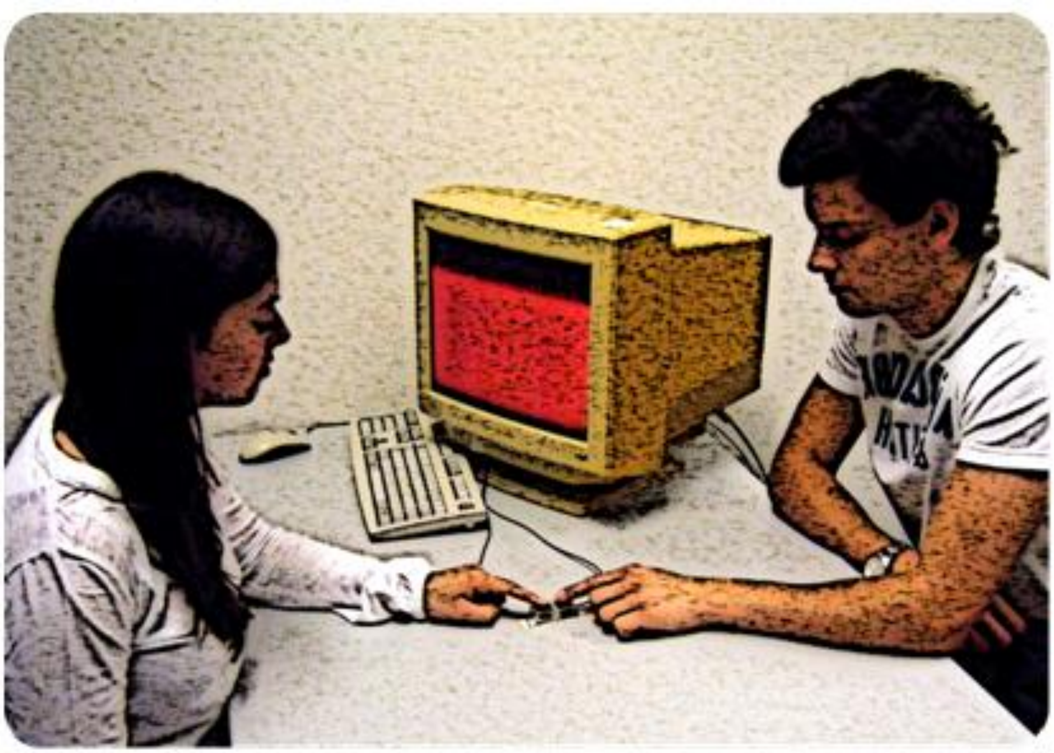
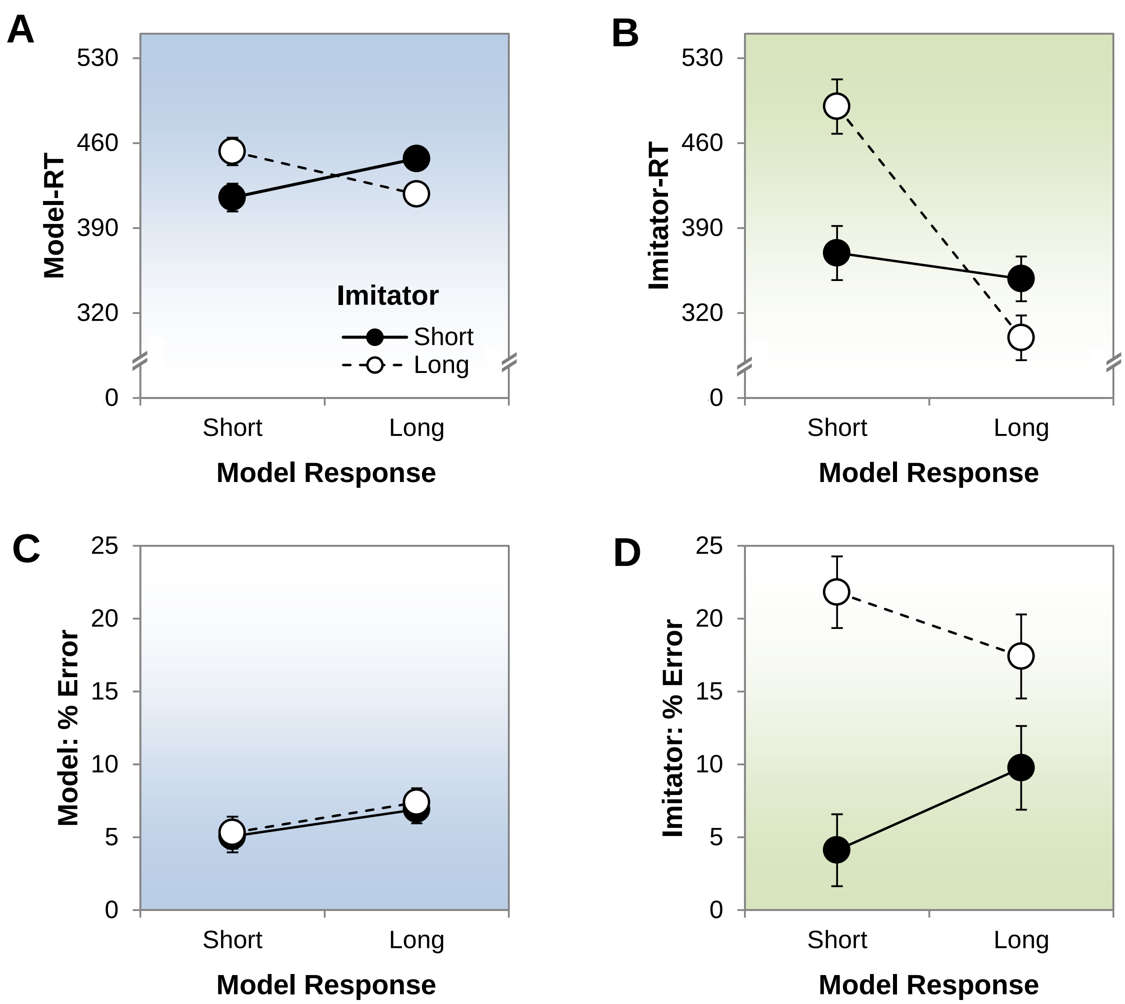
Supplementary Material



Supplementary Figure S1: Advanced analyses



(A) When considering long and short model actions separately, we found the reported imitation effects to be similarly present for both types of actions. Accordingly, a short key press was initiated faster of it were followed by an equally short rather than a long key press of the imitator, $t(23) = 3.33$, $p = .003$, d = 0.96. The opposite was true for long model actions, $t(23) = -3.80$, $p < .001$, d = 1.10 (Kunde, 2003). These effects were qualified by a significant interaction of the factors model response (short vs. long) and imitator response (short vs. long), $F(1, 23) = 18.18$, $p < .001$, $\eta_p^2 = .44$, whereas neither main effect approached significance (both *F*s < 1).

(B) In accordance with previous studies (Brass et al., 2000; Heyes, 2011; Ondobaka et al., 2012), imitators performed short key presses faster in response to short model actions as compared with long model actions, $t(23) = 5.40$, $p < .001$, d = 1.56, whereas the opposite was true for long key presses, $t(23) = 2.64$, $p = .014$, d = 0.76. As for model actions, these effects were qualified by a significant interaction of the factors model response (short vs. long) and imitator response (short vs. long), $F(1, 23) = 23.91$, $p < .001$, $\eta_p^2 = .51$. In addition, RTs were generally faster for responses to long model actions, $F(1, 23) = 90.81$, $p < .001$, $\eta_p^2 = .80$, reflecting typical effects for increased response preparation (Coull & Nobre, 1998; Reeve & Proctor, 1985)[1]. As a side effect of the significant interaction, short imitator responses were also initiated faster than long responses, $F(1, 23) = 10.94$, $p = .003$, $\eta_p^2 = .32$.

(C) As in previous experiments on the anticipation of sensory action effects (Kunde, 2001, 2003; Pfister et al., 2010), the model's errors rates were generally unaffected by the following imitative response. Accordingly, neither the main effect of imitator response nor the interaction of imitator response and model response approached significance (both *F*s < 1). Descriptively, however, models made more errors for long key presses, even though this difference was not significant, $F(1, 23) = 2.35$, $p = .139$, $\eta_p^2 = .09$. These results indicate that the effects observed for the RT data did not result from different speed-accuracy trade-offs across different conditions.

(D) Imitators made significantly more errors for long than for short key presses, $F(1, 23) = 31.19$, $p < .001$, $\eta_p^2 = .58$, whereas the main effect of model response did not approach significance ($F < 1$). Crucially, however, the interaction of both factors was significant, $F(1, 23) = 12.46$, $p = .002$, $\eta_p^2 = .35$, and exhibited the same pattern as the corresponding RT data, although with smaller effect size.

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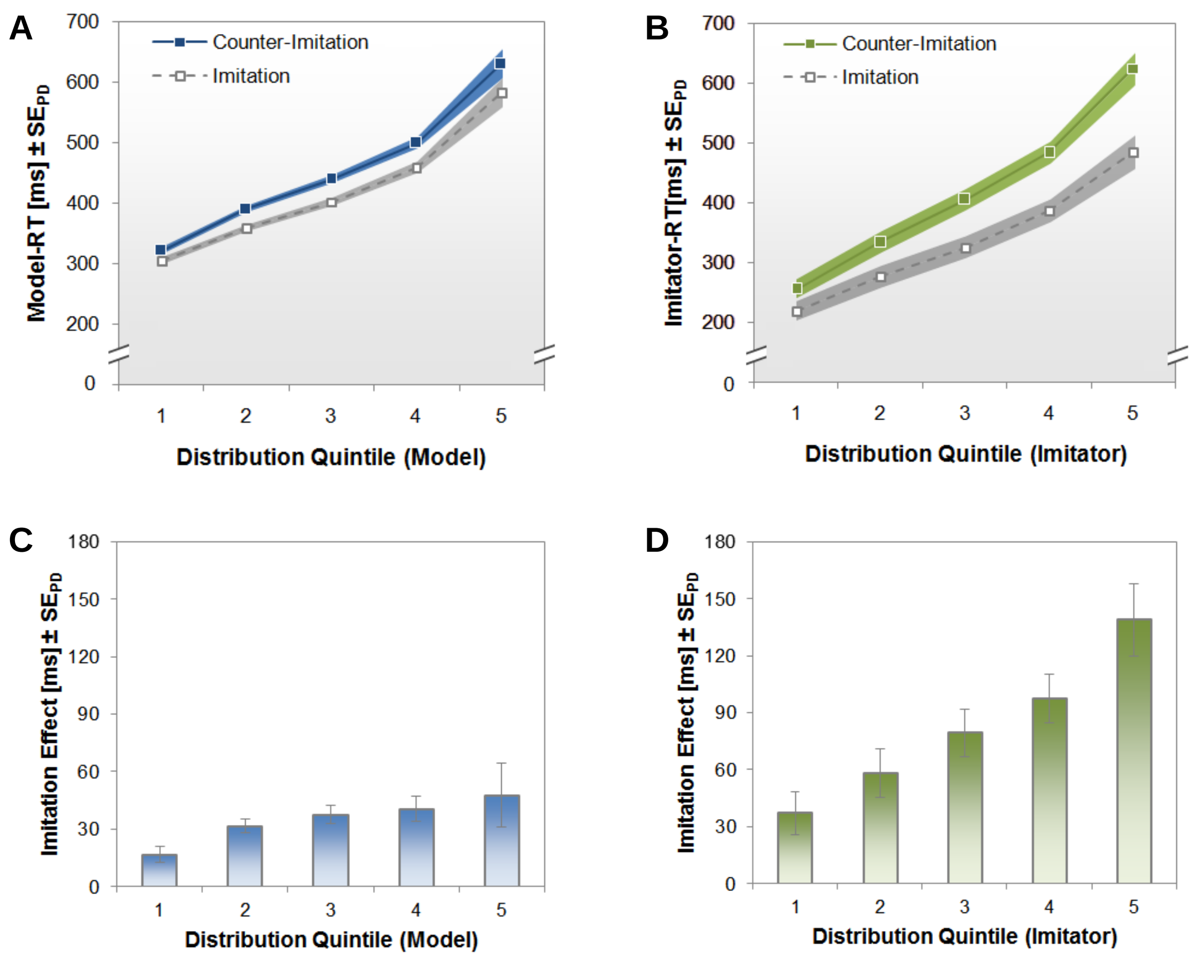
[1] Coull, J. T., & Nobre, A. C. (1998). Where and when to pay attention: The neural systems for directing attention to spatial locations and to time intervals as revealed by both PET and fMRI. *Journal of Neuroscience*, *18*, 7426-7435.

Reeve, T. G., & Proctor, R. W. (1985). On the advance preparation of discrete finger responses. *Journal of Experimental Psychology: Human Perception and Performance*, *10*, 541-553.

Supplementary Figure S2: Imitation effects across the RT distribution

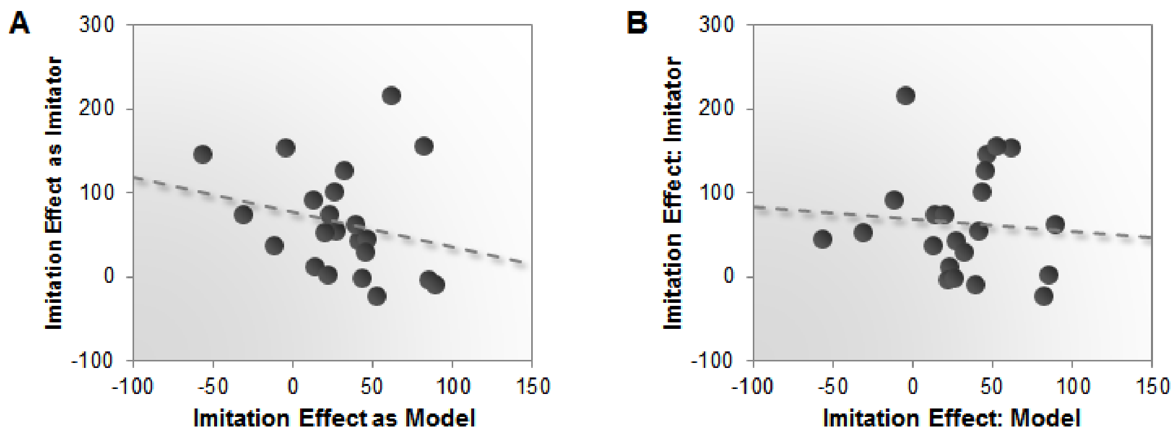


(A+C) Response times and imitation effects, i.e., $RT_{Counter\text{-}Imitation} - RT_{Imitation}$, for model responses across the distribution quintiles. The effect was significant from the first quintile onward with *t*(23)-values of 2.92, 6.07, 5.73, 4.37, and 2.01, respectively. The increase of the effect for longer response times gave rise to the reported interaction of the factors imitator response and distribution quintile in a 2 x 5 ANOVA. The main effect of imitator response, $F(1, 23) = 16.89$, $p < .001$, $\eta_p^2 = 0.42$, and distribution quintile were also significant, $F(4, 20) = 70.07$, $p < .001$, $\eta_p^2 = 0.93$. Colored areas (Panel A) and error bars (Panel C) indicate standard errors of paired difference scores for the imitation effect at each distribution quintile.

(B+D) Response times and imitation effects ($RT_{Counter\text{-}Imitation} - RT_{Imitation}$) for imitator responses across the distribution quintiles. As for the model, the imitation effect was significant from the first quintile onward with *t*(23)-values of 2.34, 3.25, 4.49, 5.32, and 5.16, respectively. Again, the increase of the effect for longer response times was mirrored in a significant interaction of imitator response and distribution quintile in a 2 x 5 ANOVA, $F(4,20) = 5.55$, $p = .004$, $\eta_p^2 = 0.53$ (cf. also Brass, Bekkering, & Prinz, 2001)[2]. The main effect of imitator response, $F(1,23) = 20.46$, $p < .001$, $\eta_p^2 = 0.47$, and distribution quintile were also significant, $F(4,20) = 91.29$, $p < .001$, $\eta_p^2 = 0.95$. Colored areas (Panel B) and error bars (Panel D) indicate standard errors of paired difference scores for the imitation effect at each distribution quintile (cf. Pfister & Janczyk, in press).

[2] Brass, M., Bekkering, H., & Prinz, W. (2001). Movement observation affects movement execution in a simple response task. *Acta Psychologica*, *106*, 3-22.

Supplementary Figure S3: Outlier corrections & fluency-based alternative explanations



(A) As obvious from Fig. 2, one participant exhibited an extremely strong imitation effect as imitator (379 ms; z = 3.25 as compared to the remaining sample). This effect cannot be reconciled with any theoretical account for the imitation effect (e.g., Heyes, 2011) and might have artificially inflated the reported correlation of imitation effects as model and as imitator across participants. To correct for this influence, we removed this participant and his partner from the analysis and found the corrected correlation still to be far from significant, r = -0.23, $t(20) = -1.08$, $p = .295$. We also ensured that the outlier participant did not influence any of the reported analyses significantly by repeating each analysis without this participant and his partner.

(B) Even though the present interpretation of the model's imitation effect in terms of an anticipation of the imitative action is in line with numerous studies on effect-based action control (Kunde, 2001, 2003; Pfister et al., 2010; Shin et al., 2010), the effect might be partly explained by a reduced overall fluency of the interaction. This alternative explanation suggests that the model perceives the imitator's difficulty across the counter-imitation blocks and adapts his response speed. As a final validation analysis, we therefore computed the correlation of the imitation effects of each model and the corresponding imitator across participants (outlier-corrected as in Panel A). This analysis showed the correlation to be far from significance, $r = -0.08$, $t(20) = -0.36$, $p = .725$, clearly favoring the explanation in terms of anticipative processes rather than in terms of reduced fluency.