**Supplementary Results**

***Schizophrenia patients***

*Motivational salience*

Figure 1d shows the button-pressing speed to slides of different valences, without the corrections made using mean-centering method. The main effect of Group (*F*[1,126] = 31.014, p < 0.001, η2 = 0.198), the main effect of Behavioural Condition (*F*[1,126] = 138.872, *p* < 0.001, η2 = 0.524), the Group-by-Behavioural Condition interaction (*F*[2,126] = 8.019, p = 0.005, η2 = 0.060), and the Group-by-Slide Valence interaction (*F*[2,252] = 22.709, *p* = <0.001, η2 = 0.153) were all statistically significant. However, the three-way interaction (*F*[2,252] = 1.817, *p* = 0.165, η2 = 0.014) was not significant. *Post-hoc* independent samples *t*-tests found that schizophrenia patients expended less effort (with slower button-pressing speed) during representational responding to slides of positive valence (*t*[126] = -5.940, *p* < 0.001) and negative valence (*t*[126] = -5.470, *p* < 0.001), but not to neutral valence slides (*t*[126] = -1.309, *p* > 0.999). During evoked responding, schizophrenia patients expended less effort to slides of positive valence (*t*[126] = -5.830, *p* < 0.001) and negative valence (*t*[126] = -4.481, *p* < 0.001), but not slides with neutral valence (*t*[126] = -0.912, *p* > 0.999).

***Unaffected first-degree relatives of schizophrenia patients***

*Motivational salience*

Figure 2d shows the button-pressing speed to slides of different valences, without the corrections made using mean-centering method. The main effect of Group (*F*[1,83] = 4.141, *p* = 0.045, η2 = 0.048) and Behavioural Condition (*F*[1,83] = 58.474, *p* < 0.001, η2 = 0.413) were significant. Although the Group-by-Behavioural Condition interaction (*F*[1,83] = 1.917, *p* = 0.170, η2 = 0.023) was not significant, the Group-by-Slide Valence interaction showed a trend toward significance (*F* [2,166] = 3.088, *p* = 0.061, η2 = 0.036). The three-way interaction was not significant (*F*[2,166] = 0.383, *p* = 0.670, η2 = 0.005). *Post-hoc* independent samples *t*-tests found that unaffected relatives apparently pressed buttons at a lower speed to slides of positive valence during representational responding (*t*[83] = -2.628, *p* = 0.06) but not other conditions (*p*s > 0.05).

***Relationship between emotion-behaviour coupling, working memory and antipsychotic medications in the three groups of participants***

In schizophrenia participants (n = 65), working memory, as measured by the Letter–Number Span Test (LNT; Gold et al. 1997), appeared to be significantly correlated with emotion-behaviour coupling during evoked responding to both desirable (rs = 0.289, *p* = 0.020, uncorrected) and undesirable (rs = 0.287, p = 0.021, uncorrected) slides, contrary to Heerey & Gold (2007)’s study, but consistent with Lui et al. (2016a)’s findings. Contrary to our expectations, LNT was not correlated with emotion-behaviour coupling during representational responding (*p*s > 0.05). Regarding medication effect, emotion-behaviour coupling in schizophrenia participants (n = 65) was significantly correlated with chlorpromazine equivalence of antipsychotics, during evoked responding to desirable slides (rs = 0.289, *p* = 0.020, uncorrected) but not in other conditions (*p*s > 0.05). Interestingly, in the genetically high-risk group (n = 40), working memory performance appeared to be correlated with emotion-behaviour coupling during both representational (seeking desirable slides in the future: rs = 0.335, *p* = 0.040, uncorrected; avoiding undesirable slides in the future: rs = 0.452, *p* = 0.004, uncorrected) and evoked responding (removing undesirable slides: rs = 0.429, *p* = 0.007, uncorrected). In contrast, in the behaviourally high-risk group (n = 32), working memory was not found to be correlated with emotion-behaviour coupling in the paradigm (*p*s > 0.05).

***Split-half analyses in the three groups of participants***

To investigate the potential confound of fatigue effect on our results, we applied split-half method to the data of each of the responding phases of the behavioural paradigm. The mean button-pressing speeds (presses per s) during the first and second halves of the representational and evoked responding phases were calculated for each individual participant. Using a Group (schizophrenia patients/unaffected relatives of schizophrenia patients/individuals with social anhedonia, controls) x Behavioural Condition (representational, evoked responding) x Session (first half, second half) mixed model ANOVAs, we examined the effect of Sessions on the button-pressing speed. A significant Session main effect or Group-by-Session interaction would suggest that participants pressed buttons faster in the first half than the second half sessions during the two responding phases, and would imply possible fatigue effect. For Sample A, the Group main effect (*F*[1,126] = 23.197, *p* < 0.001, partial eta squared = 0.155) and the Behavioural Condition main effect (*F*[1, 126] = 119.291, *p* < 0.001, partial eta squared = 0.486) were statistically significant. However, the Session main effect (*F*[1,126] = 0.012, *p* = 0.915, partial eta squared < 0.001), the Group-by-Session interaction (*F*[1,126] = 0.829, *p* = 0.364, partial eta squared = 0.007), and three-way interaction (*F*[1,126] = 0.970, *p* = 0.327, partial eta squared = 0.008) failed to reach statistical significance.

For Sample B, we found that the Group main effect (*F*[1,83] = 5.991, *p* = 0.016, partial eta squared = 0.067) and the Behavioural Condition main effect (*F*[1,83] = 54.422, *p* < 0.001, partial eta squared = 0.396) were statistically significant. However, the Session main effect (*F*[1,83] = 0.050, *p* = 0.823, partial eta squared = 0.001), the Group-by-Session interaction (*F*[1,83] = 0.598, *p* = 0.442, partial eta squared = 0.007) and three-way interaction (*F*[1,83] = 0.351, *p* = 0.555, partial eta squared = 0.004) failed to reach statistical significance. The same split half method and analysis was applied to data of Samples A and C.

For Sample C, the Group main effect (*F*[1,62] < 0.001, *p* = 0.997, partial eta squared < 0.001) was not significant. The Behavioural Condition main effect (*F*[1,62] = 66.045, *p* < 0.001, partial eta squared = 0.516) reached statistical significance. The Session main effect (*F*[1,62] = 4.534, *p* = 0.037, partial eta squared = 0.068) were statistically significant, suggesting that Sample C participants pressed buttons faster in the first half sessions during both responding phases (mean = 4.051 presses per s; *SD* = 0.192) than in the second half sessions of the responding phases (mean = 3.800 presses per s; *SD* = 0.203). However, the Group-by-Session interaction (*F*[1,62] = 0.688, *p* = 0.410, partial eta squared = 0.011), the three-way interaction (*F*[1,62] = 0.006, *p* = 0.938, partial eta squared < 0.001) failed to reach statistical significance.

Taken together, the results suggested that fatigue effect is unlikely to be a confound to results of Sample A and Sample B, but might have affected the results of Sample C.

**Figure 1d. Results of Sample A (schizophrenia patients versus controls)**. Motivated behaviour (presses per s). Error bars show +1SEM.

**Figure 2d. Results of Sample B (unaffected first-degree relatives of schizophrenia patients versus controls)**. Motivated behaviour (presses per s). Error bars show +1SEM.