

Hu, M., Ku, Y., Liu, L.: Temporal attentional bias to visual game stimuli in Internet gaming disorder

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Supplementary materials

Stimuli selection and test

The RSVP task contained 108 target stimuli including 44 neutral images and 64 game-related images. The neutral stimuli were selected from the IAPS (Bradley & Lang, 2017). Ten college students (8 male and 2 female, average age 21.70 years, $SD = 1.42$) were recruited and instructed to evaluate the collected 100 neutral images from the four dimensions of valence, arousal, familiarity, and craving, using a 9-point scale ranging from 1 (not at all) to 9 (extremely). Finally, 44 neutral images were screened out, with a mean valence rating of 6.76 ($SD = 0.78$), a mean arousal rating of 6.50 ($SD = 0.81$), a mean familiarity rating of 6.29 ($SD = 0.67$), and a mean craving rating of 2.34 ($SD = 0.33$).

The game-related stimuli were captured from the public video website of the game video screenshots including the in-game scene of Honor of Kings and League of Legends (two popular MOBA games). Other 10 students (8 male and 2 female, average age 22.50, $SD = 0.97$, average time to play Honor of Kings was 40.80 hours per week, $SD = 19.56$) rated these images from the four dimensions of valence, arousal, familiarity, and craving, using a 9-point scale ranging from 1 (not at all) to 9 (extremely). Finally, 32 images about Honor of Kings were screened out, with a mean valence rating of 7.53 ($SD = 0.42$), a mean arousal rating of 7.96 ($SD = 0.33$), a mean familiarity rating of 8.29 ($SD = 0.28$), and a mean craving rating of 8.13 ($SD = 0.21$). Similarly, 120 images depicting the in-game scene of League of Legends were rated by another 10 students (8 male and 2 female, average age 22.60, $SD = 2.07$, average time to play League of Legends was 19.06 hours per week, $SD = 8.43$) using a 9-point scale ranging from 1 (not at all) to 9 (extremely). Thirty-two images about League of Legends were screened out, with a mean valence rating of 7.80 ($SD = 0.48$), a mean arousal rating of 7.61 ($SD = 0.27$), a mean familiarity rating of 8.21 ($SD = 0.24$), and a mean craving rating of 7.57 ($SD = 0.27$).

When completing the formal experiment session, participants rated the valence, arousal, familiarity, and craving of the target stimuli presented in the RSVP task. Mixed-design ANOVA analyses were conducted with group (IGD, HC) as the between-subject variable, type of image (game-related, neutral) as the within-subject variable, and the rating of valence, arousal, familiarity, and craving as dependent variables, respectively.

For participants' rating of craving, the interaction between group and type was significant ($F_{(1, 44)} = 25.134, p < 0.001, \eta_p^2 = 0.364$). Specifically, in the IGD group, the rating of game-related images was significantly higher than neutral images ($p < 0.001$). The rating of game-related images in the IGD group was significantly higher than in the HC group ($p < 0.001$). Besides, the main effect of group was significant ($F_{(1, 44)} = 17.059, p < 0.001, \eta_p^2 = 0.279$). The IGD group showed higher ratings than the HC group. And the main effect of type was significant ($F_{(1, 44)} = 32.251, p < 0.001, \eta_p^2 = 0.423$). The rating of game-related images was higher than neutral images. The craving ratings on neutral stimuli showed no significant group difference.

As for valence, the interaction between group and type was significant ($F_{(1, 44)} = 6.391, p = 0.015, \eta_p^2 = 0.127$). In the HC group, the rating of game-related images was significantly lower than neutral images ($p = 0.004$). The rating of game-related images in the IGD group was significantly higher than in the HC group ($p < 0.001$). Besides, the main effect of group was significant ($p < 0.001$). The main effect of type was insignificant ($p > 0.05$).

As for arousal, the interaction between group and type was significant ($F_{(1, 44)} = 46.238, p < 0.001, \eta_p^2 = 0.512$). In the IGD group, the rating of game-related images was significantly higher than neutral images ($p = 0.044$). In the HC group, the rating of game-related images was significantly lower than neutral images ($p < 0.001$). The rating of game-related images in the IGD group was significantly higher than in the HC group ($p < 0.001$). Besides, the main effects of group and type were significant ($ps < 0.001$).

As for familiarity, the interaction between group and type was significant ($F_{(1, 44)} = 31.878, p < 0.001, \eta_p^2 = 0.420$). In the IGD group, the rating of game-related images was significantly higher than neutral images ($p = 0.038$). In the HC group, the rating of game-related images was significantly lower than neutral images ($p < 0.001$). The rating of game-related images in the

IGD group was significantly higher than in the HC group ($p < 0.001$). Besides, the main effects of group and type were significant ($ps < 0.01$).

To control the emotional effects of picture types on the task performance, we further conducted ANCOVA analyses with rating differences between game and neural pictures as covariates. After controlling for the ratings of the picture valence, the group differences of the AB enhancement and the AB antagonism effect were still significant. After controlling for both the ratings of valence and arousal, the significant results about the AB enhancement kept the same except for the third-order interaction effect. After controlling for both the ratings of valence and arousal, the significant results about the AB antagonism kept the same except for the T2 type by group interaction effect. Taken together, the current study provides preliminary evidence of temporal attentional biases in individuals with IGD. Future studies with more strict experimental control are necessary for further investigation of Internet-specific temporal attentional biases.

References

- Bradley, M. M., & Lang, P. J. (2017). International affective picture system. In V. Zeigler-Hill & T. K. Shackelford (Eds.), *Encyclopedia of Personality and Individual Differences* (pp. 1-4). Springer International Publishing. https://doi.org/10.1007/978-3-319-28099-8_42-1