Adaptive Cognitive Behavior Therapy with a Virtual Agent Considering User's Psychological Distress

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Abstract (should be within 1st page) :

Mental health issues cause large-scale social losses. To address the issues, various products and systems have been developed to support mental healthcare in daily life. One of them is a virtual agent, an interface embodied with CG animation, that provides counseling based on cognitive behavioral therapy (CBT). CBT is an established form of psychotherapy that alleviates psychological distress. In CBT, a therapist guides a user to identify and correct biased thinking that causes psychological distress. Previous research has proposed virtual agents that provide CBT and have shown distress reduction with long-term use. On the other hand, these studies have primarily utilized response selection based on multiple-choice inputs, resulting in a limited capacity for choosing responses tailored to the user's psychological state. In particular, there has been no research on whether users understand the responses in CBT sufficiently to reduce distress. This study aims to enhance virtual agents' performance in selecting responses during CBT to reduce users' distress effectively. Therefore, this study identifies two research questions: (1) What factors significantly influence the user's psychological state in CBT with a virtual agent?; (2) How can virtual agents adapt to the user's psychological state? To address the first research question, an analysis of interactions with fixed questions showed that the number of questions for correcting thoughts alleviates users' distress. Based on the results and the methodology of CBT, we proposed selecting the number of questions based on real-time detection of psychological distress. To address the second research question, we conducted a comparative experiment between a condition in which the number of questions was adaptively selected based on psychological distress detection and a condition in which the number of questions was selected randomly. The results showed that distress after the experiment was significantly lower in the adapted number condition than in the random number condition. These results indicate the benefits of virtual agents adapting to the user's psychological state.