

## The Effects of Goal Setting and Feedback on Inhibitory Performance

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**Abstract :** Attention Deficit/Hyperactivity Disorder (ADHD) is a neurodevelopmental disorder characterized by inattention, hyperactivity, and impulsivity; symptoms often manifest during childhood. In children with ADHD, the development of inhibitory processes is impaired. Inhibitory control allows people to avoid processing unnecessary stimuli and to behave appropriately in various situations; thus, people with ADHD require interventions to improve inhibitory control. Positive or negative reinforcements (i.e., reward or punishment) help improve the performance of children with such difficulties. However, in order to optimize impact, reward and punishment must be presented immediately following the relevant behavior. In regular elementary school classrooms, such supports are uncommon; hence, an alternative practical intervention method is required. One potential intervention involves setting goals to keep children motivated to perform tasks. This study examined whether goal setting improved inhibitory performances, especially for children with severe ADHD-related symptoms. We also focused on giving feedback on children's task performances. We expected that giving children feedback would help them set reasonable goals and monitor their performance. Feedback can be especially effective for children with severe ADHD-related symptoms because they have difficulty monitoring their own performance, perceiving their errors, and correcting their behavior. Our prediction was that goal setting by itself would be effective for children with mild ADHD-related symptoms, and goal setting based on feedback would be effective for children with severe ADHD-related symptoms. Japanese elementary school children and their parents were the sample for this study. Children performed two kinds of go/no-go tasks, and parents completed a checklist about their children's ADHD symptoms, the ADHD Rating Scale-IV, and the Conners 3rd edition. The go/no-go task is a cognitive task to measure inhibitory performance. Children were asked to press a key on the keyboard when a particular symbol appeared on the screen (go stimulus) and to refrain from doing so when another symbol was displayed (no-go stimulus). Errors obtained in response to a no-go stimulus indicated inhibitory impairment. To examine the effect of goal-setting on inhibitory control, 37 children ( $M_{age} = 9.49 \pm 0.51$ ) were required to set a performance goal, and 34 children ( $M_{age} = 9.44 \pm 0.50$ ) were not. Further, to manipulate the presence of feedback, in one go/no-go task, no information about children's scores was provided; however, scores were revealed for the other type of go/no-go tasks. The results revealed a significant interaction between goal setting and feedback. However, three-way interaction between ADHD-related inattention, feedback, and goal setting was not significant. These results indicated that goal setting was effective for improving the performance of the go/no-go task only with feedback, regardless of ADHD severity. Furthermore, we found an interaction between ADHD-related inattention and feedback, indicating that informing inattentive children of their scores made them unexpectedly more impulsive. Taken together, giving feedback was, unexpectedly, too demanding for children with severe ADHD-related symptoms, but the combination of goal setting with feedback was effective for improving their inhibitory control. We discuss effective interventions for children with ADHD from the perspective of goal setting and feedback. This work was supported by the 14th Hakuho Research Grant for Child Education of the Hakuho Foundation.

**Keywords :** attention deficit disorder with hyperactivity, feedback, goal-setting, go/no-go task, inhibitory control

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