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Effect of Impulsivity and Cognitive Load on Performance Monitoring in Aggressive Behavior

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ABSTRACT
Effective performance monitoring depends on two: threat detection and response inhibition, which refers to the end or prevention of impulse motion responses. Impulsivity is closely related to response inhibition. However, the reason high-impulsive people in the response inhibition of aggressive behavior fail to perform control due to cognitive load are not clear. It is not clear how the cognitive load of task manipulation (external) and the execution load of the target task (the task itself) affects the reaction suppression of the impulse person's attack behavior. The reason high-impulsive people in the response inhibition of attack behavior fails to perform control due to cognitive load is not clear. To this end, this study intends to examine the effect of impulse and cognitive load on repelling attack behavior, and the role of threats.

Keywords: *aggressive behavior; performance monitoring; impulsivity; response inhibition*

1 INTRODUCTION

1.1 Basic Concept

1.1.1 Aggression

As the oldest violation of human beings, the aggressive behavior has a powerful negative impact on the whole society (Temcheff et al., 2011). Combined with the findings of Bushman (2001), Anderson (2002) and Berkowitz (1993), the aggression is defined as behavior or patterns of behavior that are intended to cause harm to another target individual. There are two main points, one, that the attacker clearly believes and realizes that his or her actions will cause harm to the attacker. Second, the attacker tries to escape this kind of injury.

1.1.2 Performance Monitoring

In recent years, the frequent happening of violence, wounding and medical injuries makes it important to prevent and contain aggressive behavior. Performance monitoring is a constant capacity to note responses to detect and correct errors and is a core item of cognitive control. It is an important executive role and one of the essential characteristics of human behavior (Baumeister, Heatherton, & Tice, 1995). Effective performance monitoring depends on two: threat detection (threat sensitivity) and response inhibition. Threat detection refers to sensitivity to threat assessment, opinion, and response, also known as threat sensitivity. Response inhibition refers to the capacity to stop or cancel plans, set up inappropriate responses, and automatically resolve impulses and habits (Fujita, 2011). The neural of behavioral inhibition includes the epidermal and the subcutaneous, mainly related to IFC, pre-SMA, ACC, frontal island, top lobe, STN, striatum and other brain regions and the connection between them (Ying, F. Mo, T.， Xu, X， et al., 2020).

1.1.2.1 Individual Adjustment Variables for Performance Monitoring

As an individual regulatory variable of performance monitoring, impulse is a multidimensional personality trait that includes cognitive defects and widespread misconduct, with little consideration of consequences and often adverse consequences. It is often associated with clinical populations and may also have a negative impact on the lives of healthy adults (e.g., Evenden, 1999; Eysenck and Eysenck, 1980; Fossati, Barratt, Acquarini, and Di Ceglie, 2002; Patton, Stanford, and Barratt, 1995). Barratt Impulse Scale (BIS-11， Patton et al., 1995) is one of the most commonly used psychometric tools for assessing trait impulsivity.

1.1.3 Working Memory

Researchers have focused intensively on the between working memory (WM) and impulsivity (Mei, Tian, Xue, and Li, 2017). Working memory refers to the cognitive of preserving and processing information at the same time (Baddeley, 2012). Reducing WM capacity leads to reduced response inhibition in subjects, and effective WM training can promote individual resonating (Bickel et al., 2011). The tasks of cognitive load include two. One-way can need different cognitive load sits through the task itself, such as bilingual hearing and emotional tasks (DLWA). Studies have studied the between trait impulsivity and cognitive control using attention-grabbing two-eared word tasks. (Leshem and Rotem, 2016). Another way to manage is to insert a working memory load task into the main task. For example, researchers examined the affects of cognitive load on inhibiting response in impulsive people. In the response inhibition task of increasing the working memory load, researchers directed the participants to complete the stop signal response time task while completing the digital string holding task (Hinson et al., 2003). In the dual working memory load task, a string of five numbers was presented on the screen and participants were asked to remember and recall the selected position of the string at a specific time. For example, a string of five digits is presented on the screen before the subject begins a resonating task, asking the subject is to keep the string in their memory, such as "Remember string 45209." These numbers produced randomly, but there are no repeated numbers. Increased cognitive load highlights the specificity of the association between impulse and inhibition (Weidacker, Whiteford, Boy, and Johnston, 2017).

1.2 Experimental Paradigm

In previous studies, researchers have used go/no-go tasks, stop signal tasks (SST), Stroop paradigms, and visual oddball tasks to explore response inhibition. On this basis, researchers combined conflict detection and response inhibition to build an adapted standard flanker task with a joint paradigm for set in stop-signal task stop signal tasks, including an Eriksen flanker task (equivalent to a go task) task and a no-go task. In the Eriksen flanker task, participants are asked to react to the center arrow, a group of five arrows (the right arrow presses the right hand,

and conversely). The surrounding four arrows are consistent or inconsistent with the arrows in the middle, when the surrounding arrows are the same as the arrow in the middle, and conversely. The subject may produce a response error. The experiment included 33.3 percent consistency and 50 percent inconsistent tests. The remaining 16.6 percent of the trials were embedded in a no-go test, a variant of a stop signal paradigm (Band et al., 2003). In these trials, there is a delay time in the middle, which is randomly changed, and when the central green arrow changes to red, the participant is required to react in a dampened response to these tests. This following behavior was adapted to this delayed time by the stair tracking algorithm (Band and van Boxtel, 1999). The stop signal delay is initially set to 140ms. The stop signal delay increased by 10ms (making it more difficult to suppress) after successful suppression, and 10ms (simplified inhibition) after the inhibition failure. The master program is applied to produce a 50% suppression rate. Besides the behavioral and cognitive neural signs mentioned in experimental paradigm, several other Electroencephalogram signs are involved, including N2, P2, and P3.

To sum up, the cognitive load of task manipulation (external) and the execution load of the target task (the task itself) are not clear in the response inhibition of the impulse person's attack behavior. The reason high-impulsive people in the response inhibition of attack behavior fails to perform control due to cognitive load is not clear.

To this end, this study intends to insert the working memory load task in the adapted flanker-stop-signal joint paradigm to examine the effect of impulse and cognitive load on the resonant response of attack behavior, and to examine the role of threats.

This experimental hypothesis:
H1: Impulsiveness has no significant effect on resonance behaviorally.

H2: Cognitive load has a significant effect on resonant reaction suppression, and the reticence capacity under cognitive load conditions is worse than the resonant capacity of response under no cognitive load.

H3: The threat type has a significant effect on resonant response inhibition. And the reaction inhibition capacity is higher in threat than in neutral.

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