

# The Relationship between Cognitive Inhibition and Extraversion/Introversion

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## Abstract

The following experiment was concerned with looking at cognitive inhibition in extraverts and introverts. This was done by examining undergraduate students at Colorado State University, who were put through three different inhibition tasks that each measured their ability to perform a higher cognitive function. This data was then compared to their results from the BAS/BIS (Gray, 1987) to determine if there was a correlation between people's ability to inhibit a reaction and their personality (introversion or extraversion).

## Introduction

■ Cognitive inhibition is the process of suppressing irrelevant information out of working memory, while attending to the current task (Harnishfeger, 1995). Most research about inhibition has been completed by developmental psychologists in order to understand the way the mind develops, and how inhibition improves over time (Harnishfeger & Bjorklund, 1993).

■ Dempster (1991) found that inhibition is localized in the frontal lobes, which are important for a number of cognitive tasks, including executive functioning and are thought to play a large role in personality variables.

■ Inhibition can be tested using a variety of different tasks including the Tower of Hanoi (TOH). This task is essential in identifying the role that working memory plays in inhibition (Zook, Davalos, DeLosh, & Davis, 2004). The task requires participants to plan and monitor and in some cases inhibit certain moves. Welsh, Satterlee-Cartmell and Stine (1999), examined the TOH and concluded that, when performing the TOH task other cognitive processes, including working memory, pair with inhibition to determine how successful a participant is in completing the task (Welsh et al., 1999).

■ Specifically for this study, we sought to examine the role of other cognitive processes in addition to personality, specifically related to introversion and extraversion, to see how these variables affect cognitive inhibition.

■ Gray (1987) developed a test to assess the degree to which people are more extraverted, or introverted, the BIS/BAS. The Behavioral Inhibition System (BIS) categorizes a person's ability to regulate actions such as, avoidance behavior, compared to the Behavioral Approach system (BAS) which relates to positive motivation and approach (Smits & Boeck, 2006).

■ So far there has been very limited research that focuses on the relationship between the BIS/BAS and cognitive inhibition. The exception is Eysenck's (1966) finding that extraverts are worse at inhibition tasks than introverts. These findings are explained by Gray (1970), he proposes that a possible explanation is in the amount of arousal. Extraverts tend to have a higher threshold, meaning it takes a lot to get them aroused, compared to introverts, who have a relatively low arousal threshold (Gray, 1970). A possible explanation for Eysenck (1966) is the evidence that introverts are more aware of slight subtle changes, which could help explain their ability to inhibit responses (Gray, 1970).

■ The recent study sought to further explore this relationship between cognitive inhibition and personality using a greater variety of cognitive inhibition tests that are thought to measure multiple facets of inhibition.

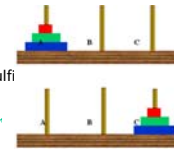
## Method

### Participants

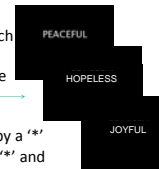
- 87 undergraduate students enrolled in Introductory Psychology course participated to fulfill a class requirement
- Apparatus: A standard PC

### Procedure

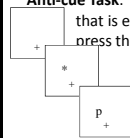
**Tower of Hanoi:** an inhibition task that asks participants to move rings from a starting position to the appropriate place, in the correct order on another peg.



**Affective Go/ No Go:** Participants participated in 10 blocks with 18 words presented for each block, with positive, negative, and neutral words. Participants were required to press a button as soon as they had seen a target word, which were either positive words or negative words. Participants must inhibit pressing the button when the word is a distracter.

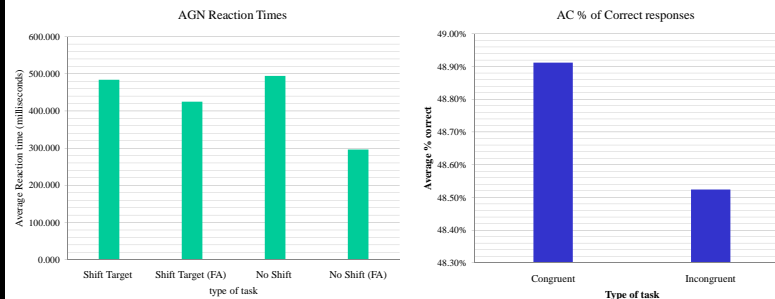


**Anti-cue Task:** 'p' or 'q' is presented on either the left or right side of the screen Preceded by a '\*' that is either congruent or incongruent with the placement of the letter. Ignore the '\*' and press the key that matches with the placement of the letter (q=left; p=right).



## Results

- A Pearson correlation was run on all measures of the inhibition tasks as well as the BIS/BAS to determine significance. Several tasks were shown to be significant measures with personality:
  - AGN (Shift False Alarm Reaction Time, No Shift Reaction time, and No Shift False Alarm Reaction time) is related to BAS (fun seeking)  $r = .82, p < .05, r = -.57, p < .05, r = .73, p < .05$ .
- Other tasks were shown to be significantly correlated with other tasks:
  - AGN (average shift False Alarm Reaction Time) is related with TOH (Sum of onset think time)  $r = .91, p < .05$ .
  - AGN (No Shift Reaction Time) is related with TOH (total number of errors made)  $r = .80, p < .05$ .
  - AGN (No Shift Reaction Time) is related with AC (Reaction time of Incongruent to Congruent)  $r = .51, p < .05$ .
  - AC (Number of Moves) is related to AGN (No Shift False Alarm Reaction time)  $r = -.83, p < .05$ .



## Correlates of Personality with AGN tasks

Shift FA Reaction Time	No Shift FA Reaction Time	No Shift Reaction Time
0.82	0.57	0.73

## Discussion

• The four dimensions of the BIS (Behavioral Inhibition System) BAS (Behavioral Approach System) include three dimensions for BAS which are, drive, fun seeking and adventure, compared to inhibition for the BIS.

• Part of the proposed hypothesis was supported in the results for the current study, that concluded that one specific measure of the BAS (fun seeking) was significantly correlated with the AGN.

• This particular measure of the AGN was the average reaction time of false alarms on shifts as well as no shift blocks, as well as the overall reaction time for the No Shift blocks when the target was correctly identified.

• The strong positive relationship between these two measures, indicate that there is less inhibition in these tasks, resulting in a high correlation between fun seeking and a lack of inhibition.

• And the strong negative correlation indicates that there is some strong correlation of the BAS with inhibition as well, indicating a heightened awareness of inhibiting a response.

## References

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