

# Impulsivity for Intravenous Cocaine or Food Measured by a Go/No-go task in Adolescent and Adult Rats

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## Introduction

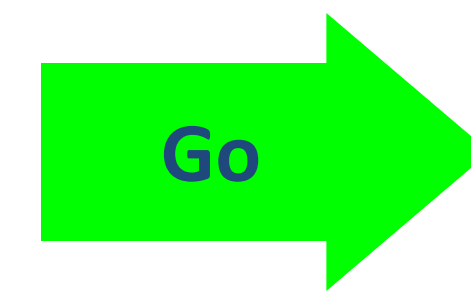
- Drug addiction is considered a disease [1] and impulsivity contributes to addiction
- Age is an important factor for vulnerability to drug abuse shown by preclinical [2] and clinical studies [5]
- Impulsivity is a defining characteristic of adolescence, and is another important factor in vulnerability to drug abuse in animals [2] and humans [3][4][6]
- Impulsivity may lead to drug abuse and drug exposure may exacerbate impulsivity [4]
- Impulsivity in this study is defined as “impaired response inhibition”

## Hypothesis

- Adolescent rats will earn more cocaine infusions and have more Go and No-go responses than adults
- Adolescent rats will have more No-go responses under the food condition than adults

## Methods

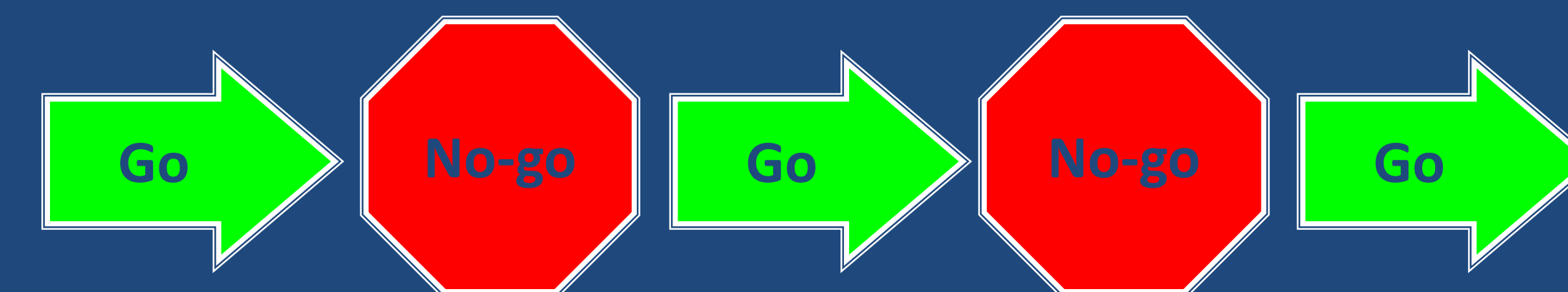
- 23 adolescent, 15 adult Wistar rats
- Separate cocaine and food groups
- Doses: 0.4 mg/kg cocaine and 45 mg pellets
- Three 45 min Go periods alternating with two 15 min No-Go periods



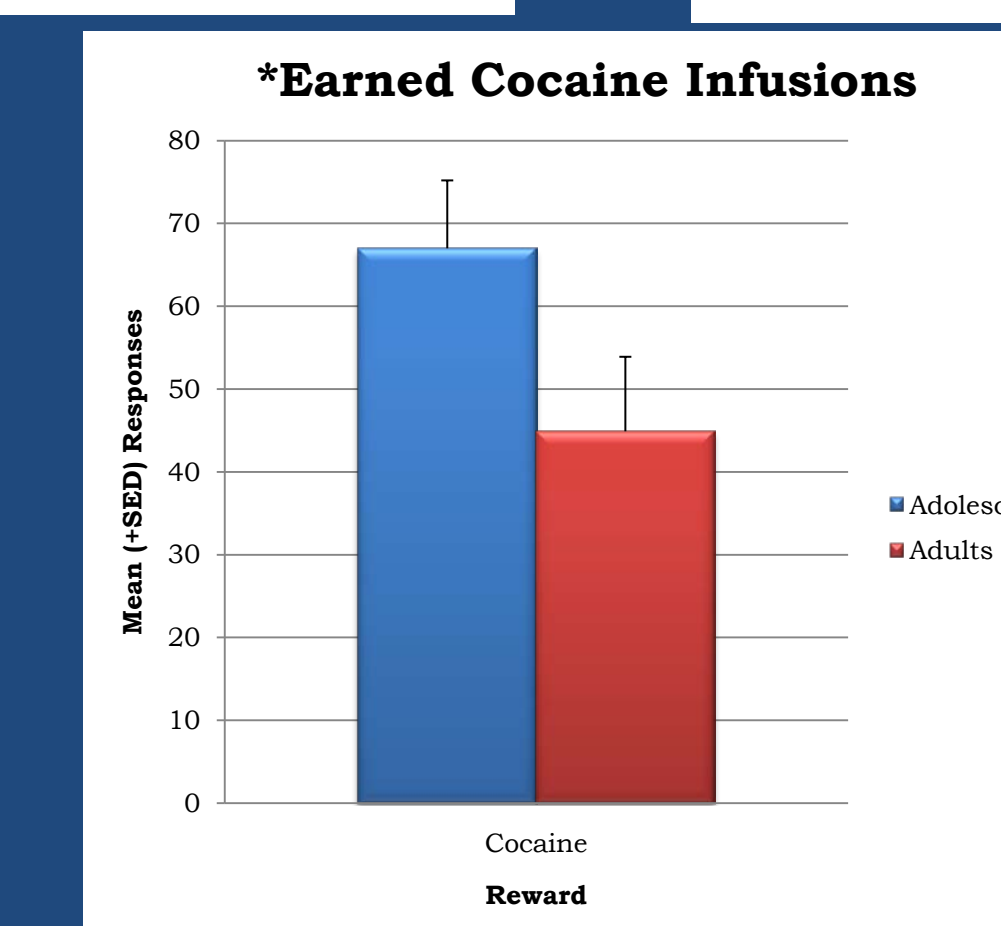
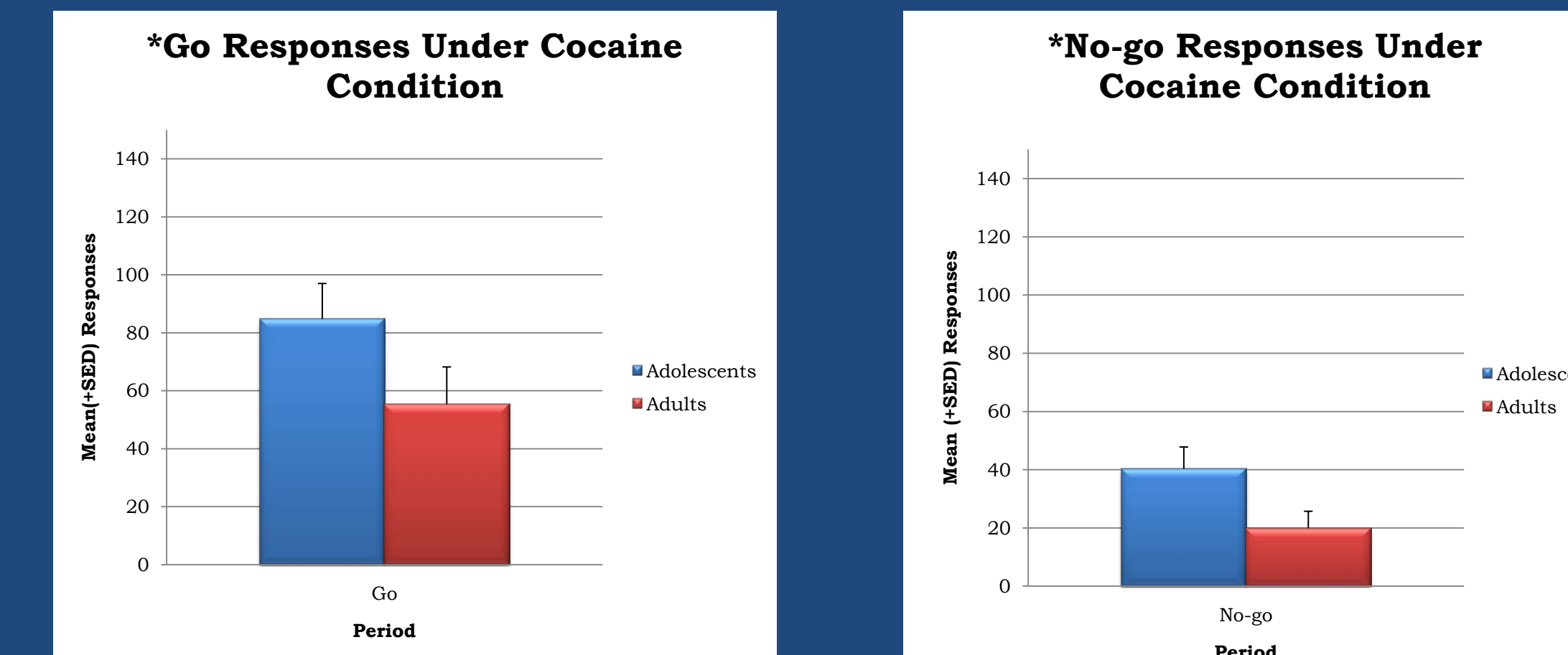
- Illuminated house light
- Response on drug-paired lever = cocaine infusion and stimulus lights



- Green No-go light turns on
- Responses measure impaired inhibition or impulsivity
- Response = no cocaine infusion or stimulus lights

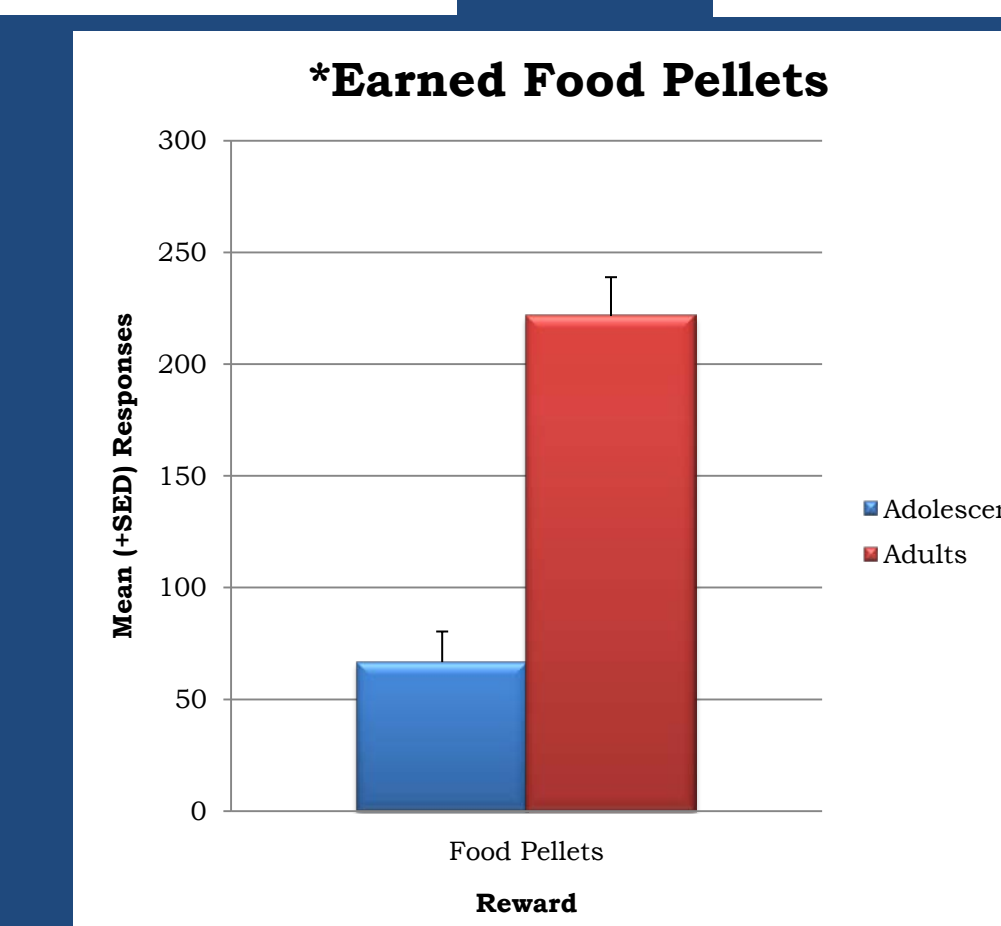
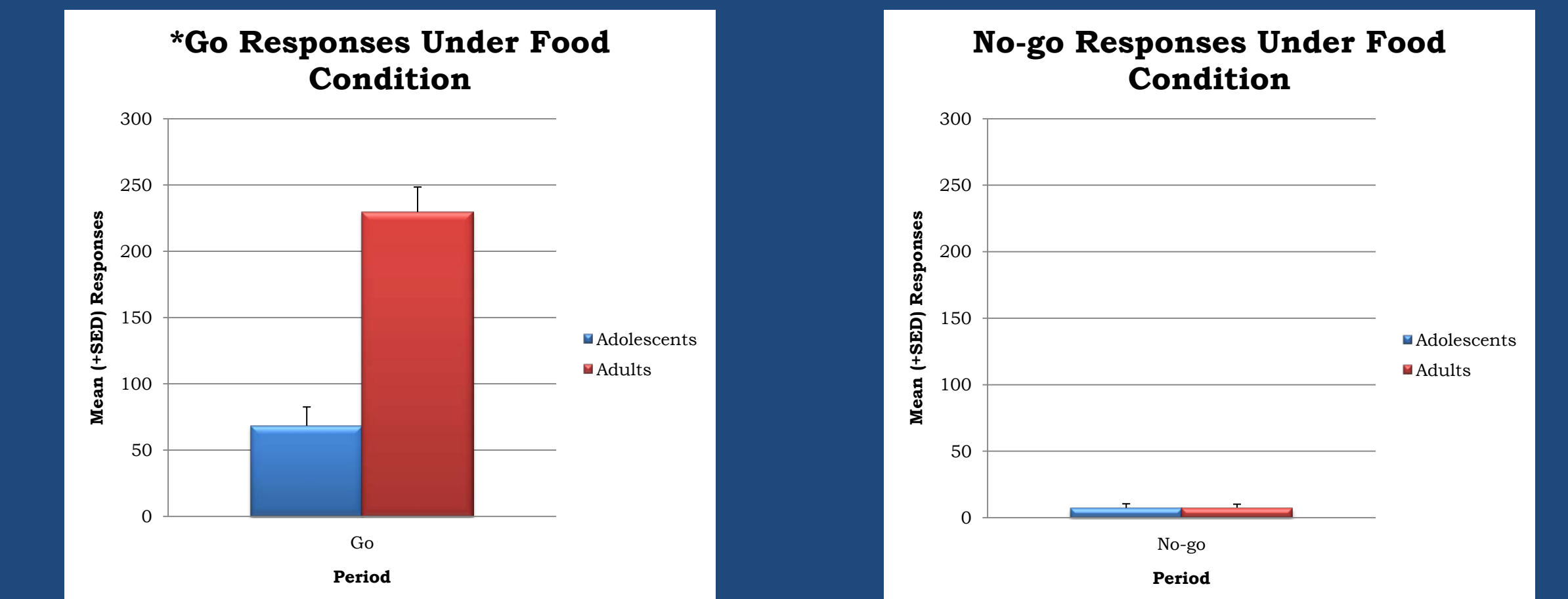


Adolescents had more cocaine infusions, Go, and No-go responses for cocaine than adults



Cocaine  
 \* = significant ( $P < 0.05$ )  
 Infusions:  $F_{(1,47)} = 8.50$ ,  $P < 0.01$   
 Go:  $F_{(1,47)} = 6.17$ ,  $P < 0.05$   
 No-go:  $F_{(1,47)} = 7.14$ ,  $P < 0.05$

Adults had more Go and No-go responses for food and earned more food pellets than adolescents



Food  
 \* = significant ( $P < 0.05$ )  
 Pellets:  $F_{(1,28)} = 36.46$ ,  $P < 0.0001$   
 Go:  $F_{(1,28)} = 32.24$ ,  $P < 0.0001$

## Discussion

- Age is a major factor determining cocaine self-administration and impulsivity
- Cocaine reinforcement influenced impulsive drug-seeking behavior more in adolescents than adults
- Adolescents may be more vulnerable to cocaine use than adults as a result of elevated levels of impulsivity
- Impulsivity may be one of the factors that accounts for high initiation rates of drug use in adolescence
- Since No-go responses for food were very low and not significant in different adolescents and adults, the Go/No-go task may not be a sensitive indicator of impulsivity using food reward

## References

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