The role of serotonin in learning and decision-making: a behavioural study*

Published: 15-07-2024
Last updated: 18-01-2025

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Ethical review	-
Status	Pending
Health condition type	Other condition
Study type	Observational invasive

Summary

ID

NL-OMON57229

Source
ToetsingOnline

Brief title
Serotonin and decision-making

Condition

- Other condition

Synonym
n/a

Health condition

neurowetenchappelijk onderzoek (fundamenteel onderzoek)

Research involving
Human

Sponsors and support

Primary sponsor: Radboud Universiteit Nijmegen
Source(s) of monetary or material Support: NWO VIDI beurs

Intervention

Keyword: decision-making, learning, resource investment, serotonin

Outcome measures

Primary outcome

Behavioural performance on cognitive tasks

Secondary outcome

Subjective measurements (e.g., self-report questionnaires, visual analogue

scales)

Study description

Background summary

Meta-decision making, or 'deciding how to decide', involves arbitrating how much time and effort (both physical and cognitive) to invest into making a decision. Recently, it has been suggested that these meta-decisions could be governed by assessing the costs and potential benefits associated with each behavioural strategy. This trade-off between costs and benefits would incorporate readily internal and external variables, like availability of time and other resources, reward history, motivation and confidence, to name a few.

A potential neural implementation of these variables is through neuromodulators known to be involved in value-based decision-making: dopamine and serotonin. The influence of serotonin appears to be particularly complex, with findings implicating serotonin in aversive inhibition, waiting and patience, heuristic responding, effort and information cost. In this study, we aim to reconcile these different computations attributed to serotonin and elucidate serotonin*s role in decision-making, by modulating serotonin using the selective serotonin reuptake inhibitor escitalopram.

It is important to clarify the mechanistic basis of the role of serotonin in these cognitive processes for a better understanding of human brain

functioning.

Study objective

The purpose of this study is to determine and clarify the role of serotonin in cognitive processes that support decision-making. The neural processes being studied are reward learning, patience, aversive inhibition, investing cognitive effort and other resources, and computational measures of the controllability of the environment. Serotonin has been implicated in all of these processes, but its precise role in them is not clear in humans.

Study design

We will employ a double-blind placebo-controlled design, using with a between-subject approach, and two measurements per participant for a within-subject component. All participants will participate in one screening session and two testing sessions where behavioural tasks will be performed on a computer. The two testing sessions will take place at the following points during the study: on the first testing day before first oral intake of escitalopram/placebo, and on the second testing day following a 2-3 week course of escitalopram/placebo. The purpose of this manipulation is to increase serotonin levels in the brain in one arm of the study population, by inhibiting serotonin reuptake. Similar pharmacological studies, although with other pharmacological agents, are regularly conducted within our research group. Additionally, this dose of escitalopram has been used frequently in studies where a similar (healthy) population was studied, without the occurrence of serious side effects.

Study burden and risks

Subjects will participate in three research sessions: an intake session (3 hours), and two behavioural sessions (5 hrs each). In addition, subjects will complete a set of online questionnaires at home (1 hour), and will keep a daily diary to record side effects, via a smartphone application (2 minutes per day). The intake session will consist of a medical and psychiatric screening interview, neuropsychological testing, and training for the tasks during the behavioural sessions. Between the first and second testing session, subjects will take an oral dose of escitalopram or placebo daily for a period of 14 to 21 days, depending on their availability for the second testing session. The first 5 days of the intervention, participants will take one capsule (dose escitalopram: 10mg). The next 9-16 days, participants will take 2 capsules (dose escitalopram: 20mg). By taking a lower dose the first few days, the occurrence and intensity of side-effects will decrease. During this period, subjects must adhere to some simple restrictions regarding medication, alcohol, and drug use. During the behavioural sessions, subjects are asked to complete some questionnaires and perform tasks related to decision-making. Escitalopram

can be safely administered in healthy individuals without any relevant risk of serious serious side effects, and is approved for clinical use in the Netherlands.

Contacts

Public
Radboud Universiteit Nijmegen

Thomas van Aquinostraat 4
Nijmegen 6525 GD
NL
Scientific
Radboud Universiteit Nijmegen

Thomas van Aquinostraat 4
Nijmegen 6525 GD
NL

Trial sites

Listed location countries

Netherlands

Eligibility criteria

Age
Adults (18-64 years)

Inclusion criteria

Healthy volunteer between 18-40 years of age

Exclusion criteria

Neurospychiatric disorders, history of drug abuse (See section 4.3 in Research

protocol C1 for full list)

Study design

Design

Study type:	Observational invasive
Intervention model:	Parallel
Allocation:	Randomized controlled trial
Masking:	Double blinded (masking used)
Control:	Placebo
Primary purpose:	Other

Recruitment

NL

Recruitment status:	Pending
Start date (anticipated):	01-09-2024
Enrollment:	90
Type:	Anticipated

Ethics review

Not available

Study registrations

Followed up by the following (possibly more current) registration

No registrations found.

Other (possibly less up-to-date) registrations in this register

No registrations found.

In other registers

Register	ID
CCMO	NL85857.091.23