# A Systematic Review: Mirror Neurons & Schizophrenia

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## Background & Purpose

- Schizophrenia is a mental disorder marked by episodes of psychosis, affecting 24 million globally, 3.7 million in the US.
- Symptoms of the disorder are categorized into surpluses/depletions of mental experience.
- Purpose: to delve into the components of the effects of schizophrenia and discuss new treatment plans.

## Operational Definitions

**Mirror Neuron** - a brain cell that reacts both when a particular action is performed and when it is only observed

**Mirror Neuron System (MNS)** - group of specialized neurons that "mirror" the actions and behavior of others

**Schizophrenia** - mental illness that affects how a person thinks, feels, and behaves

- **Positive Symptoms** - hallucinations, delusions, illogical changes in behavior, hyperactivity
- **Negative Symptoms** - social withdrawal, alogia, affective flattening, motivational impairment
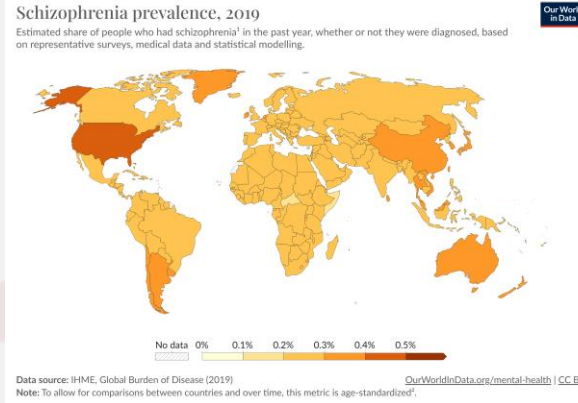
## Research Objective

What is the role of the Mirror Neuron System in schizophrenic patients with negative symptoms and how can this information be used to determine social interaction based-treatment plans for them ?

## Methodology

12 studies from the National Institute of Health, and PubMed were examined. Inclusion criteria consisted of publication between 2010-2023, credibility, and study design. Exclusion criteria were studies that focused on cases of autism or mental health disorders.

## Schizophrenia

- WHO: "Only 31% of people with psychosis receive specialist mental health care."



Schizophrenia prevalence, 2019
Estimated share of people who had schizophrenia[1] in the past year, whether or not they were diagnosed, based on representative surveys, medical data and statistical modelling.

No data    0%    0.1%    0.2%    0.3%    0.4%    0.5%

Data source: IHME, Global Burden of Disease (2019)
Note: To allow for comparisons between countries and over time, this metric is age-standardized[2].
OurWorldInData.org/mental-health | CC BY
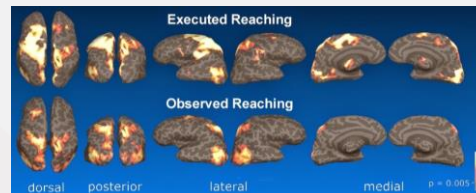
## Mirror Neurons

In modern day, mirror neurons are considered a "cornerstone" of human social skills.

- This explains the positive and negative symptoms found in schizophrenic patients.

Scientists have also pointed out that mirror neurons are most active when there is a specific goal in mind.

- Ex: reaching for an object

Since symptoms of schizophrenia originate from inactive MNSs, a social-based rehabilitation model may prove to be the most effective.



## Results & Key Findings

Out of the 12 studies reviewed, 10 of them established a link between mirror neurons and schizophrenic manifestations.

- Patients who experienced "flat" or "negative" symptoms showed decreased activity when compared to their neurotypical counterparts.
- This decreased activity manifests as the negative symptoms, most notably being emotional and verbal withdrawal.
- These findings give way to a new horizon of treatments for schizophrenic patients in the psycho-social domain.

Additionally, there have been links to overactive MNSs when it comes to patients on the autism spectrum.

## The Clubhouse Model

The goal of such rehabilitation centers is to have "community members support one another" (NIH).

The core principles of the model are:

1. Emphasis on personal strengths
2. Restorative Relations
3. Right to membership
4. Decision Autonomy
5. Right to be needed

The clubhouse model operates on the concept of mirror neurons, training them through the idea of learning by observation.

## References