# Science or Sci-Fi? A Database Analyzing the Science behind the Screen

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## Background

**Objective:** Create a database that documents the validity of scientific claims made in popular films to enhance scientific literacy for students, educators, and the general public.

**Scientific Literacy:** The ability to understand basic scientific concepts, evaluate information, and make informed decisions (Kontkanen et al., 2024).

**Addressing the Gaps:**

1. Despite Canada's top ranking in science literacy among Organization for Economic Cooperation and Development (OECD) countries, only 42% of Canadians are scientifically literate, highlighting the need for accessible and accurate educational resources (Gopichandran, 2015).
2. Unlike traditional learning tools like textbooks, which provide jargon-heavy explanations, films generate excitement and simplify concepts through compelling storytelling (Arroio, 2010).

## Methodology

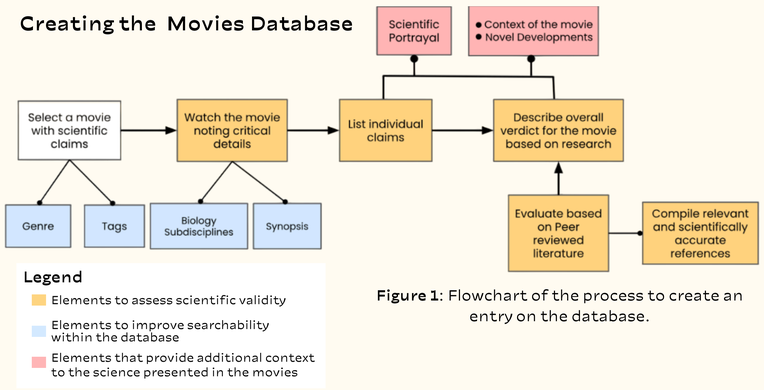


**Figure 1**: Flowchart of the process to create an entry on the database.

- Repository of ~130 movies as of March 2025, tagged using themes of film genres and biology subdisciplines.
- Each entry includes a synopsis and key scientific claims that are systematically assessed for accuracy thorough the review of relevant scientific literature.
- Only primary, peer-reviewed sources were consulted in our research process to ensure accuracy and reliability of the verdicts.
  - Each film is then assigned a verdict:
    > Accepted
    > Conditionally accepted
    > Tentatively accepted
    > Rejected

## BIOLOGY IN THE MOVIES DATABASE

Check out our database here!

### The Giver

Browse the movie on the websites: TMDB IMDb

MOVIE DESCRIPTION
In the future, a perfect community lives without negative emotions like pain, suffering, and choice. Only the "Giver" can feel the emotions of the real world. Only the Giver can remember the past, so when Jonas is chosen as the new "Receiver of Memory", he learns about what living really feels like.

SCIENTIFIC CLAIM

**Claim 1:**
Through a set of rules set by the "Elders", conflict and emotions can be eliminated.

**Claim 2:**
The Giver can hold all of the memories and emotions of the past and pass them through touch.

SCIENTIFIC PORTRAYAL: Neutral

The movie shows a future where negative emotions have been eliminated via a set of rules and genetic testing. The removal of all emotions raises ethical concerns because it takes away their ability to choose what and how to feel. However, the movie also demonstrates that this control is beneficial because it allows for the citizens to live without conflict and pain. Overall, the film suggests that there are benefits and consequences to protecting people from pain, and that humans should be given the choice whether or not they want to feel deeply.

Our Verdict: Reject

**Claim 1: Reject**
At the beginning, Jonas believes that their community lives without fear, pain, and conflict because of a set of rules conditioned into them from birth. However, when he starts his training, he learns that the Elders are giving the community injections that block all emotions. While this idea is false, the ability for different medications to remove emotion is true. This notion is called emotional blunting, or the inability to feel any emotions (Christensen et al., 2022). This can be common in people with psychiatric disorders like depression, PTSD, and schizophrenia (Christensen et al., 2022). Additionally, medications called selective serotonin reuptake inhibitors (SSRIs) like those used to treat depression can also cause this phenomena (Marazziti et al., 2019).

**Claim 2: Reject**
In the film, all of the members of the community but Jonas and the Giver cannot remember how the people of the past lived. This is not possible because there are limits to how much the brain can store, and humans cannot transfer memories to others via touch. While there is no specific research about how much information the human brain can hold, many believe that there is a physical capacity for how many memories the brain can hold at any given time (Cowan, 2010). It has been found that the brain of an adolescent can only hold 3-5 items at a time so that they can still process new information (Cowan, 2010). Therefore, the idea that the Receiver of Memory can store and recall all of those memories at any given time cannot be accepted.

**Figure 2**: Database entry of 'The Giver' from prototype of web source developed in collaboration with the Digital Scholarship Unit and the UTSC library.

## Applications

### 1. Public Outreach Tool – Improve Scientific Literacy!

- The diverse selection of films in the database enables individuals from all backgrounds to explore a wide range of scientific topics.
- The public can benefit from the database through movie screenings, discussions, and outreach events.
- Empowers the public to contribute to the conversation by suggesting movies, questioning verdicts, or challenge the claims.

*"How effective do you think a movie screening could be as a public outreach activity to improve scientific literacy?"*

- 86% of participants felt that our pilot movie screening was effective/very effective in improving scientific literacy!


**Figure 3**: Poster from our Feb 2025 UTSC Movie Screening pilot

### Additional Applications

**2. Teaching Resource/Classroom Aid:**

- Curricular and assignment support for educators.
- Increase student engagement through creative and real-world contexts.
- Improve the comprehension of complex concepts through cinematic depictions and storytelling.

**3. Student-as-Partners Research Tool:**

- Hone critical thinking skills as students create their own entries.
- Immerses students in the research process, deepening their understanding of research methodology and emerging scientific developments.
- Encourage students to actively contribute to advancing science literacy and engage with the public.

## Results

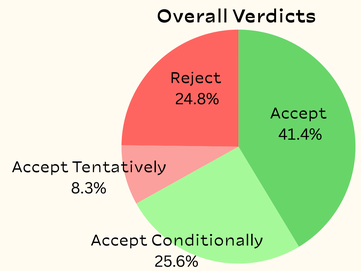


**Figure 3**: Overall verdict distribution within database thus far, n= 133.

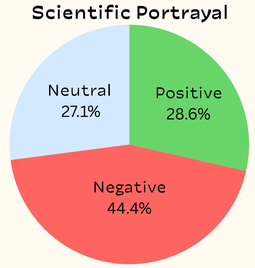


**Figure 4**: Scientific portrayal distribution within database thus far, n= 133.

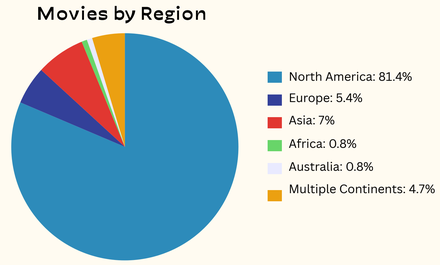


**Figure 5**: Overall continental distribution of movies within database thus far, n= 133.

**Future Directions:**

- Launch database as a public facing website.
- Create a user friendly interface to allow the public to challenge our verdicts and/or suggest movies.
- Expand and diversify the number of entries within the database.
- Offer curricular support to educators using the database in teaching.

## References