

## Media Representations of Scientific Uncertainty during the COVID-19 outbreak in Israel

### Introduction

During the COVID-19 pandemic, an evolving scientific issue became a Digital news became a prime learning platform. This study explored the ways in which scientific uncertainty was represented in the digital news.

Scientific information about COVID-19 is characterized by uncertainty. Gustafson and Rice (2020) identified four types of scientific uncertainty: (1) Deficit uncertainty, which emphasizes a known gap in knowledge. (2) Technical uncertainty, which includes model approximations, statistical assumptions, and ranges of probabilities. (3) Consensus uncertainty, which refers to disagreements among experts or others, and (4) Scientific Uncertainty, which is a part of the nature of science - the possibility that research will develop, and understanding that the claims will change. Uncertainty in science affects the audience's decision-making (Hendriks & Jucks, 2020). Understanding scientific uncertainty differs from knowing scientific facts and is not always emphasized in science education (Kirch, 2012).

### Research questions

RQ1: In what ways was scientific uncertainty represented and framed in the Israeli media during the COVID-19 pandemic?

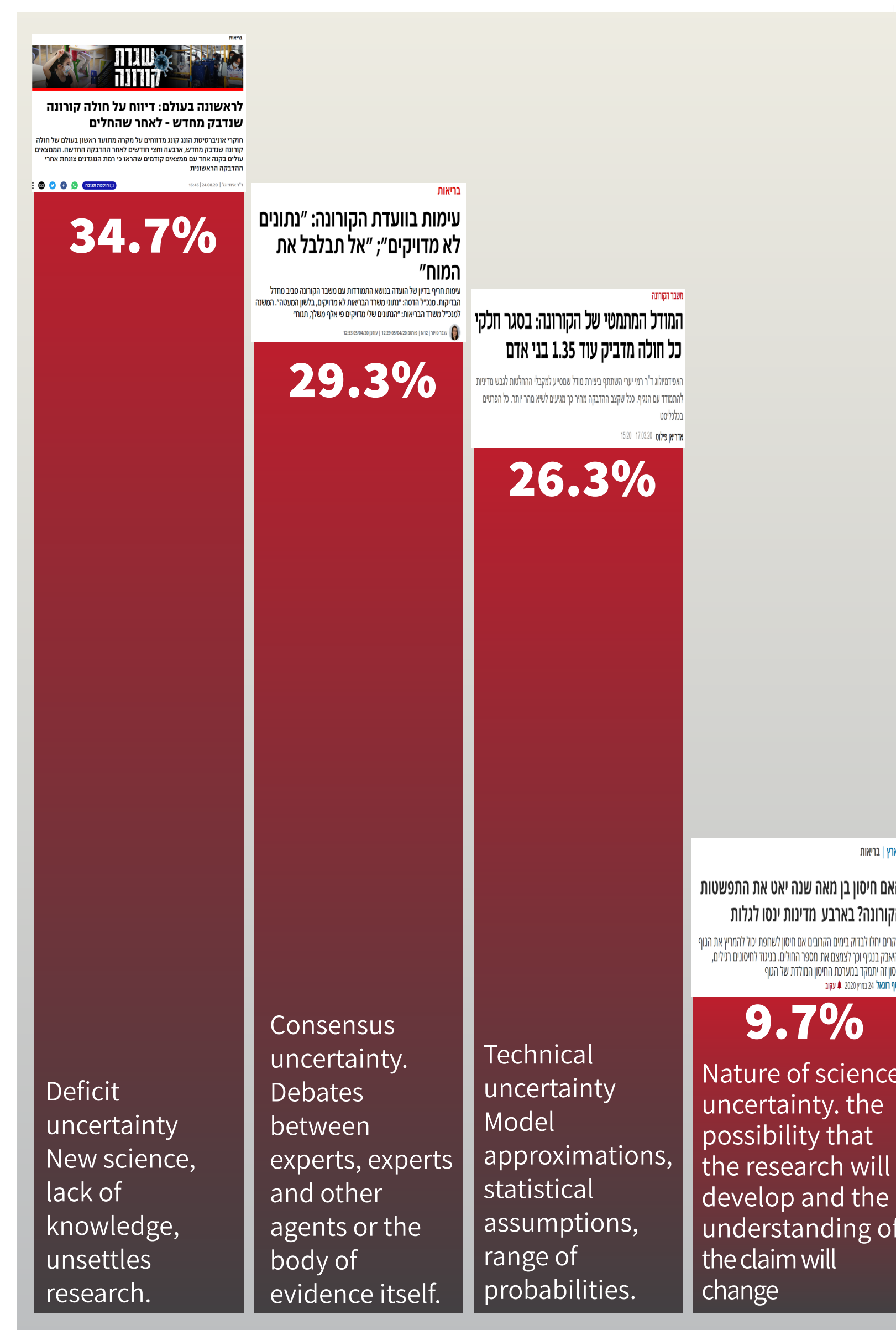
RQ2: What are the goals that drive scientists to communicate in times of scientific uncertainty, and what views do they have concerning scientific uncertainty and its communication with the lay public?

### Methods

Content analysis was conducted on 586 articles from Israeli general and Haredi news outlets. The articles dated from the first six months of the pandemic. They were selected according to the following criteria: (1) items concerning COVID-19, (2) with a scientist as a writer or interviewer, who is cited or mentioned, and (3) referring to uncertainty.

Additionally, we conducted 10 semi-structured interviews with scientists who appeared in the media about issues of scientific uncertainty.

Figure 1. Representations of scientific uncertainty in news articles from popular news outlets



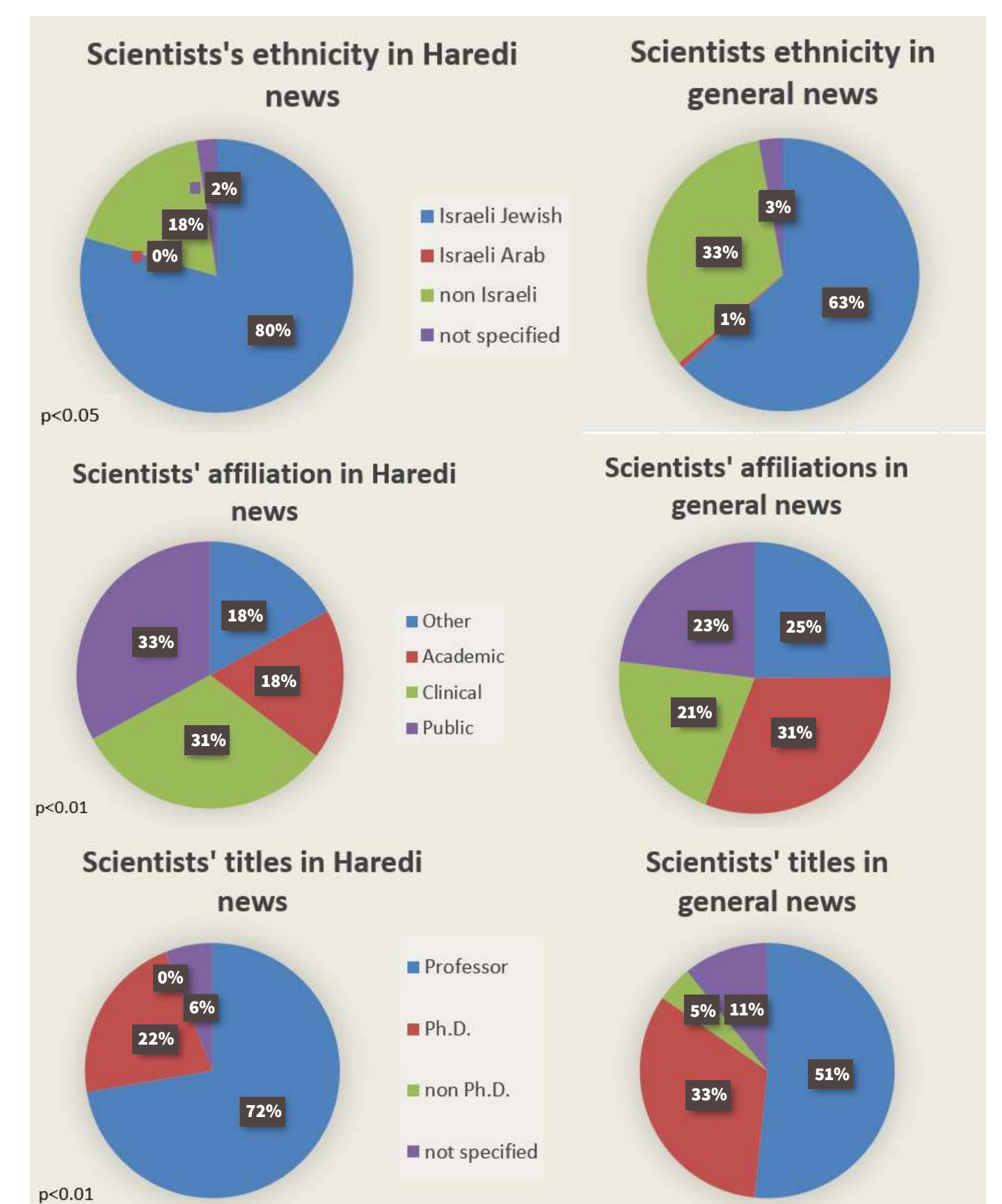
### Results

All four types of scientific uncertainty were present in the media (Fig.1).

General and Haredi news outlets showed similar distributions of uncertainty type and framing. Significant differences were found in terms of certain characteristics of the scientists appearing in the articles in terms of ethnicity, title, and affiliation. In the Haredi news there were more representations of professors than other titles, more scientists were clinically affiliated and more were Israeli Jews (Fig.2). The scientists' fields of expertise and gender did not differ significantly (p>0.05) between general and Haredi news outlets.

In terms of the scientists' views on scientific uncertainty, the scientists addressed conflicts, which is one type of uncertainty as non-scientific or not purely scientific if it was outside the boundaries of anticipated scientific inquiry, or their own scientific field of expertise discipline, or the issue was socio-scientific or political (Table.1).

Figure 2. Differences between Haredi and general news



### Discussion

Understanding scientific uncertainty is part of scientific literacy (National Academies of Sciences, Engineering, 2016). Misunderstanding can cause distrust in science (Barzilai & Chinn, 2020) or reactions that would otherwise be avoided, such as delaying decisions or misunderstanding the message (Lasser et al., 2020; Olsen et al., 2020).

We argue that scientific uncertainty should be explained in its context on digital information platforms. Conflicts, the scientific explanations behind them and the disciplines involved should also be explained.

Table 1. Scientists' quotes on scientific conflict as a form of uncertainty

#### The conflict is not scientific

It does not meet the criteria for scientific inquiry

Prof. Assaf

"There is [another scientist] ... he doesn't understand what is going on, it's not the model. He doesn't understand the mathematics here."

#### The conflict is not scientific

It is not the expected discipline

Prof. Neta

"Debate is part of science... during the coronacirus things became extreme, when people didn't pay attention at all to from what discipline you are coming from and what you are reacting on"

#### The conflict is not scientific

It is socio-scientific or political

Dr. Alon

"I think it should be called politics. It is not like there was a debate among scientists regarding the hidden assumptions of the models. No, the models are quite simple. The debate was about priorities"