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## Using Data Science to Predict How Rituals Will Evolve

*Orit Hazzan and Avital Binah-Pollak consider how the data science perspective helped to predict the transformation of Israel's 2023 social protest.*



**Orit Hazzan and Avital Binah-Pollak**  
**The Link between Rituals and Data Science**

<https://bit.ly/49yhvPI>

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Think about your most personal ritualistic event—walking your dog, grocery shopping, or a weekly meet-up with your friends. Most likely it takes place in the same place, close to home, with the same people, and at a certain frequency. Rituals occur also on the social level; for example, Sunday Mass, birthday parties, and sports competitions.

Ritualistic events are characterized by two dimensions: continuity and repetition, and emotional engagement. In this blog, we discuss the links between rituals and data science, arguing that thanks to these two characteristics, machine-learning algorithms can mod-

el rituals relatively easily. If and when needed, this model can then predict how a given ritual will continue in case an unexpected situation halts its ritualistic pattern.

We illustrate our claim using the case of the Israeli 2023 social protest, which had taken place for nine months,

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from January 2023 until October 7, 2023, when the State of Israel experienced its worst terror attack since its establishment in 1948, and reality there changed dramatically. That Saturday night, October 7, was supposed to be the 40<sup>th</sup> week of the social protest. Due to the extreme events of that morning and the war that followed, the demonstrations were called off and have not been renewed at the same volume and in the same ways since. As it turns out, in the new Israeli reality, the ritualistic characteristics of the protest did not stop existing; rather, the protest transformed into a new ritual that was manifested by a large civic social movement, maintaining the two ritualist characteristics mentioned here.

In this blog, we argue, therefore, that the ritualistic character of the protest does not only explain its success but also enables, from a data science perspective, to predict the new form it took. The adoption of the data science perspective to explain the new form of the protest makes sense considering the properties of rituals and machine-

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learning algorithms. As a ritual, the protest exhibits a pattern of behavior, which is expressed by a vast amount of similar data. The machine-learning algorithm identifies (relatively easily thanks to the repetitive nature of the ritual) the critical features and patterns of that ritual and constructs a model that predicts new instances of the ritual that were not seen before.

### Data Collection for Protest Characterization

According to the anthropological tradition, ritualistic behavior has two dimensions: the continuity of the act, and the symbols that hold meaning for the participants and lead to their emotional engagement.<sup>a</sup> For scholars seeking to explain the persistence of protest, the task is, therefore, to characterize the continuity of the action and to trace the meaning-making processes in the protest events themselves.

Thus, as civilians as well as scientists, our repeated participation in the protests enabled us to systematically and continuously observe the events and document them. Based on our insights, we designed a questionnaire (in

Hebrew) that was distributed through various relevant WhatsApp groups in Israel and abroad, where demonstrations in support of Israel's democracy also took place. The questionnaire addressed the habits of protest participants and included both closed- and open-ended questions. The closed-ended questions referred to places, times, and frequencies, and helped characterize the respondents and the repetitive characteristics of the ritual. The open-ended questions addressed personal behaviors and feelings. We received 391 responses.

It seems that the respondents more or less represent the protester population in terms of age (see the table here), gender, and protest location. The gender distribution among respondents was 59.4% females, 39.8% males, and 0.8% others. Of the locations most frequently listed by the respondents, we mention the three largest cities in Israel: Tel Aviv (44%), Jerusalem (27.9%), and Haifa (23.2%)—respondents could select more than one location—and abroad, where 15.6% of the respondents resided.

### The Ritualistic Spirit of the Israeli Social Protest

We demonstrate the ritualistic characteristics of the protest using the data we collected.

**A. Continuity: frequency, location, fellow protesters.** The protest continued for a very long time (January 2023–October 7, 2023) and took place in 150 locations; it is estimated that about 4% of Israel's population took part at one time or another. This percentage is important since, based on research by Chenoweth and Stephan,<sup>b</sup> once 3.5% of the population of a state participates in a sustained protest, its success is guaranteed. Most of the respondents (91.3%) participated in the weekend demonstrations. About half of them (50.7%) participated once a week, and close to a quarter (23.8%) participated at least twice a week in some activity of the protest. Only one-quarter (25.5%) participated in the protest activities less frequently than once a week. In terms of locations,

63.4% participated in demonstrations that took place in their area of residence, and 28.4% participated in protests both near their homes and elsewhere. The 150 demonstration locations spanning the entire country allowed people to maintain the ritual since a close location was always accessible, requiring neither a long commute nor any expenses. See Barberá et al.<sup>c</sup> for a discussion of the critical role of the periphery in the growth of social protests.

We asked the respondents to describe the specific location they usually stand in during the demonstration itself: More than one-third (36.3%) replied that they stand in the same place and about the same percent (38.5%) answered that they sometimes stand in the same place, and sometimes not. When asked who they go to the protests with, 77.7% answered that they often go with the same people (family or friends). Indeed, going to the same place once a week, at the same time (Saturday night), with the same people, and standing in the same spot, is nothing but a ritual.

**B. Symbolism: vocal elements, items, emotional engagement.** Rituals frequently incorporate symbols that hold meaning for the participants. In our case, although the protest was considered an anti-government protest, the protestors adopted national

<sup>c</sup> Barberá, P. et al. The critical periphery in the growth of social protests. *PLoS ONE* 10, 11 (2015). <https://doi.org/10.1371/journal.pone.0143611>

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<sup>a</sup> Turner, V. *The Ritual Process: Structure and Anti-Structure*. Aldine, Chicago (1969).

### Age distribution of the respondents (n=391).

Age	% of respondents
Up to 20	19.2%
21–40	8.5%
41–60	38.2%
61–80	32.6%
80+	1.5%

<sup>b</sup> Chenoweth, E. and Stephan, M. *Why Civil Resistance Works: The Strategic Logic of Nonviolent Conflict*. Columbia University Press (2012).

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## Emotions displayed by participants in a ritual can allude to the significance of the ritual for them.

symbols that highlighted the emotional connections of the protesters to the protest messages.

We asked several questions regarding the different parts of the demonstration, items that protesters felt it was important for them to bring to the demonstrations, and emotional engagement:

1. *Which part of the demonstration is the most meaningful for you?*

For 29.9% of the responders, the speeches were the most significant part, and for 23.9% it was the intermediate chants, whistles, and songs; for 14.9% it was the march to the place of the demonstration, and for 11.8% it was the national anthem.

2. *Important items to bring to the demonstrations:*

An Israeli flag was the item most frequently mentioned as the most important thing to bring to the demonstration. Other objects were placards, shirts of one of the 150 organizations and associations that took part in the protest, and other people (!), as an "item." The "other people" answer is interesting, as it further highlights the spirit of the ritual, which in many cases takes place as a communal activity. More abstract objects mentioned were (positive) energy and "myself," expressed in terms such as my voice, my presence, my participation, and my feeling of belonging.

3. *Emotional engagement*

Emotions displayed by participants in a ritual can allude to the significance of the ritual for them. The emotional engagement expressed in the answers to our questionnaire was apparent. The most common answers to the open-ended question: "What are three feelings you feel when participating in a protest event?" were hope, pride, excitement, and a sense of belonging, as well as concern, anger, anxiety, and sadness. In ad-

dition, when asked why, in their opinion, other people participate, many of the respondents suggested fear for the fate of the nation, a feeling that is highly relevant in our explanation of the new form of protest that arose, as presented here.

### Conclusion: The New Form of Ritualistic Protest

On October 7, 2023, the protest changed its form. Its skilled infrastructure was immediately channeled to civil purposes to support the hundreds of thousands of citizens who were influenced by the war. Among these channels and activities we mention the War Room, opened to track kidnapped and missing people; the shift in the activities of the Brothers in Arms organization; the Restart-Israel website, which changed its focus from the protest to the civil and judicial aspects of the war; the demonstrations for the release of Israelis kidnapped and held captive by Hamas terrorists in Gaza (for example, the march to Jerusalem and the Saturday night demonstrations); and many more.

From the ritual perspective, this shift can be explained by the symbols that hold meaning for the participants and lead to their emotional engagement, reflecting the motivation, active ongoing participation, and the general feeling of belonging to a large community they care about and wish to protect.

From a data science standpoint, had we taken this perspective, this shift could have been explained by the fact that thanks to the massive amount of what we call "*ritual data*" collected over the 40 weeks of the protest and demonstrations, first, a predictive machine-learning algorithm could have easily modeled the ritual, and second, using this model, a new instance of the protest, namely a large civic social movement that befits the new situation in Israel, could have been predicted. **C**

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