Planetary Simulation

This report will run a simulation that assigns system information for every planet in the `planets.xml` database so that we can examine how well the simulation produces socio-industrial codes, population, and the like.

First, we read in the XML file. In order to assign colonization variables, we need to know the:

- distance from Terra
- faction type: Inner Sphere, Major Periphery, Minor Periphery, Clan
- year colony founded

We pull data from year 3047, so that we can derive clan factions by original foundings. We determine original year of colony founding by the first faction change from the default faction of `UND`. We code faction type from specific faction codes. The method used here is not safe to be used if the date is changed from 3047 as we only code factions that existed in 3047, not all possible factions. We remove all factions that were `ABN` (abandoned), `UND`, and `NONE`. This removes all of the Exodus Road planets.

The following cases of planets were missing a founding year:

```
##          name       x       y faction  hpg founding_year tech industry  raw
## 2489 Pioche -392.36 -497.51    PIND <NA>            NA <NA>     <NA> <NA>
##       output agriculture distance_terra faction_type
## 2489   <NA>        <NA>       633.6107        Minor
```

After removing missing factions and missing founding year, we have a total of **2275** planets. The maps below show our key independent variable values across diferent planets.
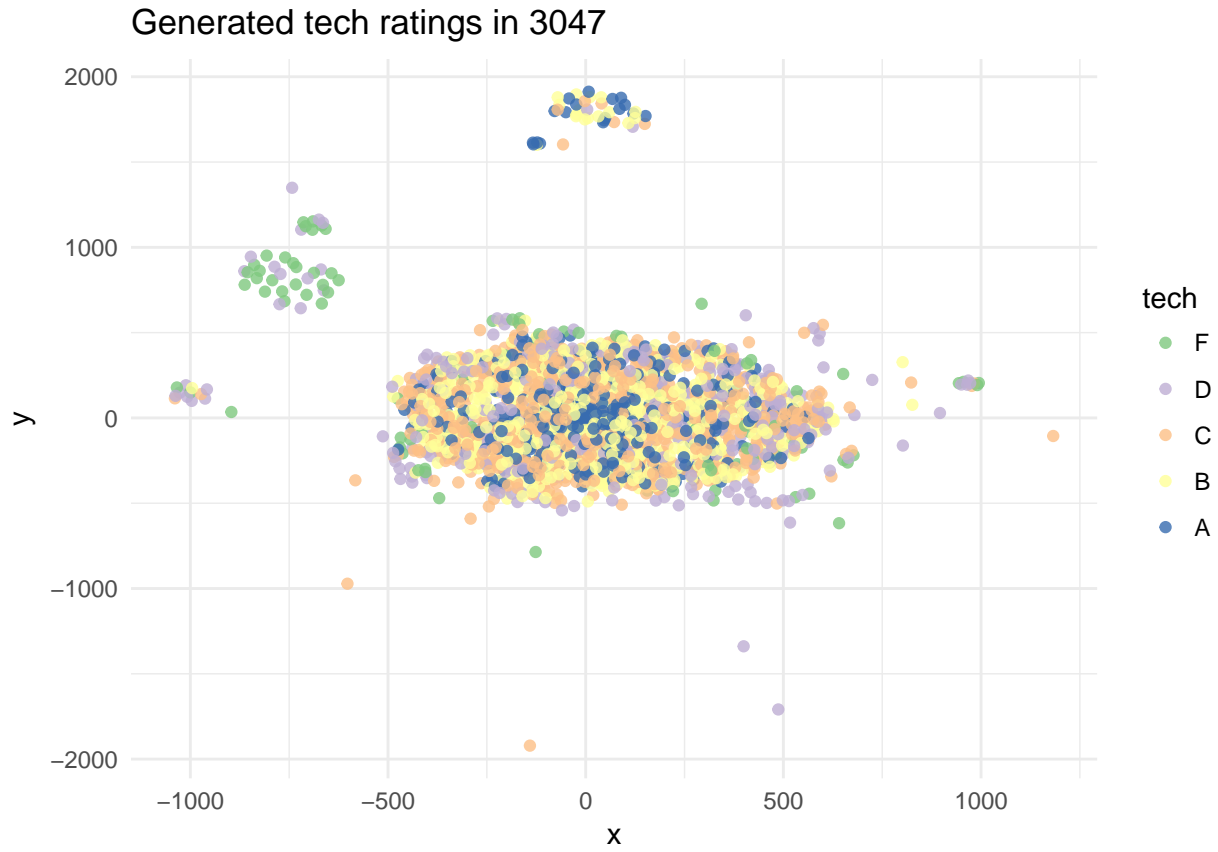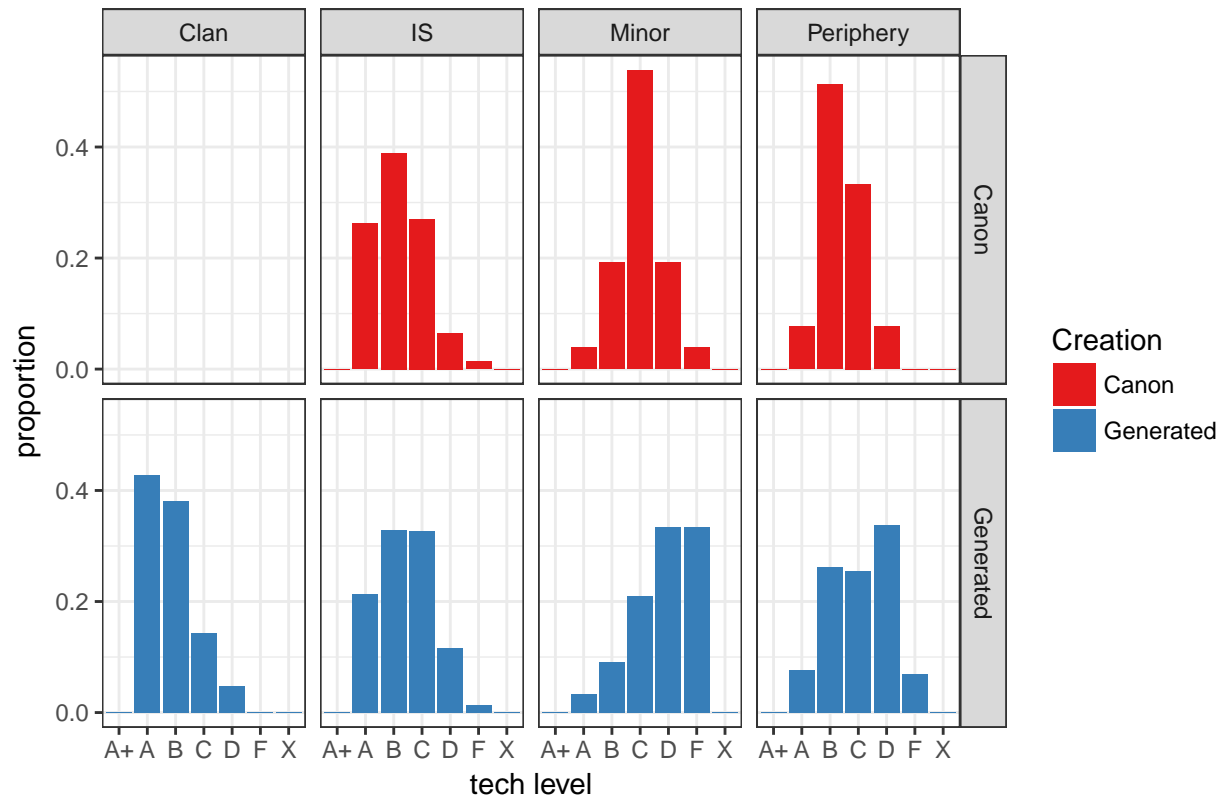
Founding year

Founding year
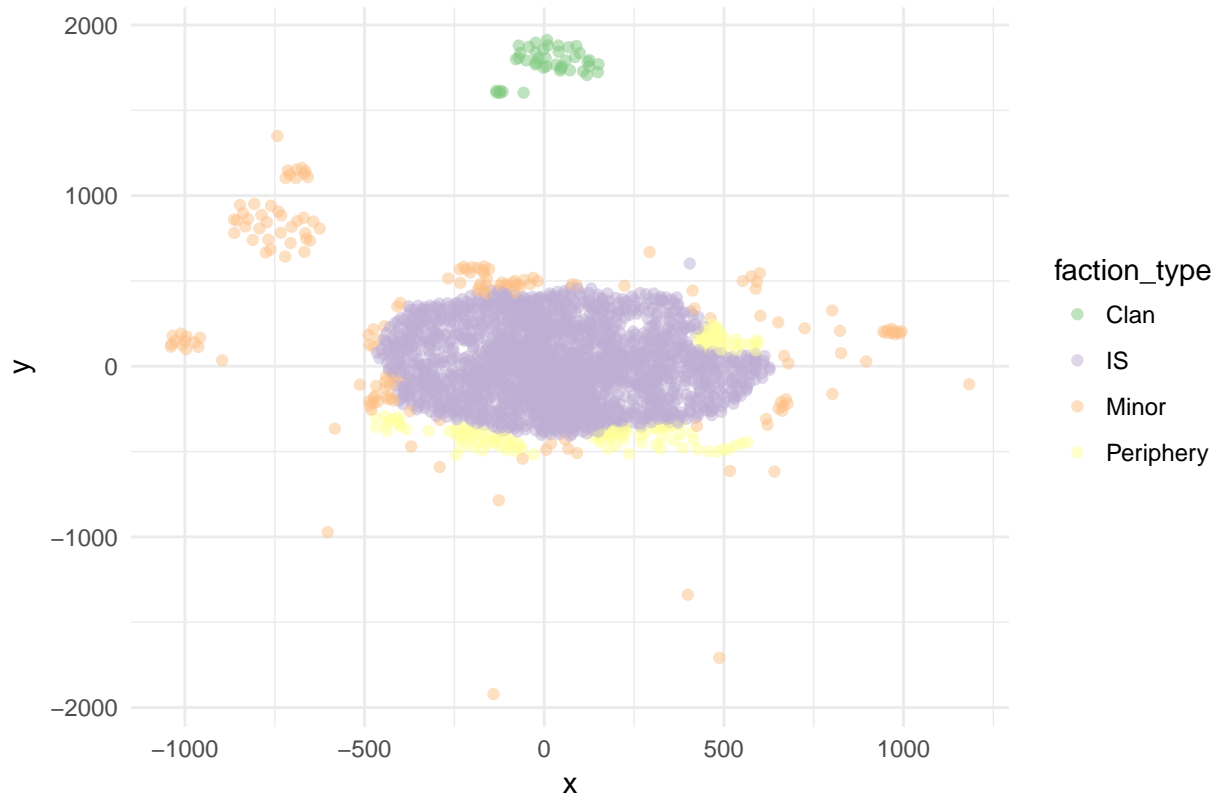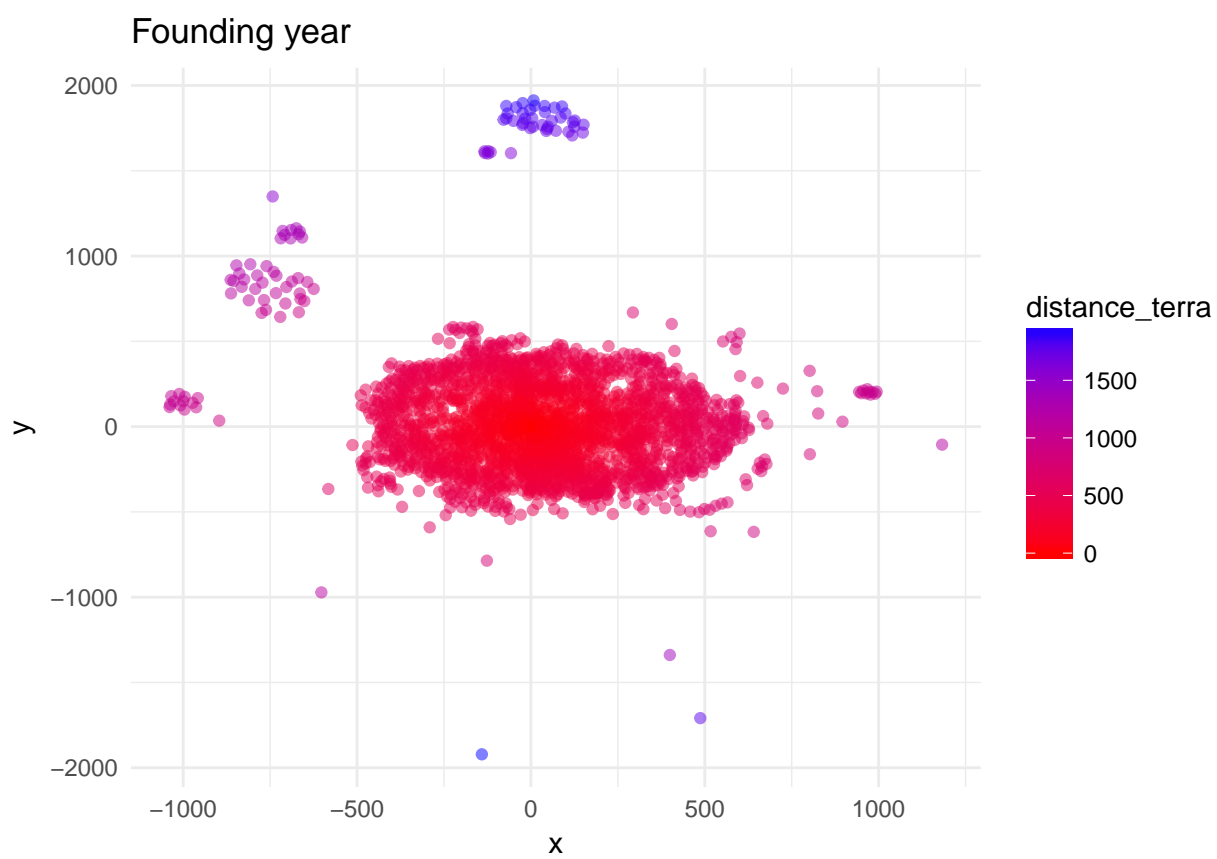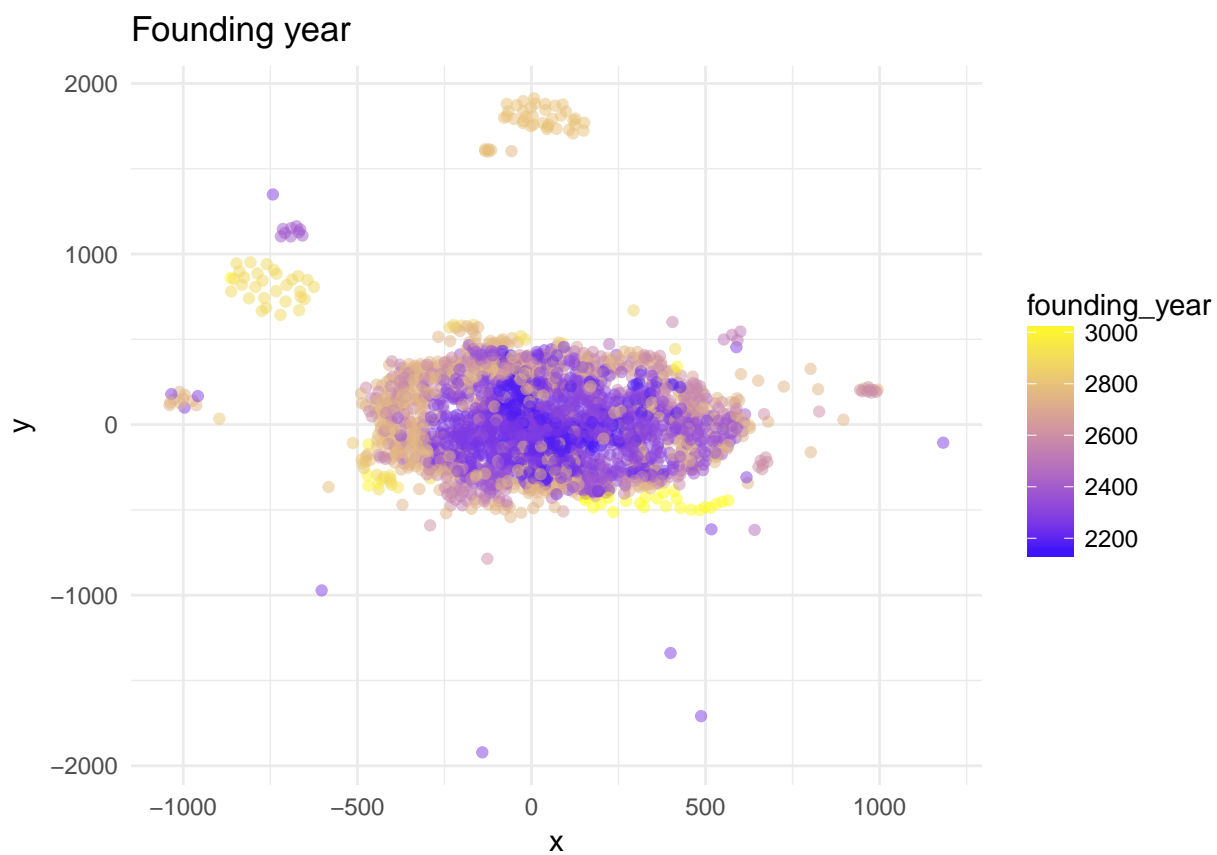
Now, we cycle through every single planet and generate a system complete with astronomical and social data. Now lets look the results.
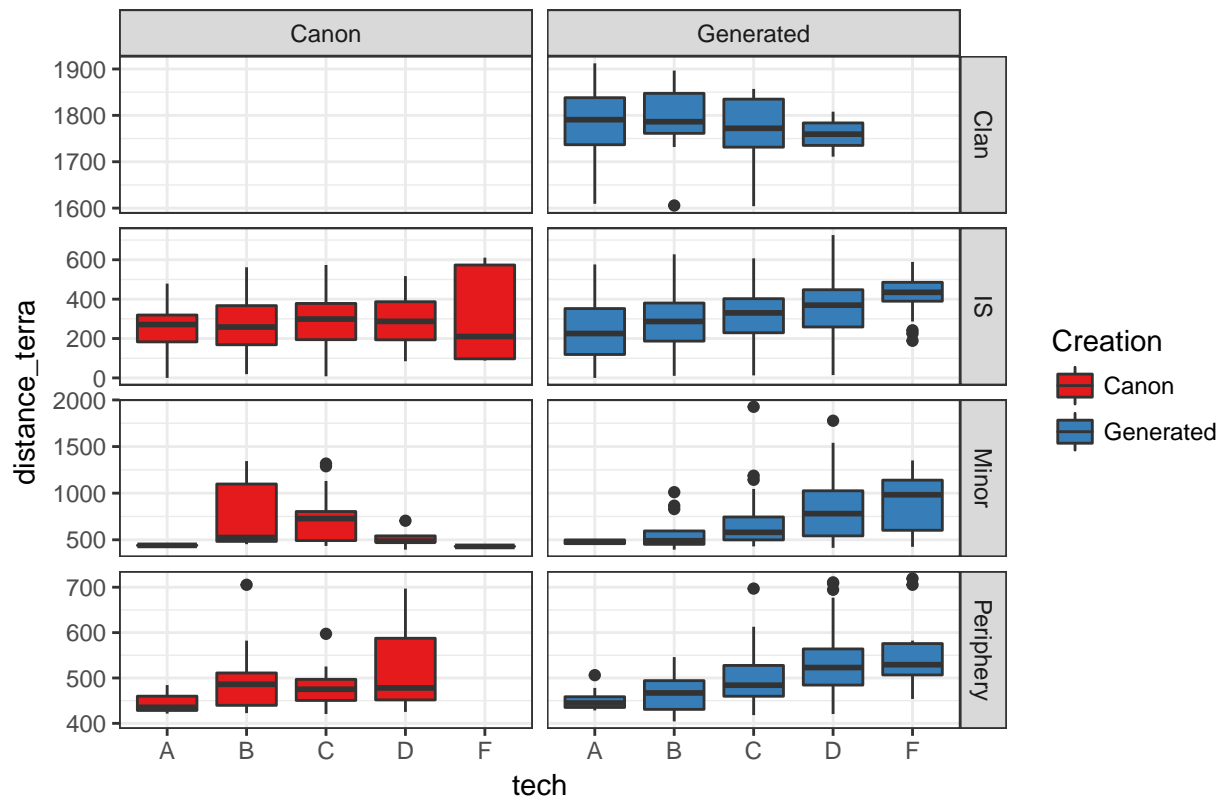
Tech Rating

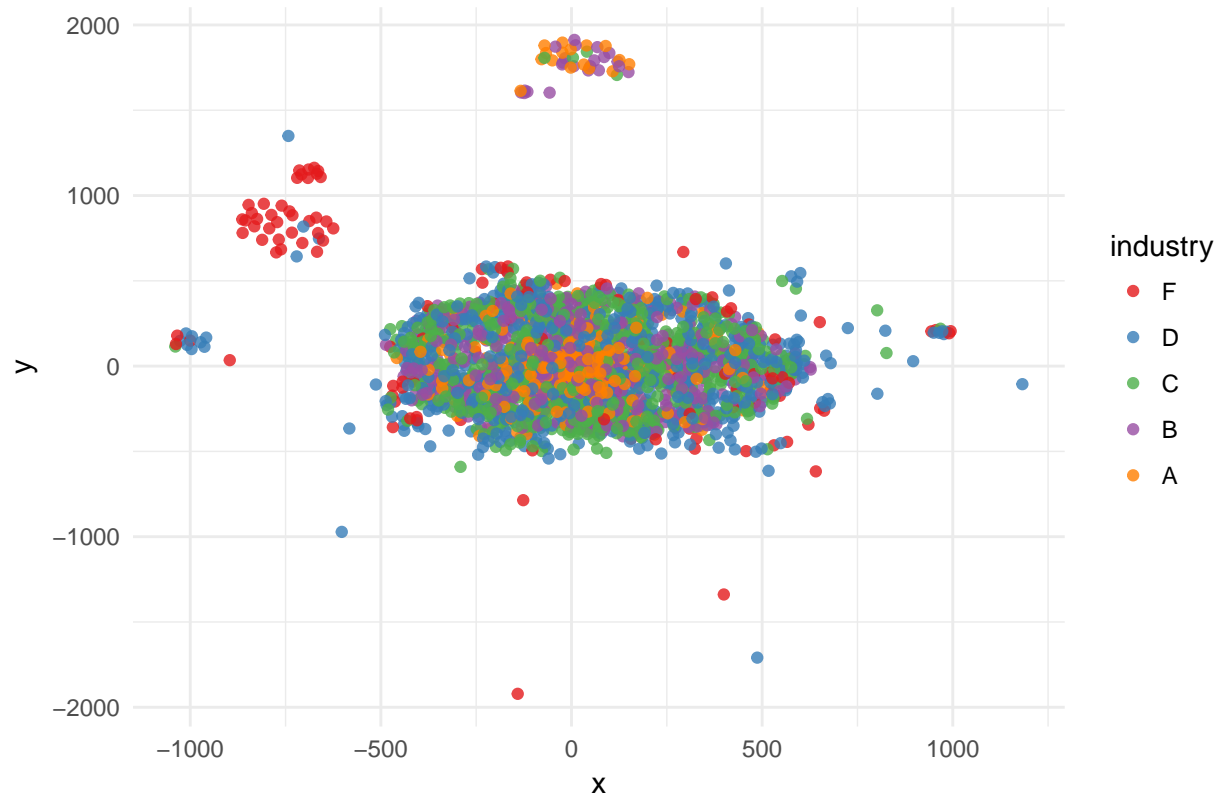Generated tech ratings in 3047

Tech rating distribution by faction type

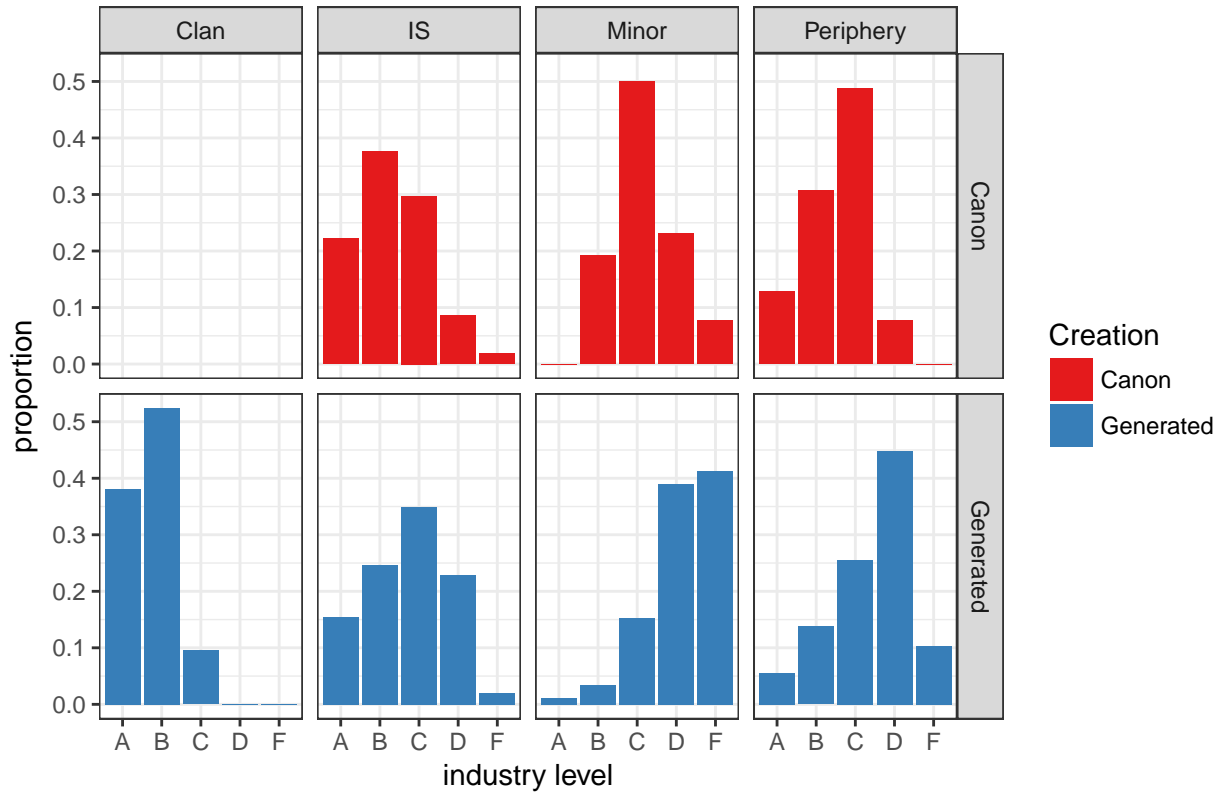## Relationship between tech rating and distance from terra, by faction type
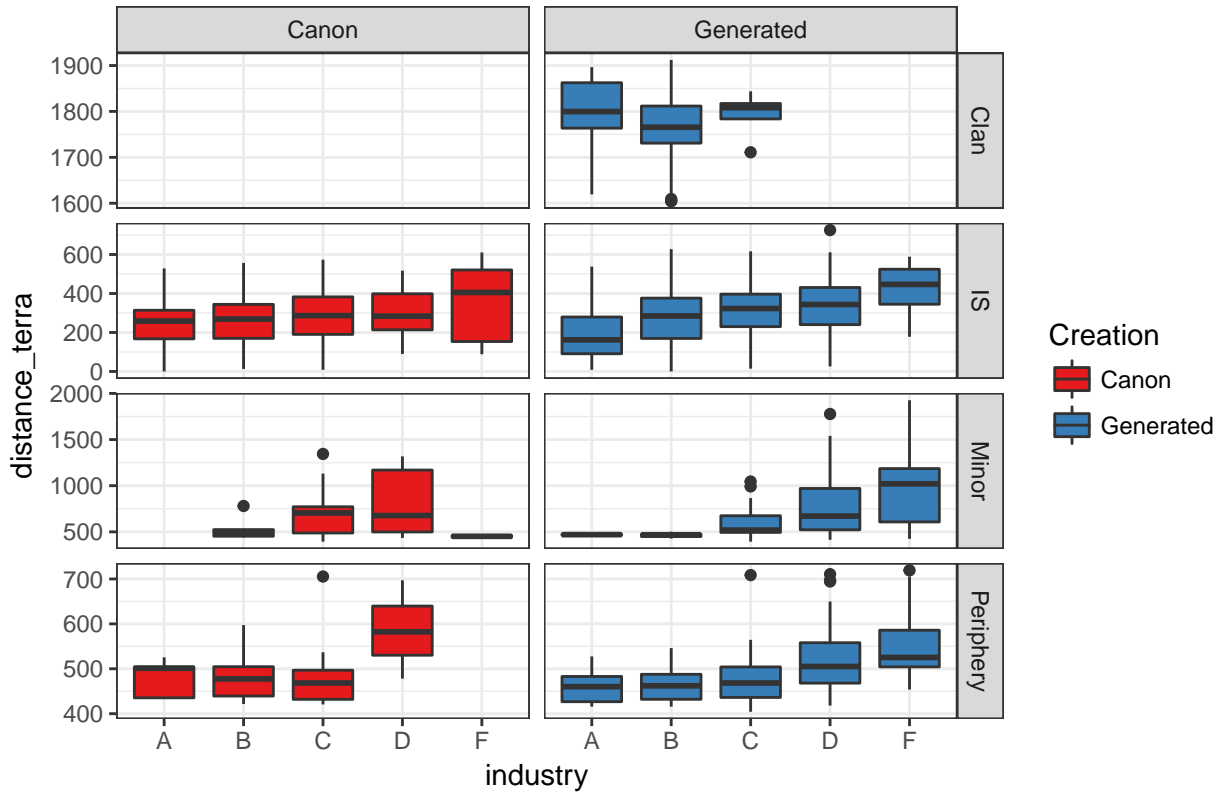
Generated industry ratings in 3047

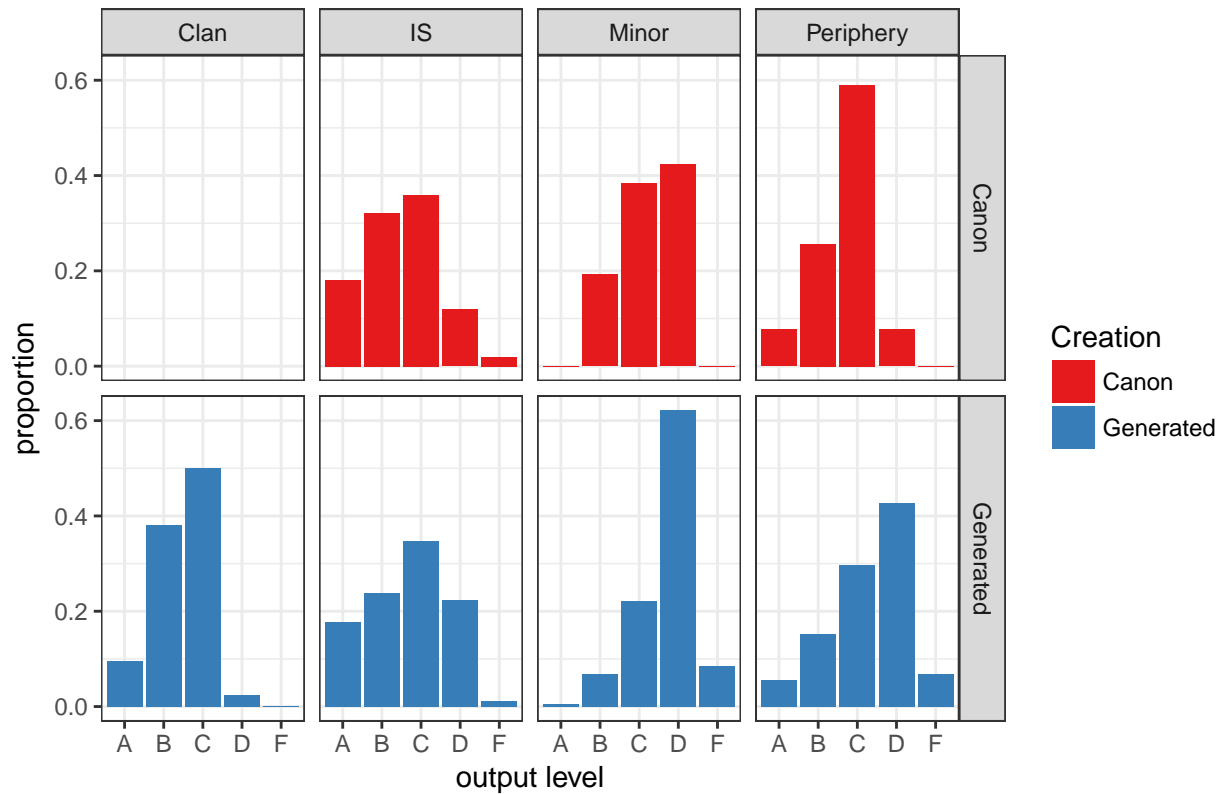# Industry rating distribution by faction type

Relationship between industry rating and distance from terra, by faction ty
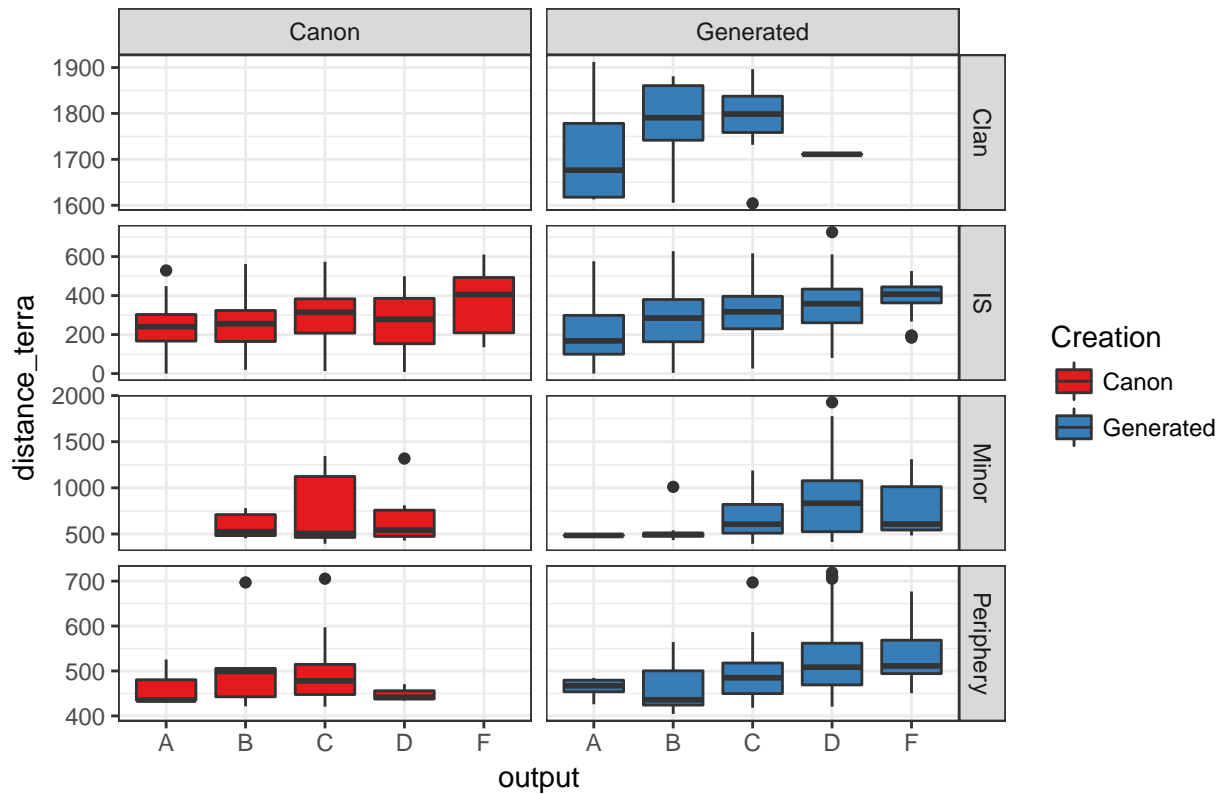
Generated output ratings in 3047
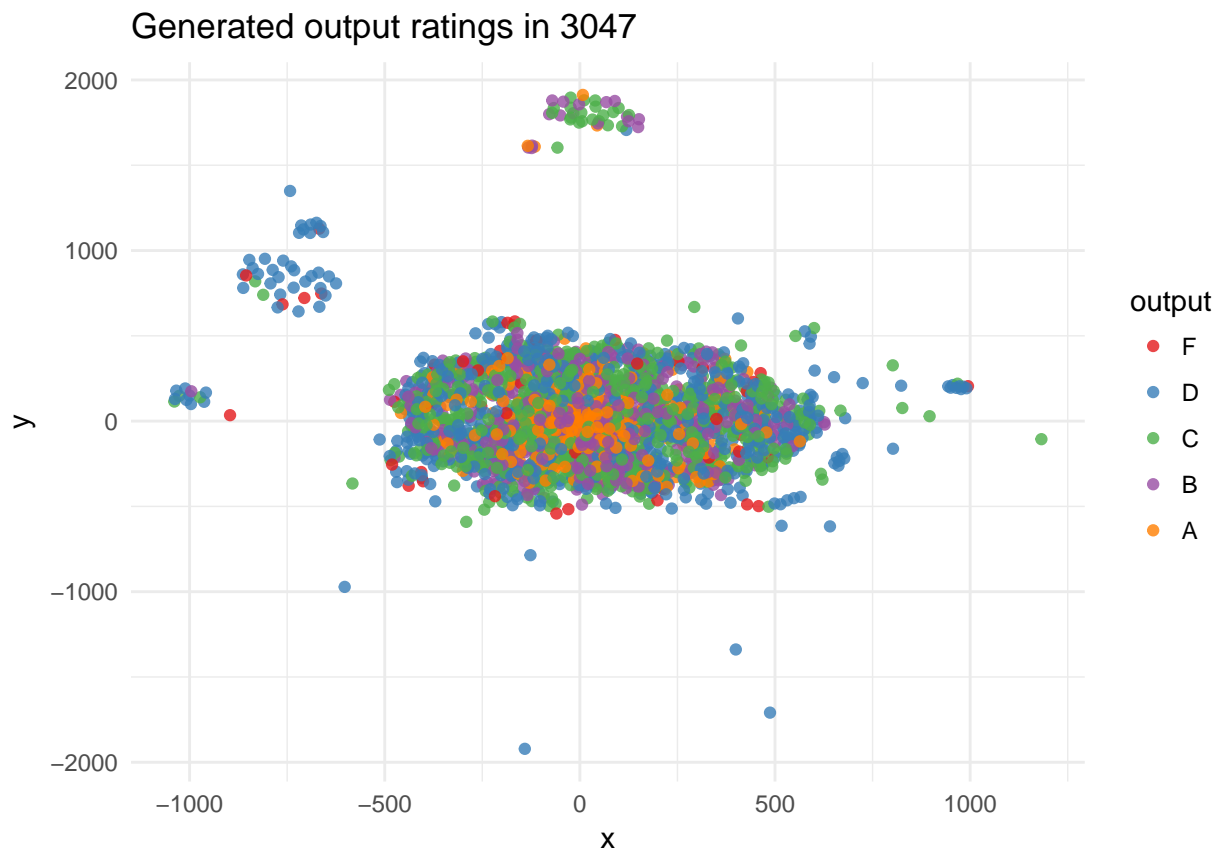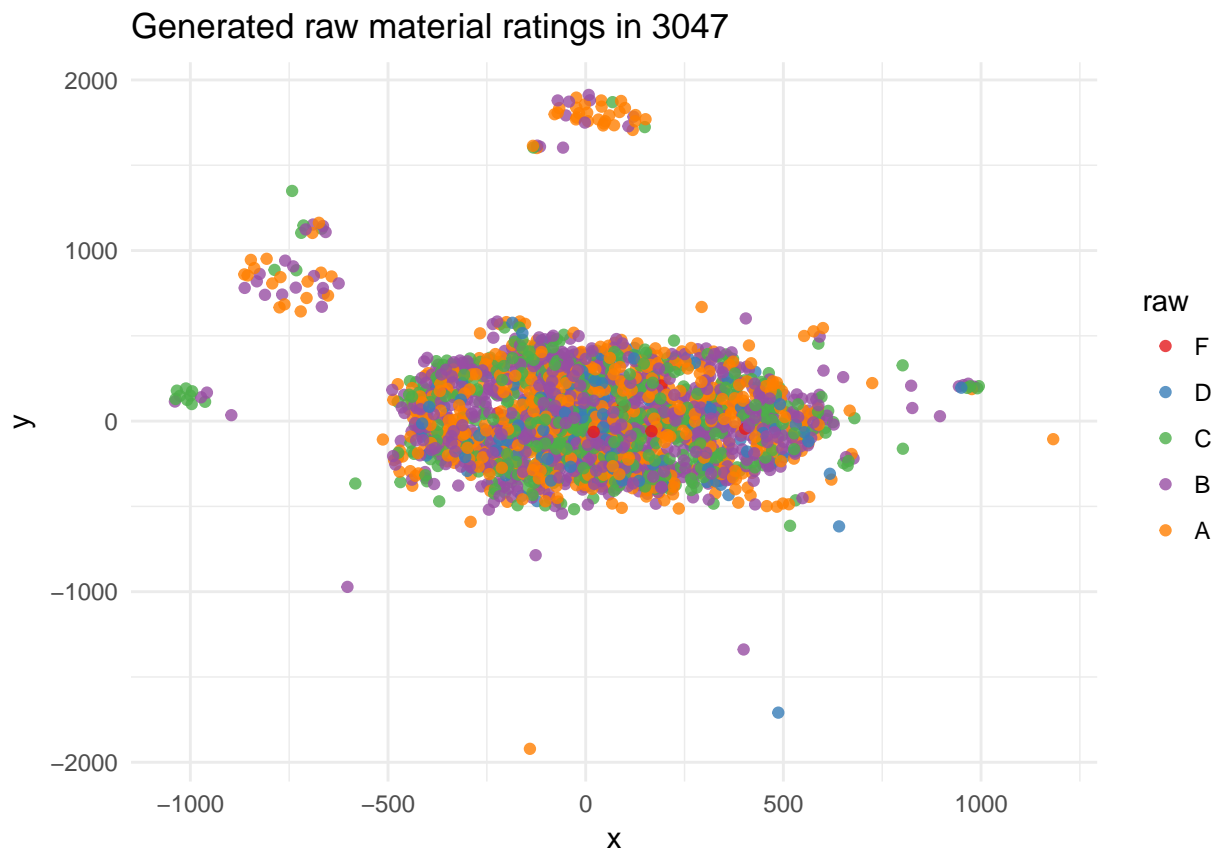
Output rating distribution by faction type

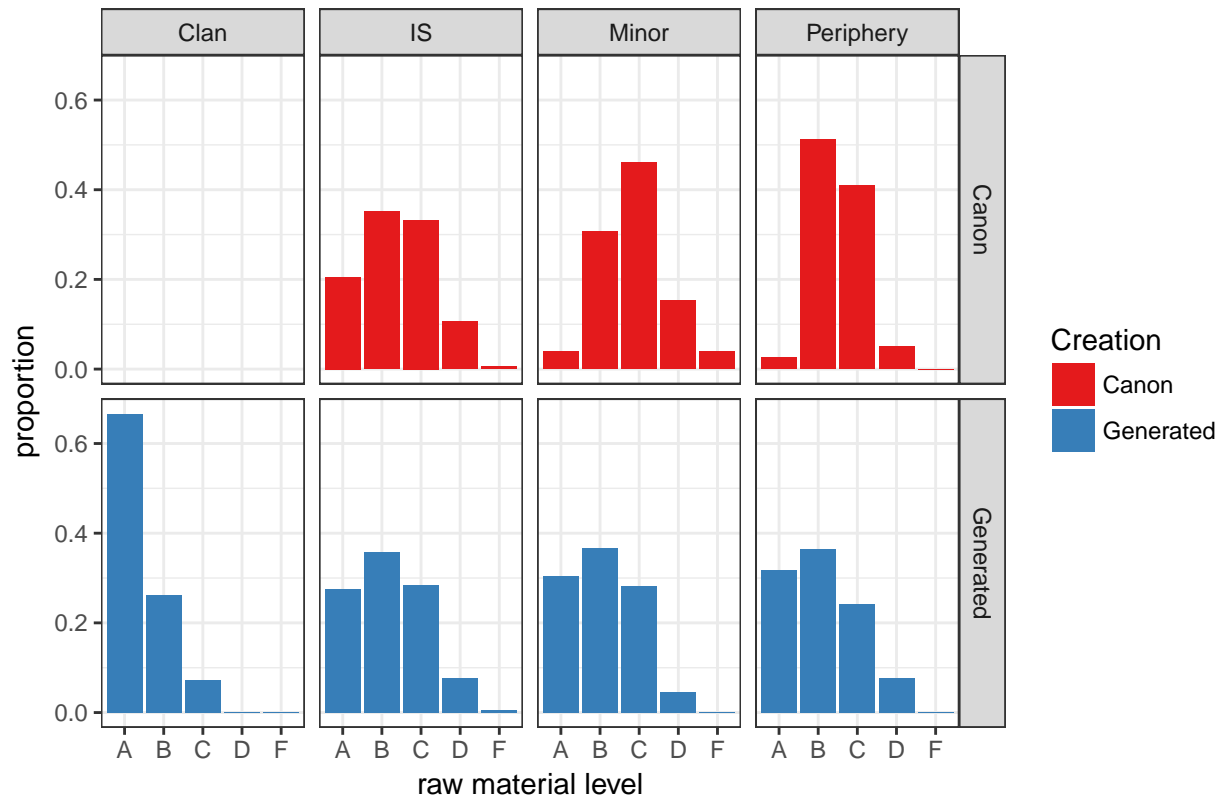# Relationship between output rating and distance from terra, by faction type
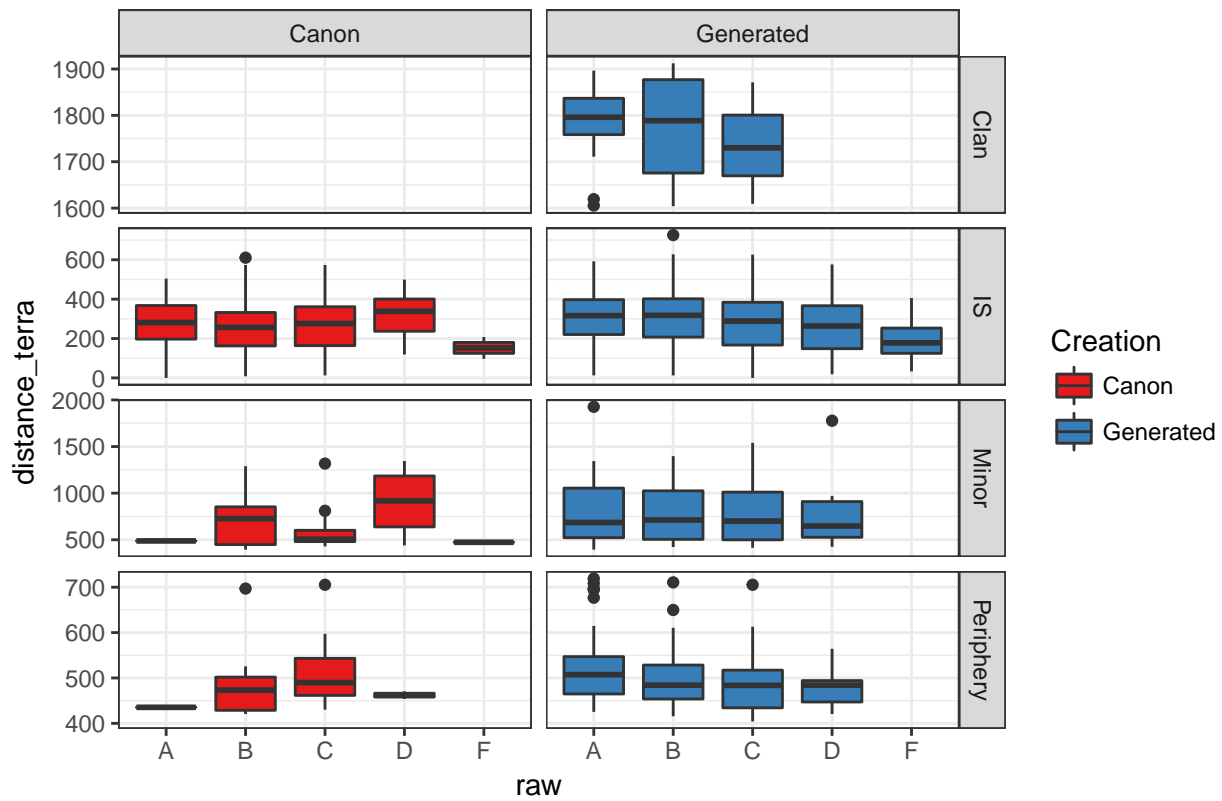
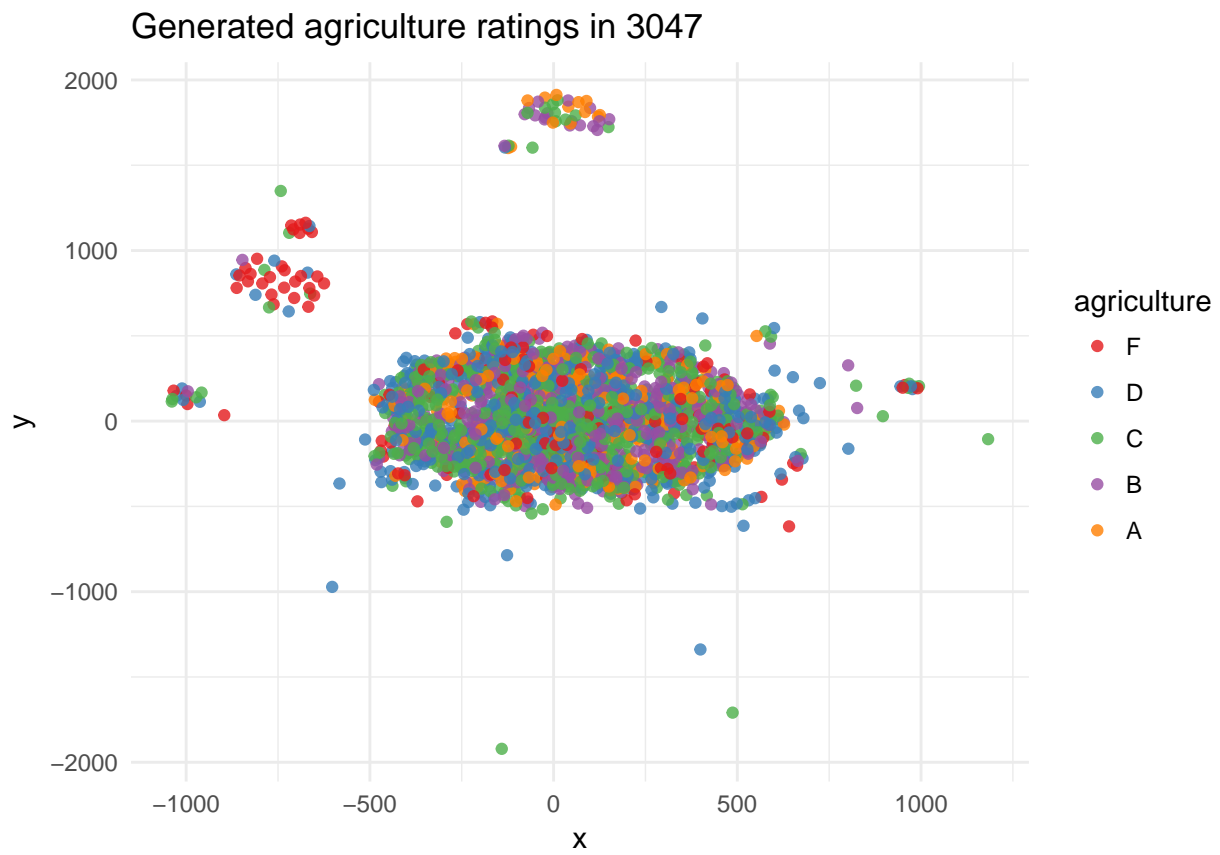## Generated raw material ratings in 3047
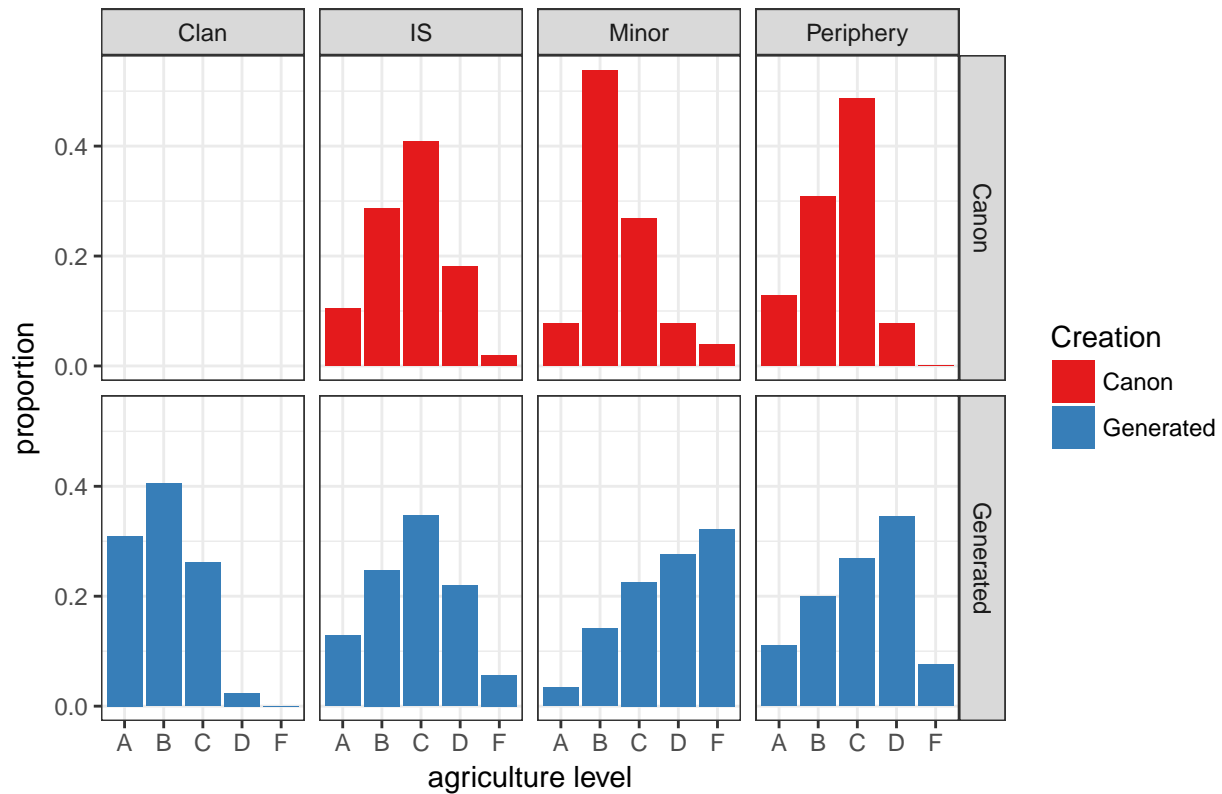
Raw materials rating distribution by faction type

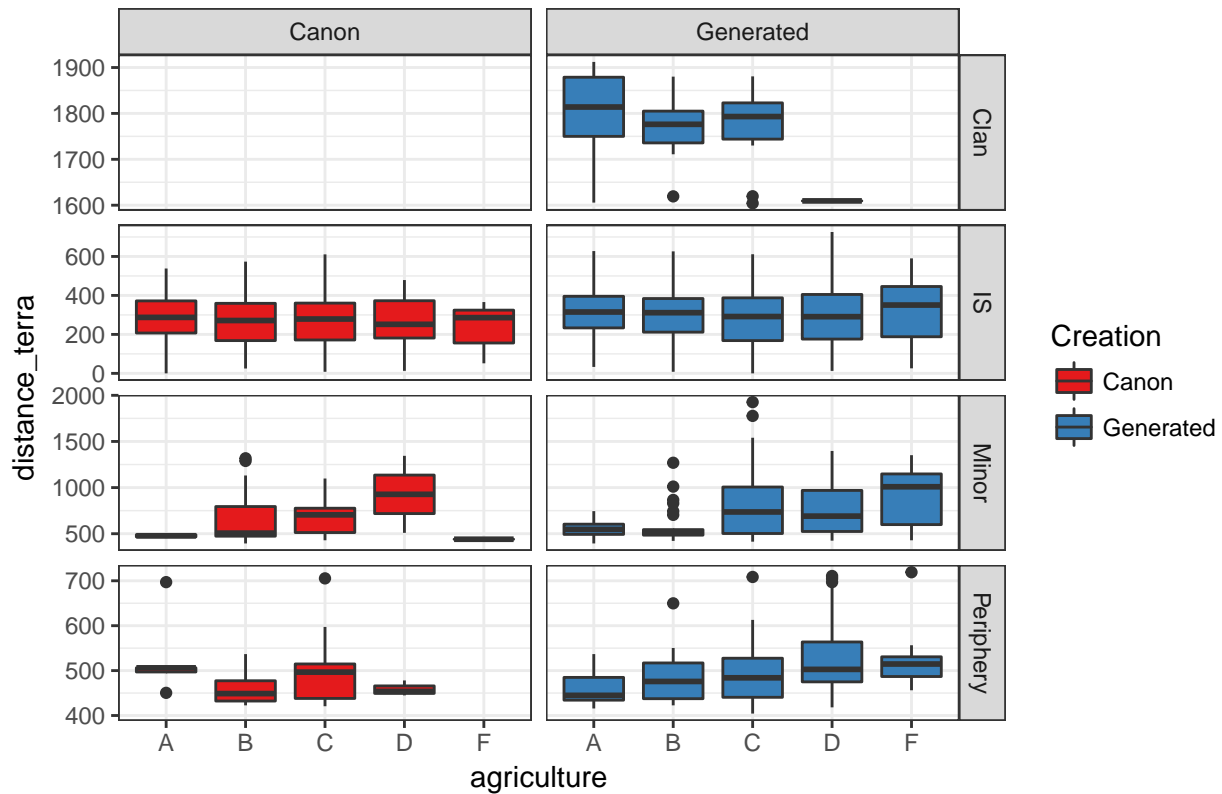Relationship between raw material rating and distance from terra, by facti

Generated agriculture ratings in 3047

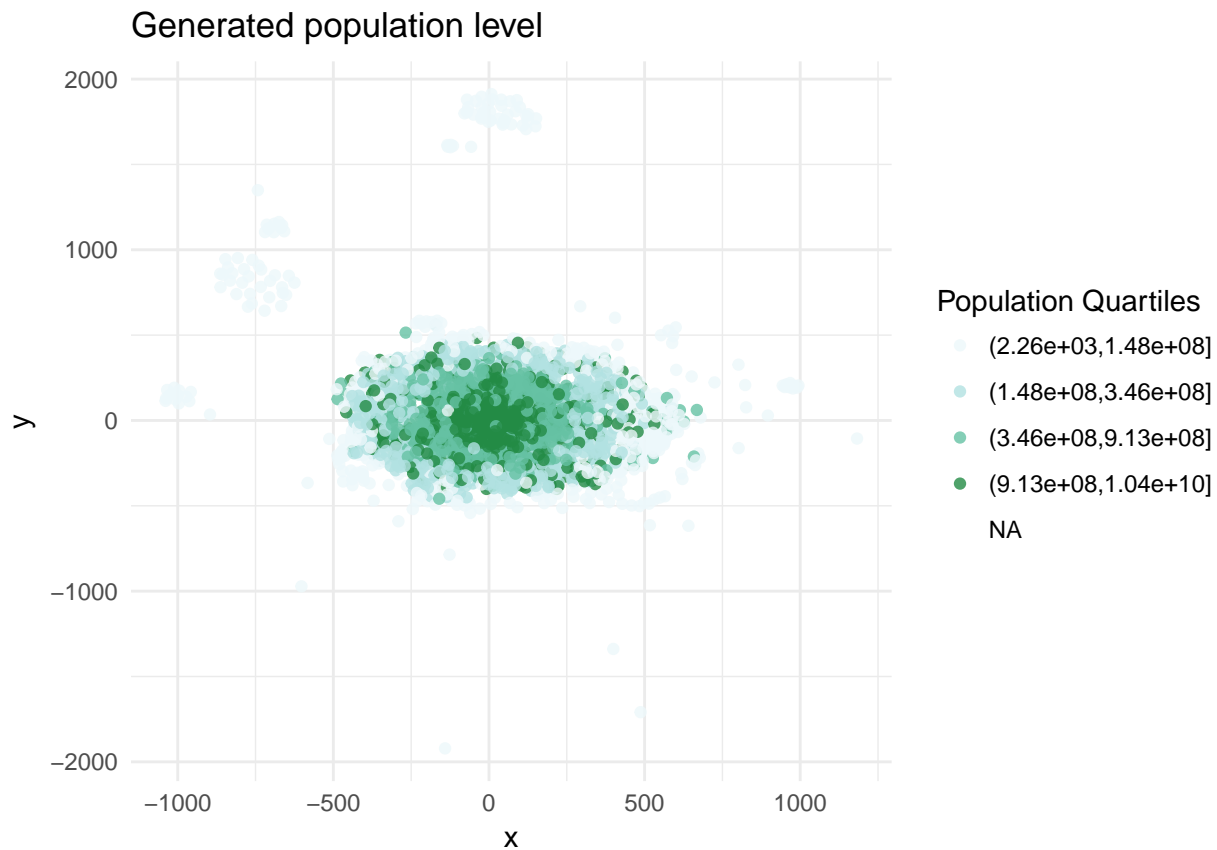# Agriculture rating distribution by faction type

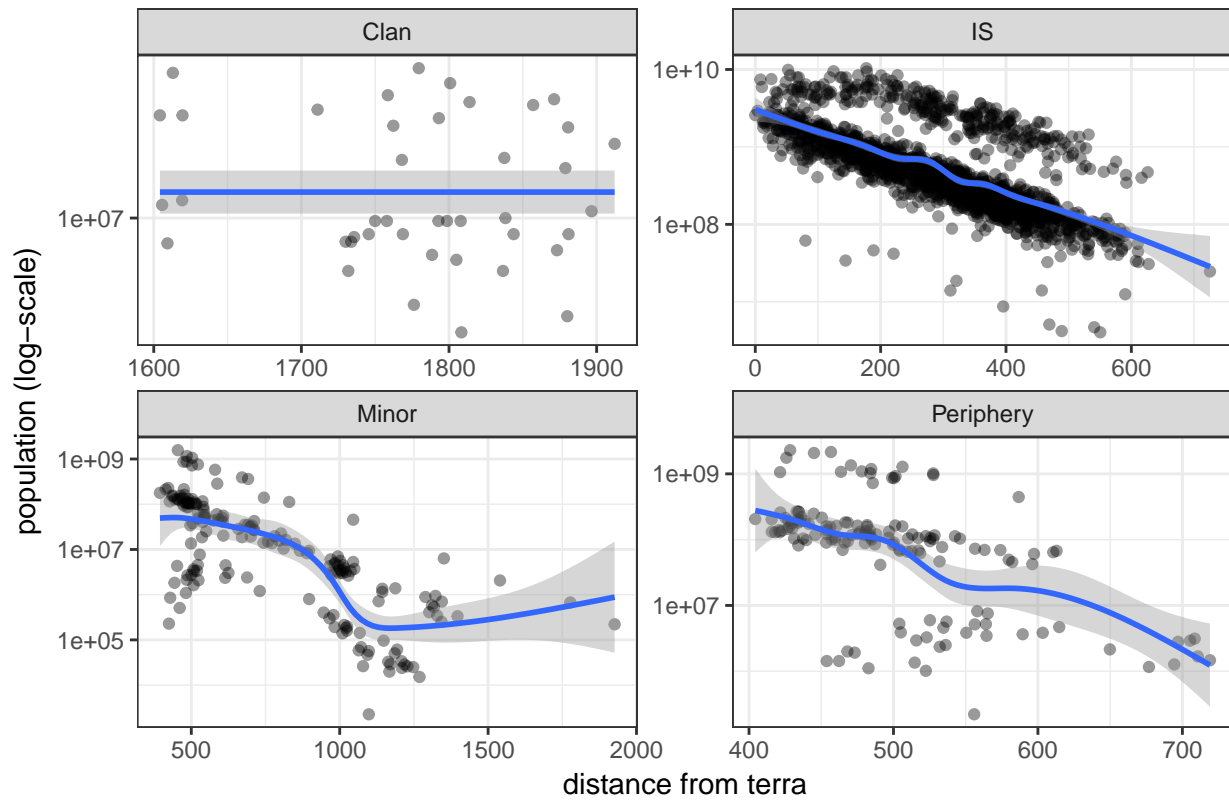# Relationship between agriculture rating and distance from terra, by faction

Population

```
## Warning: Removed 1 rows containing missing values (geom_point).
```
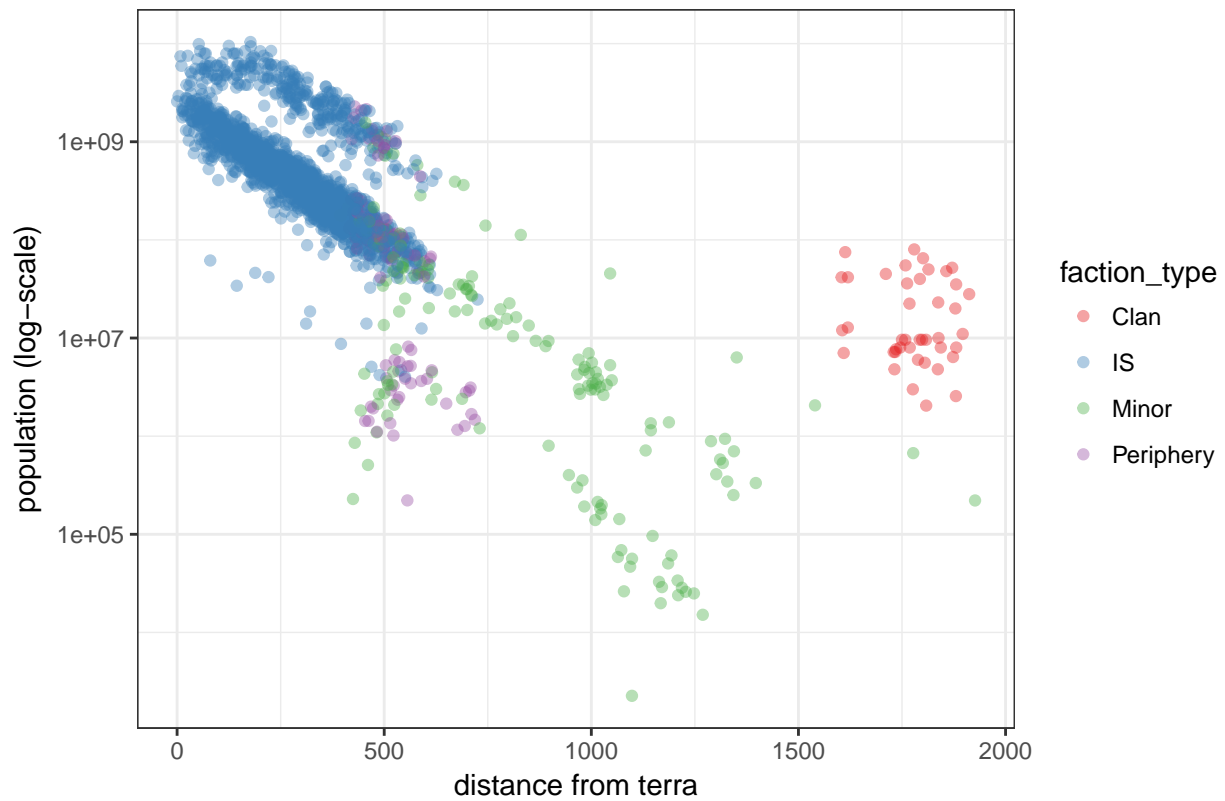
## Generated population level


```
## `geom_smooth()` using method = 'gam'
```

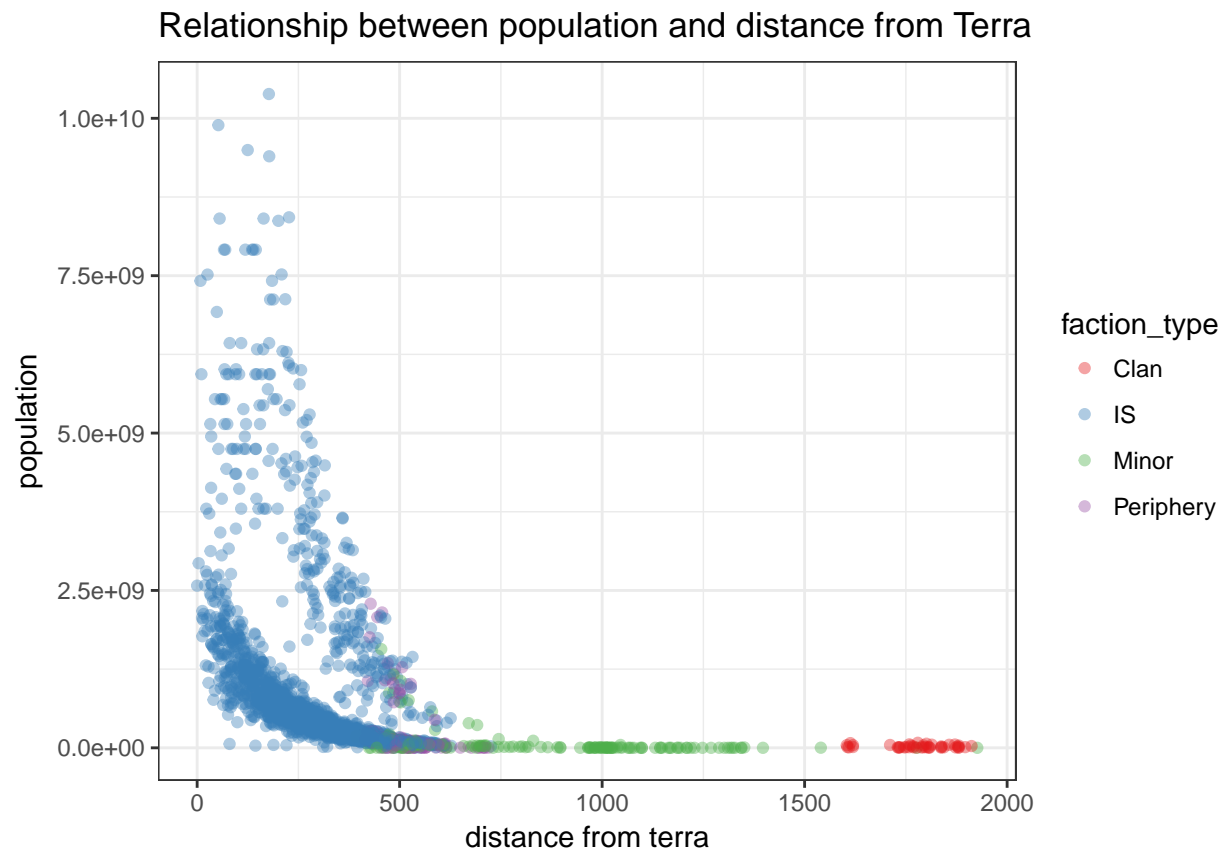# Relationship between population and distance from Terra, by faction type

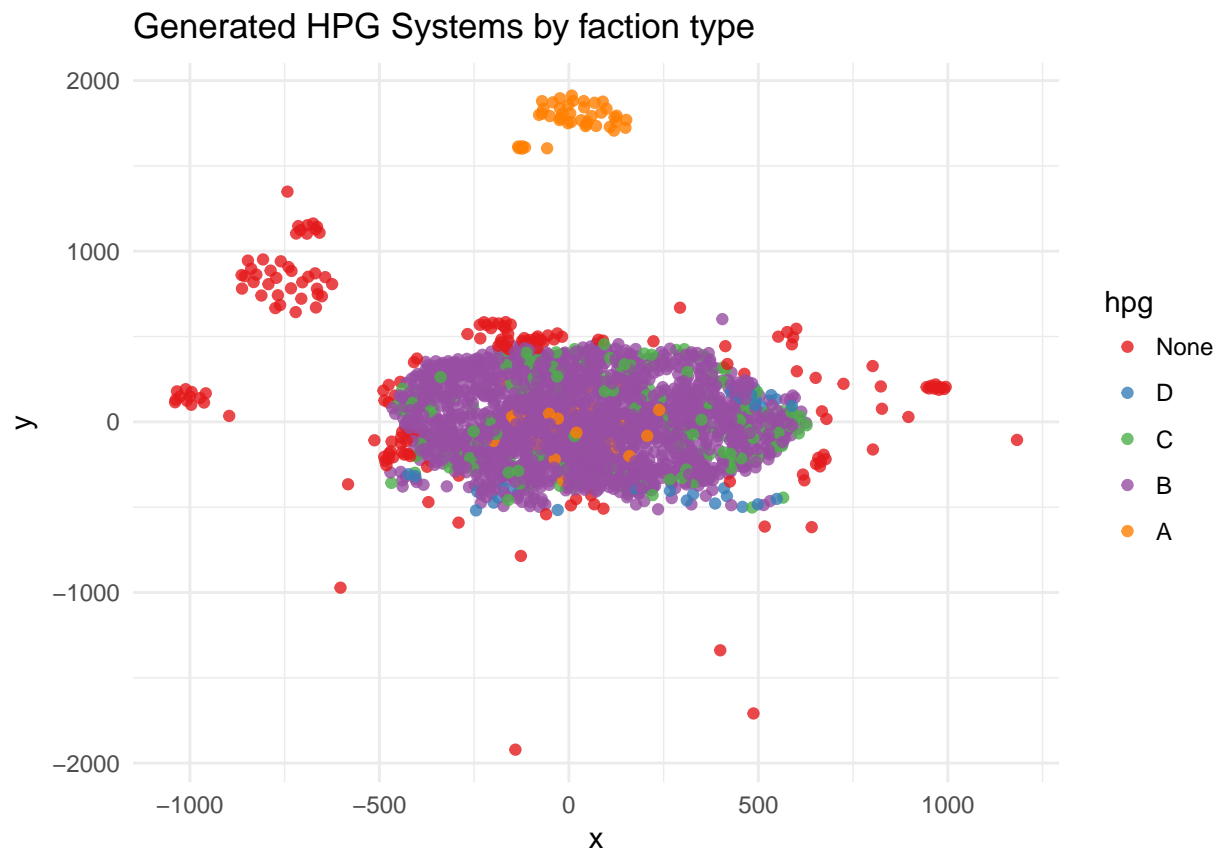# Relationship between population and distance from Terra

Relationship between population and distance from Terra, by faction typ

Relationship between population and distance from Terra
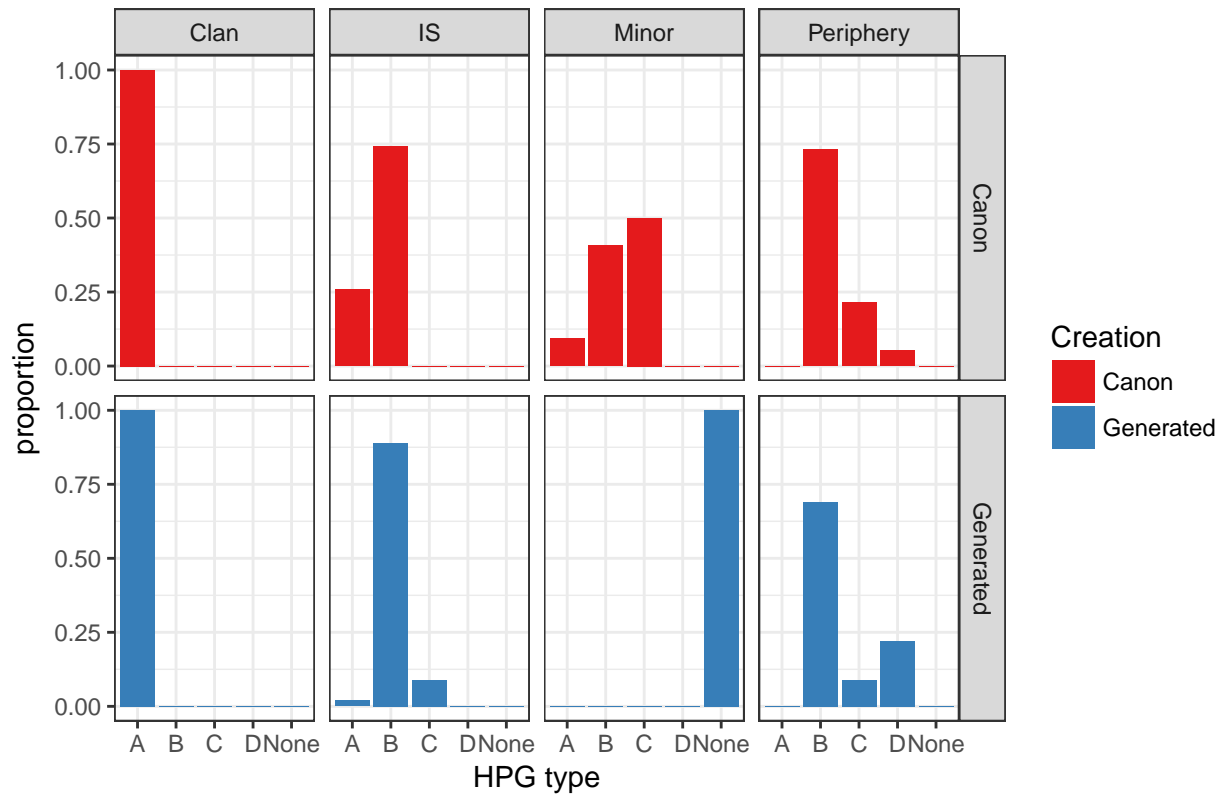
Generated HPG Systems by faction type
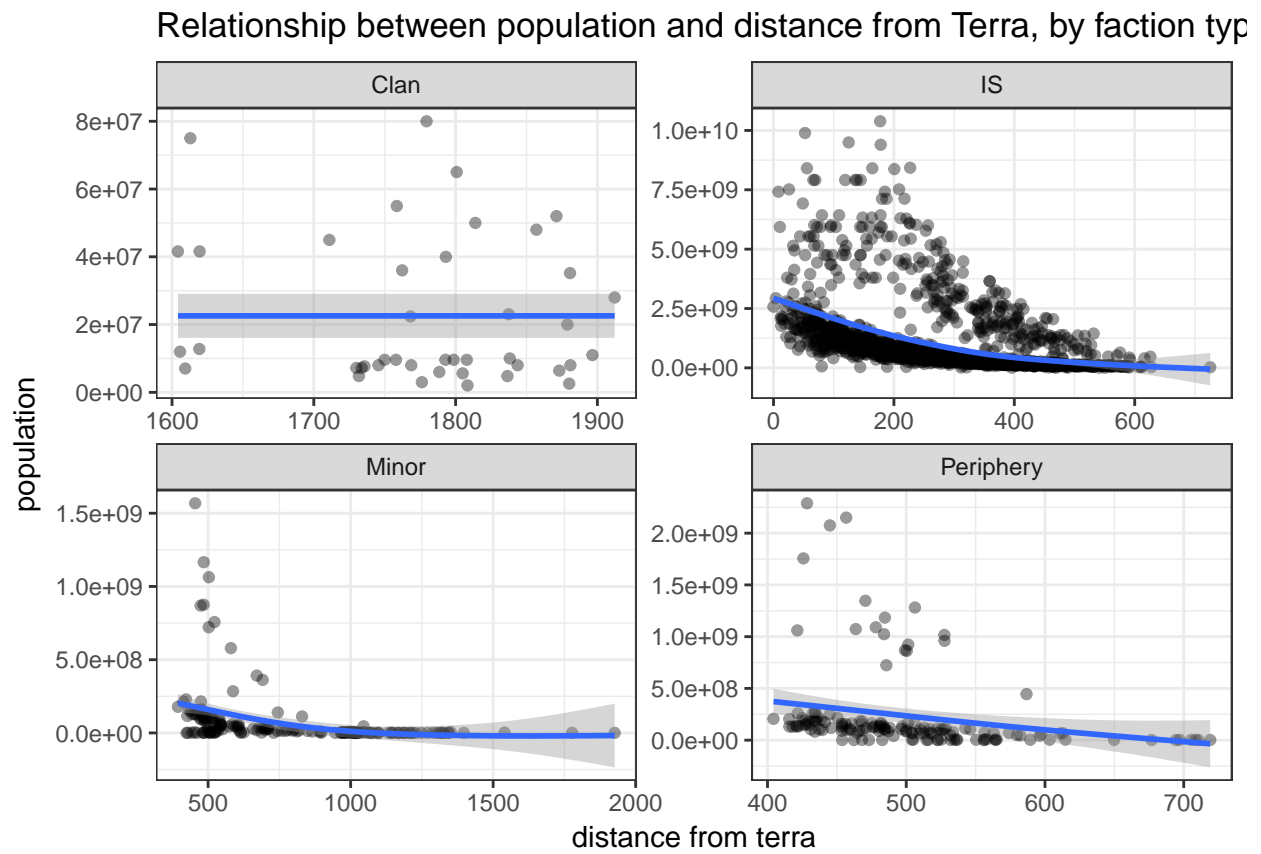
HPG rating distribution by faction type

Relationship between HPG rating and distance from terra, by faction type