WJPC 2023 Stats

Sergei Dakov

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While most people view a jigsaw puzzle as a calming weekend activity; some elect to go the other direction, going against the clock and trying to complete the puzzles as fast as possible.

For the second kind of puzzler the World Jigsaw Puzzle Federation hosts the World Jigsaw World Championships, where puzzlers from across the world compete the find out who can complete a never seen before puzzle the fastest.

The competition has categories for singles, pair and teams of four.

The latest edition of the championship took place on September of 2023, in this document I would like to present some stats about the singles event in that competition.

First, we will need to scrape the data from the results page of the official webpage of the event, to do that we will use the Rvest library

For the different stats, we are interested in the singles finals throughout the years (2019,2022,2023), as well as the classification heats for 2023

General Competition Stats

Over all the event saw attendees from 50 countries, offering strong variety and diversity.

The finals saw 180 competitors from 36 nations, narrowing the field down significantly.

We can compare this to past competitions to see if there was much growth in reach over the years:

In 2019 there were 33 nations.

In 2022 there were 39 nations.

Overall, there is no significant increase in the nations represented in the finals (in fact, this year saw a minor decrease in diversity).

We can further analyze the popularity of the competition (as well as perceived strength) by checking the delegation sizes for each country

```
## # A tibble: 36 x 2
##    country            n
##    <chr>          <int>
##  1 USA               33
##  2 Spain             25
##  3 Germany           18
##  4 Czech Republic     9
##  5 France             9
##  6 Sweden             9
##  7 Poland             8
```

```
##  8 Australia          7
##  9 Netherlands        5
## 10 Hungary            4
## # i 26 more rows
```

The largest delegations (at least in singles competition) are from the USA, Spain, and Germany.

Finals Stats

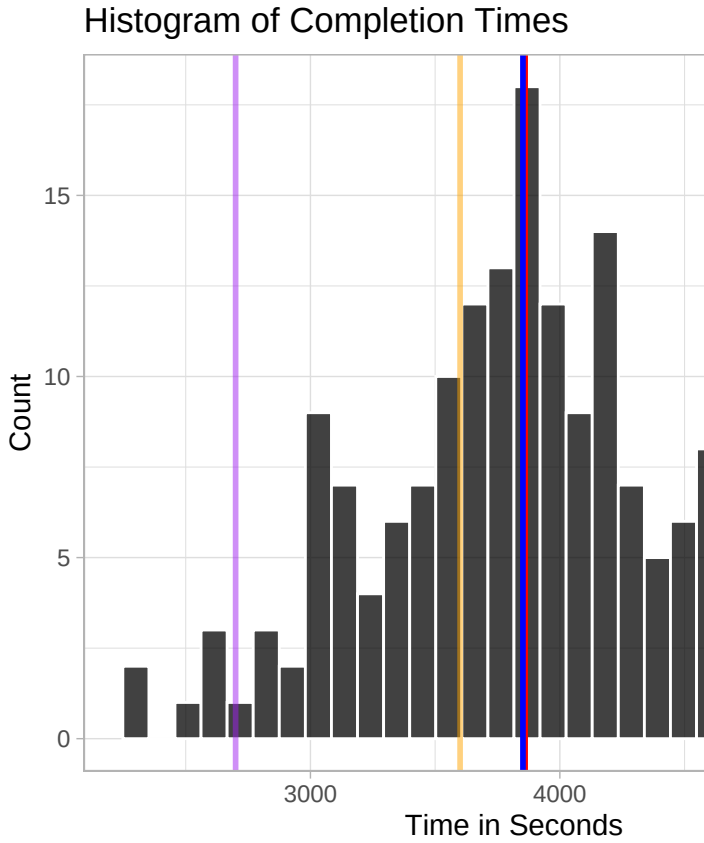
By the rules, all participants have 1 hour and 30 minutes to assemble a 500 piece jigsaw puzzle, the competitors see the puzzle for the first time as the timer begins and the timer includes any preparation time that may be required (such as flipping or sorting pieces).

To complete the puzzle within the time limit contestants must place a piece every 10.8 seconds, which does not leave much time for deliberation.

In fact, for the 2023 finals the average completion time (among the finishers) was: 3860.6534091 seconds, meaning that a piece must be placed every 7.7213068 seconds.

And for Alejandro Clemente León, the winner of the competition it took 2279 seconds, meaning it took him 4.558 seconds per piece; Once again, that is including the time it took to flip and possibly sort the pieces.

Generally, out of the 180 competitors 176 have completed the assignment within the alloted time. We can see the distribution of the completions times in the following graph:



We can see that most people finished in the final half hour, while only an exceptional few managed to finish the puzzle in the first half of the allotted time (only the top 6 participants).

Out of all the countries participating in the final, we can calculate the fastest average completion:

```
## # A tibble: 35 x 4
##    country        completion place     n
##    <chr>               <dbl> <dbl> <int>
##  1 Lithuania           3095   22       1
##  2 Hungary             3203.  33.2     4
##  3 Norway              3260.  49.8     4
##  4 Slovakia            3542.  50.5     2
##  5 Czech Republic      3543.  62.6     9
##  6 Switzerland         3564   61.7     3
##  7 Netherlands         3621.  75       5
##  8 Australia           3646.  70.7     6
##  9 Italy               3731   80.2     4
## 10 USA                 3737.  76.1    33
## # i 25 more rows
```

We can also attempt to assemble "dream teams" for each nation by taking into account only the top 4 times of each nation (as teams consist of four members):

```
## # A tibble: 35 x 3
##    country        completion place
##    <chr>               <dbl> <dbl>
##  1 Spain               2827.  11.8
##  2 USA                 2957.  17.2
##  3 Lithuania           3095   22
##  4 Czech Republic      3040.  24
##  5 Hungary             3203.  33.2
##  6 Germany             3300.  36.2
##  7 Australia           3319   38.8
##  8 France              3421.  42
##  9 Norway              3260.  49.8
## 10 Slovakia            3542.  50.5
## # i 25 more rows
```

We can note that some of the teams in the top 10 are not technically eligible for a team entry, as they have fewer than 4 representatives. If we limit ourselves only to countries with 4 or more finishers we get:

```
## # A tibble: 13 x 3
##    country        completion place
##    <chr>               <dbl> <dbl>
##  1 Spain               2827.  11.8
##  2 USA                 2957.  17.2
##  3 Czech Republic      3040.  24
##  4 Hungary             3203.  33.2
##  5 Germany             3300.  36.2
##  6 Australia           3319   38.8
##  7 France              3421.  42
##  8 Norway              3260.  49.8
##  9 Sweden              3597.  58.8
## 10 Netherlands         3500.  64.2
## 11 Poland              3793   79.8
## 12 Italy               3731   80.2
## 13 United Kingdom      4252  128
```

We can see that there is a general correlation between delegation size and average placement of the appropriate top 4 competitors. Though in many cases large delegations tend to be "dragged down" on average and perform worse than small teams with a single high performing participant.

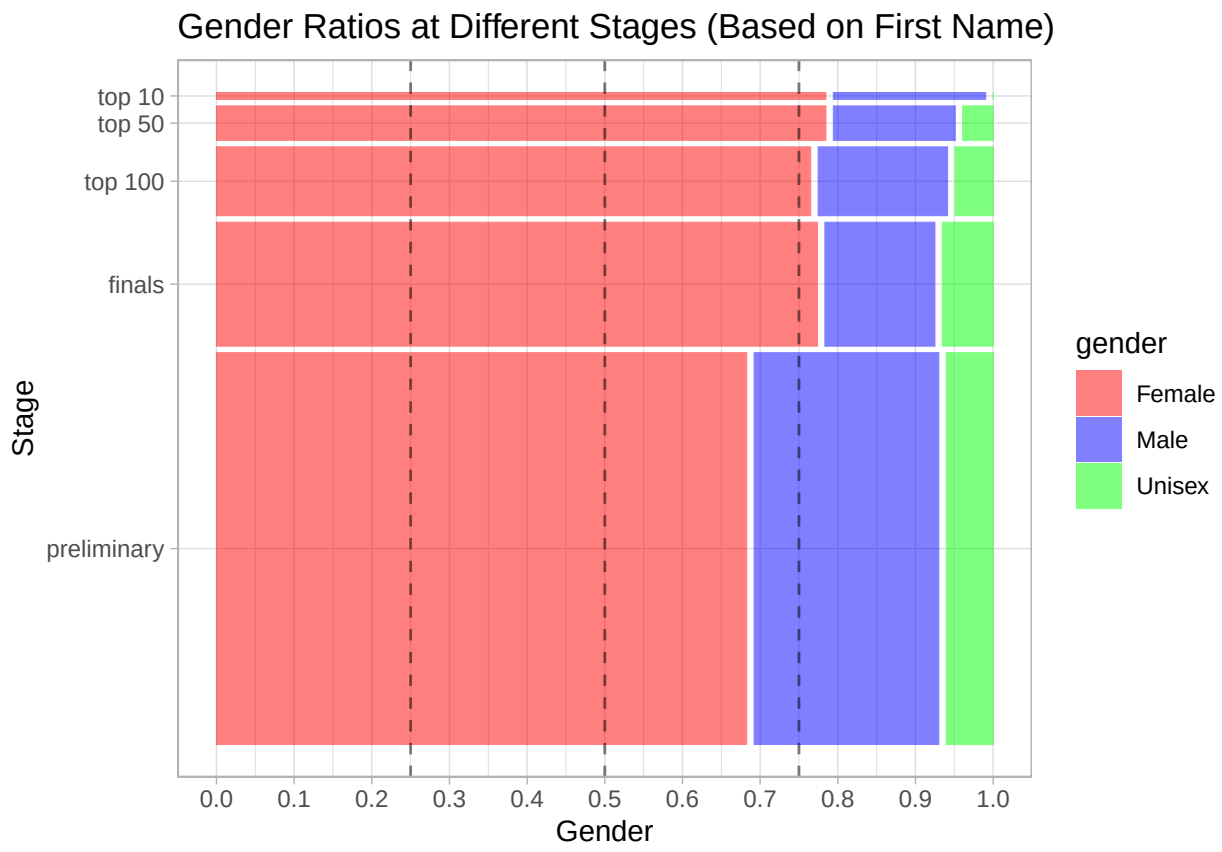
Gender Representation

When watching a stream of the event, one thing that is easily noticeable is the high amount of female participants in the event, including the finals. This is possibly surprising to see as most competitive activities tend to be more male dominant. In part this may be due to the demographics of puzzlers skewing more female in general. Additionaly, some studies suggest that girls are naturally naturally predisposed to be better at solving jigsaws than boys (for example [this] (https://psycnet.apa.org/record/2017-49107-001) study suggests such a relation).

We can observe the demographics in this events, as well as track how they change throughout different levels of the competition (preliminaries, finals, top 100, top 50,top 10). To do this we would need the genders of each participant, this data is not available on the WJPC web page, and there is no guarantee the federation tracks this data at all. As such, this data would be inaccessible, but we can utilize data that is available to us to get an approximation of it - First names!

Using the API and databases of [Behindthename.com] (https://www.behindthename.com/), we can look-up the names of participants and note if they are predominantly male or female names. Of course, there are some possible limitations such as Unisex names or exceptionally rare/unique names, but this should give us a good approximation of the gender ratio among participants. To start we will get the gender for all participant of the preliminary stages, This way we can use the already existing data on the more narrow groups of people (e.g. the finals), by simply cross referencing the preliminary list

Now we can explore the gender ratios through different stages in the event:



We can see that the event has a strong majority of women that is retained through all levels of play (even if we assume all unisex names represent male competitors, we get approximately 70% women)

NOTE: due to the automatic nature of the name gender assignment, it is possible that some error and inaccuracies could be present in the data